Y-PAY-MOR CLEANERS
Federal Way, K.

2210 320th St. S.

november 1992 thru
october 1993 94
NFA 10/22/1998

PRELIMINARY REMEDIAL INVESTIGATION

Y-PAY MORE DRY CLEANERS

Federal Way, Washington

Prepared for

Northwest Building Corporation

W-7883-4,-5,-6

November, 199~~3~~ 2

RZA AGRA, Inc.
Engineering & Environmental Services

AGRA
Earth & Environmental Group

RZA AGRA, Inc.
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23 November 1992

W-7883-4

Mr. John Bickley
Director of Shopping Center Management
Northwest Building Corporation
801 Second Avenue, 1300 Norton Building
Seattle, Washington 98104

RECEIVED
JAN 29 1993
DEPT. OF ECOLOGY

Attention: Mr. John Bickley

Subject: Preliminary Remedial Investigation
Former Y-PAY-MOR Drycleaners

Dear Mr. Bickley:

RZA AGRA, Inc. (RZA AGRA) is pleased to submit this preliminary remedial investigation report for the former Y-PAY-MOR drycleaners. Following your review, a copy of this report should be submitted Washington Department of Ecology in order to satisfy remedial investigation requirements in accordance with Chapters 173-340-350 through Chapter-173-340-360 of the Washington Administrative Code.

We recommend that:

- Northwest Building Corporation review and comment on this preliminary remedial investigation for ultimate submittal to the Washington State Department of Ecology in order to satisfy the remedial investigation requirements per Chapters 173-340-350 through 173-340-360 of the Washington Administrative Code.

- Vapor extraction be utilized as the remedial alternative for site clean-up;

- Vapor extraction remediation design, and permitting should commence as soon as possible in order to contain the residual DNAPL which appears to exist in the near surface site (fill) soils.

- Sample and analyse vapor extraction well point effluent with respect to vinyl chloride presence for engineering design, permitting and health/safety purposes;

- Monthly sampling of groundwater from monitoring wells MW-2 and MW-3 is recommended, for the next six months, due to the fact that aqueous concentrations of cis-1,2 dichloroethene and acetone were detected in apparently downgradient and upgradient monitoring wells MW-3 and MW-2, respectively.

- Soil vapor survey beneath the drycleaner east and south of the explored areas in order to assess whether DNAPL (residual phase tetrachloroethylene) impacted soils persist beneath the former drycleaning facility;

- Passive air monitoring of ambient air in property west of the former dry cleaner;

We appreciate the opportunity to be of continued service to Northwest Building Corporation. If you have any questions please do not hesitate to call.

Respectfully submitted,

RZA AGRA, Inc.

Dale A. Kramer

Dale A. Kramer
Project Scientist

Michael C. Moore

Michael C. Moore
Associate

Preliminary Remedial Investigation

Former Y-PAY-MOR Dry Cleaners

Best Shopping Plaza

2210 320th Street South

Federal Way, Washington

Prepared for

Northwest Building Corporation

1300 Norton Building

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November 1992

W-7883-4

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REMEDIAL INVESTIGATION
FORMER Y-PAY-MOR DRYCLEANERS

1.0 EXECUTIVE SUMMARY

A brief summary of remedial investigation conclusions is presented below:

Washington State Department of Ecology (Ecology) documented release of hazardous fluids (tetrachloroethylene) at the subject site on 4 October 1991 and 8 August 1991. Total volume of documented release reported by Ecology was estimated to be 6 gallons of tetrachloroethylene and an unreported volume of tetrachloroethylene "waste product";

Sparsely distributed zones of residual and vapor phase tetrachloroethylene and acetone components may exist in weathered till/till fracture aperatures and more permeable zones of the native soils.

Site unsaturated zone soils consisting of fill in the west-central area of former dry cleaner exhibit residual and vapor phase components in the areas surveyed, consisting mainly of tetrachloroethylene, and lesser amounts of trichloroethylene, acetone, and cis-1,2 dichloroethene to an approximate depth of 6.5 feet. This depth roughly corresponds to the fill/native soils boundary;

The site is technically classified as a dense non-aqueous phase liquid (DNAPL) site where more-dense-than water fluids have entered the subsurface and now exist as residual phase.

Concentrations of tetrachloroethylene detected in soil samples, which exceeded Ecology's Model Toxics Control Act (MTCA) Method A cleanup levels (for residential and industrial/commercial sites) appear to occur adjacent to the former equipment drain line in the drain line backfill. Soil samples BW-2-1, BW-2-4, B12, S1, and B-12, S2, B-12, S3b and B7, S2 contained concentrations of tetrachloroethylene which exceeded MTCA Method A cleanup levels;

Based on measurements obtained from monitoring wells MW-2 (assumed hydrologically upgradient) and MW-3 (assumed hydrologically downgradient), depth to groundwater occurs at approximately 8.56 feet and 10.93 feet below the top of the casings of monitoring wells, respectively. Actual groundwater gradient has not been determined.

Acetone was detected, in at least one soil sample collected from each boring advanced at both the former dry cleaner structure and upgradient (northeast) of the former dry cleaner;

Laboratory analysis detected 25 parts per billion (ppb) acetone in groundwater collected from monitoring well MW-2 while 7.0 ppb cis-1,2 dichloroethene (DCE) (a possible degradation product of tetrachloroethylene) was detected in a representative groundwater sample collected from monitoring well MW-3;

Based on currently collected data residual and vapor phase volatile organic compounds appear to have migrated more laterally than vertically through the relatively dry, heterogeneous, poorly sorted, more permeable vadose zone (fill) soils; however, sparsely distributed zones of residual and vapor phase tetrachloroethylene/acetone components may exist in fracture aperature and more permeable zones within the native soils below approximately 6.5 feet;

Passive monitoring badges detected vinyl chloride to .477 ppm which indicates that tetrachloroethylene has transformed to vinyl chloride;

Based on RZA AGRA's vapor extraction feasibility testing (Appendix F) and Washington Department of Ecology opinion (Appendix G), soil vapor extraction is an applicable remedial alternative at the site which should be utilized as a primary clean-up option.

2.0 SITE LOCATION AND GENERAL CONDITIONS

The former Y-PAY-MOR drycleaners is located at 2210 S. 320th Street in Federal Way, Washington, in the eastern extreme of the Best Shopping Mall. Figure 1, the Site Location Map shows the approximate location of the site, and the surrounding vicinity.

Site topography is generally flat-lying with an increasing topographic gradient to the east rising approximately 18 feet to 23rd Avenue South from the former dry cleaner. The inside area of the former dry cleaner is paved with a concrete slab which is on average seven inches thick.

Figure 2, the Site and Exploration Plan shows the relative site location, and the location of subsurface characterization conducted outside the former drycleaners. Note that characterization activity inside the former drycleaner is shown in the lower left section of Figure 2. Also note the legend symbols which identifies the approximate location and investigation employed(i.e. drilling, soil vapor sampling).

Site catch basins (storm drains) are located at the northern portion of the site just outside the loading dock, and to the northeast and east (in parking lot) of the former drycleaner.

3.0 SITE HISTORY

The site operated as Y-PAY-MOR drycleaners from approximately 25 November 1985 to 15 June 1992.

3.1 Spill Response

Ecology responded to fluid spills at the former dry cleaners on 8 August 1991 and 4 October 1991. The 8 August 1991 spill reportedly involved 6 gallons of dry cleaning solution, while the 4 October 1991 spill involved an unreported volume of approximately 99.9% tetrachloroethylene "waste product". Appendix A contains copies of these spill response forms.

3.2 Chemical Inventory

Various containers of chemicals were observed by RZA AGRA in the subject site on 17 June 1992. The chemicals noted included: (1) amyl acetate (a dry cleaning fragrance), (2) acrylic lacquer, (3) dye strip, (4) paint and grease remover, (5) boiler water treatment and (6) hydrochem 252 K.

3.2.1 Industrial Solvent Analysis

A white 5 gallon bucket containing approximately 4 gallons of fluid and fluid soaked rags was observed at the subject site inside the former drycleaner. A sample of this fluid was collected and submitted for analytical testing by EPA Method 3810/8015 Modified (Industrial Solvent Analysis). Analytical test results of the fluid yielded 640,000 parts per million (ppm) tetrachloroethylene (PCE). PCE, a chlorinated solvent, is used by drycleaners in the drycleaning process.

3.2.2 Drain Line

The drain line (Figure 2) which trends north-south is located in the proximity of the contaminated soils.

3.2.3 North Catch Basin

The asphalt surrounding the northern catch basin, located just outside the loading dock doors is visibly stained and possibly could have been a release entry point for dry cleaning chemicals. Figure 2 shows the approximate location of the catch basin.

4.0 FATE AND TRANSPORT OF DENSE NON-AQUEOUS PHASE LIQUIDS

The depth of penetration of tetrachloroethylene through the vadose zone is a function of source strength, thickness of vadose zone, pathways, soils stratigraphy, spill strength and a host of other variables. The site falls under technical classification as a Dense Non-Aqueous Phase Liquid (DNAPL) impacted site. DNAPL sites are sites where more-dense-than water fluids have entered the subsurface and reside as residual phase liquids (Feenstra, 1992).

The major component DNAPL at the subject site appears to be the drycleaning solvent PCE with minor components of trichloroethylene (TCE). PCE and TCE have higher than water density, lower than water viscosity and high dissolved phase mobility.

Residual DNAPL was observed in soil vapor survey sample SVS-2A which was obtained from approximately 5 foot depth adjacent to the former drain line in the site fill soils. Residual DNAPL is the source for long term dissolved phase contamination and is formed at the trailing edge of moving DNAPL bodies due to snap-off from and by-passing around soil particles (Kueper and Frind, 1988).

It is important to note that characterization of DNAPL impacted sites requires a conservative approach. DNAPL pools and residual zones can occur far from suspected release points. Moreover, soil sample analytical test results and dissolved phase concentrations in groundwater can show absolutely no consistent trends in space and time (Feenstra, 1992).

It remains unknown if pools of DNAPL persist in the subsurface. If the documented spills discussed (section 3.1) are the only spills which occurred at the site, then possibly, thin pools could exist in the subsurface. If, larger volume spills of PCE have occurred than those documented, then thicker pools of DNAPL could occur in the subsurface.

Finally, a component of the PCE present in the site subsurface may have undergone biotransformation to vinyl chloride. Passive monitoring badges which were worn by site personnel and attached to the drilling rig, during exploration detected .477 ppm vinyl chloride in the ambient air space of the exclusion zone over approximately a ten hour period.

5.0 EMERGENCY RESPONSE PROJECT DESCRIPTION

RZA AGRA responded to the subject site on 9 June 1992 to assess local subsurface conditions. Four borings (BW-1 through BW-4) were drilled beneath the west-central area of the subject site to depths of approximately 20 feet (Figure 2). One boring (BW-2) was completed as a 2 inch (ID) monitoring well identified as monitoring well MW-1. Monitoring well MW-1 was subsequently abandoned to 8 feet on 28 August 1992 due to the fact that the well was separated at the stainless steel well screen/PVC interface. A stainless steel, slotted (.010 inch) vapor well was installed in the boring of former monitoring well MW-1 to approximately 8 foot depth on 28 August 1992.

5.1 Emergency Response Soils Analytical Test Results

Table 1 summarizes the analytical test results of soil samples obtained from borings BW-1 through BW-4. Note that the shaded values in Table 1 indicate concentrations of volatile organic compounds which exceeded, MTCA Method A cleanup criteria. Boring logs and analytical testing lab certificates are found in Appendices B and C, respectively.

Soil samples BW-2-1 and BW-2-4 obtained from boring BW-2 contained, 160 ppm PCE and 7.5 ppm trichloroethylene (TCE), respectively. Soil sample BW-2-1 was obtained from a depth of approximately 5.0 feet, while soil sample BW-2-4 was obtained at a depth of approximately 20 feet. Note that these concentrations exceed Ecology Method A cleanup criteria.

MTCA Method A cleanup levels are referenced at the bottom of Table 1. These cleanup levels are tabulated and discussed in detail in MTCA chapters 173-340-740 for soils and 173-340-720 for groundwater.

Other volatile organic compounds detected in soil sample BW-2-1, vinyl chloride, acetone, trans-1,2 Dichloroethene, cis-1,2-Dichloroethene, 1,1,2,2, (tetrachloroethane) and 2-Butonone.

6.0 SITE CHARACTERIZATION/REMEDIAL INVESTIGATION

In order to meet the requirements of remedial investigation as set forth in Washington Administration Code (WAC) 173-340-350, RZA AGRA conducted subsurface characterization beneath the subject site, on 25 through 28 August 1992 and 27 through 28 October 1992.

6.1 Remedial Investigation Work Plan/Quality Assurance Project Plan

RZA AGRA's Remedial Investigation Work Plan and Quality Assurance Project Plan are located in Appendices D and E, respectively. The purpose of these two documents is to identify appropriate investigation methods which augment that data generated through drilling, sampling, and laboratory analytical testing and to ensure analytical test results are representative of existing subsurface soil and groundwater conditions.

6.2 Subsurface Soil Exploration

Exploration boring logs are included in Appendix B; the logs are based on observations and interpretations in the field and include diagrams depicting boring abandonment, vapor point installation and monitoring well construction. The relative densities indicated on the boring logs are based upon drilling action and advancement rate of the sampling spoon, as well as the driving resistance measured during sampling ("blow counts"). The logs also indicate the depths where physical characteristics of the soils change. If the change occurred between sample intervals, the depth of the change was interpreted. Organic materials were noted whenever they were encountered. Figure 2, the Site and Exploration Plan indicates the approximate location of borings B-5 through B-12. Fill soils encountered and sampled during drilling beneath the subject site consisted of moist, medium, dark grey, silt to approximately 7.5 foot depth. In general, at the 7.5 foot depth fill soils became increasingly organic rich. Gravel and sand persist in these fill soils, with gravelly fill occurring in borings B-6 and B-7. Native soils observed ranged from medium, grey sand to stiff silt with varying amounts of sand and gravel.

The fill/native contact generally occurs between 5.0 and 7.5 feet beneath the former drycleaner.The native soils are interpreted to be weathered till grading vertically to non-weathered till. Note that borings B-5 and B-11 were advanced from locations outside the former drycleaner, in apparent hydrologically upgradient and downgradient positions, respectively.

Note that passive monitoring badges worn by site personnel and attached to the drilling rig, during exploration on 27 and 28 October detected .477 ppm vinyl chloride in the ambient air space of the exclusion zone over approximately a ten hour period.

6.3 Soils Analytical Test Results

Samples are designated by boring number and subsequent sample depth from the surface to the bottom of the boring. The media sample is described in the text. Actual depths are shown in the Analytical Test Result Tables. Soil samples obtained during the 25 August to 28 August 1992 period were submitted to the analytical laboratory for analysis of volatile organic compounds by EPA Method 8240. Analytical results are summarized in Table 2A and 2B and laboratory certificates are located in Appendix C. Note that Table 2A corresponds to the analytical test results of soils obtained from borings B-5 through B-10, while Table 2B corresponds to analytical test results of soils obtained from boring B-11 and B-12.

Samples B7, S2, obtained at an approximate depth of five feet had detectable concentrations of PCE that exceeded the MTCA Method A Cleanup criteria of 0.5 ppm.

MTCA Method A cleanup levels are referenced at the bottom of Table 2A, 2B, and 4. These cleanup levels are tabulated and discussed in detail in MTCA chapters 173-340-40 for soils and 173-340-720 for groundwater

Concentrations of PCE were also detected in soil samples B6,S2 (.062 ppm) and the eastern most sample B9,S2 (.015 ppm); while concentrations of acetone and methylene chloride were detected in all soil samples submitted for analysis.

Soil samples obtained from surface cased boring B-12 also contained, concentrations of PCE which exceed MTCA Method A clean up levels. Samples B12,S1; B12,S2; and B12,S3 contained PCE concentrations of 1700 ppm, 11 ppm and 1.2 ppm, respectively.

6.3.1 Soils Analytical Test Results Keyed to Cross Sections

Figure 3 depicts two cross sections; one trending north-south (A to A') and one trending west-east-northeast (B to B').The A to A' cross-section intersects borings B-6, BW-2, B-12, B-7 and B-10. The B to B' cross-section intersects borings B-12, BW-1, B-8 and B-5. Cross-sections A to A' and B to B' are displayed in Figure 3 with respect to PCE occurrence. Cross-section A to A' is also displayed for cis-1,2 DCE and acetone occurrence.

Cross section A-A' of Figure 3 illustrates that 39.0 ppm PCE detected in soil sample BW-2-4 at an approximate depth of 20 feet was the maximum depth that contained detectable concentrations of PCE. The shallowest depth at which PCE was detected in soils submitted for analytical testing was soil sample B-12, S-1. Soil sample B-12, S-1 located at a depth of two and one-half feet adjacent to the former equipment drain contained 1,700 ppm PCE.

The easternmost occurrence of tetrachloroethylene detected in soil samples submitted for analysis was soil sample B-9, S-2, obtained at approximately five feet depth. Acetone was detected in at least one soil sample submitted for analysis from the "northernmost" (B-6), southernmost (B-11) and easternmost (B-5) borings.

The northernmost occurrence of PCE was detected in soil sample B-6, S-2 which contained .062 ppm PCE. There was no detection of PCE above the method detection limit in the southern most borehole B-10.

The soil sample with the highest concentration of cis-1,2 DCE was soil sample BW-2-1 obtained at five feet in depth. Analytical test results of sample BW-2-1 yielded concentrations of cis-1,2 DCE at 3.9 ppm.

There is no apparent trend with respect to Acetone occurrence along north-south cross section A-A', except for the fact that Acetone was detected in at least one soil sample submitted for analytical testing from each boring intersected by the cross-section.

6.4 Vapor Extraction Point Installation

Stainless steel (.010 inch, slotted) vapor extraction well points were installed in borings BW-2 (former monitoring well MW-1), B-6, B-7, B-8, B-9 and B-10. The well points were installed to approximately 7.5 feet at the approximate fill/native soil contact. The 7.5 foot depth was selected as the depth to which qualitative and quantitative concentrations of volatile organic compounds decreased markedly. Note that this depth corresponds to the fill/native soils boundary.

6.5 Soil Vapor Survey

RZA AGRA conducted a Soil Vapor Survey on 23 September 1992 at the subject site. Figure 2, the Site and Exploration Plan, shows the approximate location of vapor points SVS-1 through SVS-4 which were advanced when possible to approximately 10 feet.

The objective of the Soil Vapor Survey was to assess the north-south lateral and vertical distribution of volatile organic compound vapors in the fill and native soil pores. Table 4 summarizes quantified results of the soil vapor survey.

During the soil vapor survey, dense, pale yellow liquid was observed dripping from the tip of the soil vapor probe upon extraction from vapor point SVS-2A. Volatile organic compounds collected from the vapor point matched the calibrated vapors for PCE, TCE and acetone.

Relative soil pore concentrations with respect to PCE were highest in soil vapor point SVS-2A which is located adjacent to the former drain. Sample SVS-2A soil vapor was obtained at approximately 5.0 feet. The highest PCE soil vapor concentration at maximum depth was vapor point SVS-3B, which yielded, a concentration of 2,900 ppm PCE (Table ~~4~~ 3).

6.6 Groundwater

Based on observations made during boring advancement, monitoring well installation and groundwater sampling, groundwater at the subject site occurs as discontinuous perched lenses in the upper portions of weathered till at approximately 12.5 feet below grade.

6.6.1 Monitoring Well Installation

Boring B-5 and B-11 were completed as 2-inch (ID) monitoring wells, referred to hereafter as monitoring wells MW-2 and MW-3, respectively. Monitoring well MW-2 is located in an apparent hydrogeologic upgradient position, while monitoring well MW-3 is located in an apparent hydrogeologic downgradient position.

Figure 2, the Site and Exploration Plan shows the location of monitoring wells MW-2 and MW-3. Monitoring well MW-2 is located approximately 85 feet east-northeast of the northeast corner of the former dry cleaner. Monitoring well MW-3 is located approximately 60 feet south-southwest of the front (south) entrance to the former drycleaner.

Based on groundwater level measurements obtained from monitoring wells MW-2 and MW-3 (see section 6.6.1), groundwater at the site lies approximately at 10.90 feet below the top of the casing in monitoring well MW-2 and 8.56 feet below the top of the well casing in monitoring well MW-3. Monitoring well MW-2 lies in an apparent upgradient hydrogeologic position while monitoring well MW-3 lies in an apparent hydrogeologic downgradient position.

6.7 Groundwater Analytical Test Results

Groundwater was collected from monitoring wells MW-2 and MW-3 and submitted for analytical testing for volatile organic compounds by EPA Method 8240. Duplicate samples of groundwater obtained from monitoring well MW-2 and MW-3 were collected and submitted to separate analytical laboratories. Non-detectable concentrations of volatile organic compounds were reported, by one laboratory while 25 ppb Acetone was detected by another laboratory, for groundwater which was sampled from monitoring well MW-2 (see Table 4).

Analytical test results of groundwater sampled from monitoring well MW-3 on 28 October 1992 detected concentrations of cis-1, 2 DCE at 9.0 ppb. Groundwater was resampled from monitoring well MW-3 on 13 November 1992. The additional analysis yielded concentrations of cis-1,2 DCE at 6.6 ppb and concentrations of TCE at 2.3 ppb. A duplicate groundwater sample from monitoring well MW-3 was submitted to another analytical testing lab and contained 9.0 ppb cis-1,2 DCE and an estimated concentration of 2.0 ppb PCE.

6.7.1 Special Cased Boring

In order to obtain a qualitative-screening groundwater sample directly beneath the former dry cleaner, RZA AGRA advanced a special cased boring B-12. The casing was a 13 inch (ID) steel casing which was installed through the site fill soils (vadose zone) to an approximate depth of 6.5 feet. A suite of groundwater samples were collected from boring B-12 at an approximate depth of 12.5 feet below site grade, where groundwater first entered the boring.

Analytical test results of the groundwater collected detected PCE, cis-DCE and acetone concentrations of 780 ppb, 29 ppb, and 19 ppb, respectively. A split groundwater sample sent to another analytical testing laboratory contained of 1,700 ppb of PCE.

7.0 REMEDIAL ALTERNATIVES

To date RZA AGRA has submitted three draft remedial alternatives to Northwest Building Corporation. These alternatives investigated costs, logistics, inherent assumptions and feasibilities of:

1. Impacted soils excavation;
2. Thin lift indoor soils remediation; and
3. Vapor extraction remediation.

RZA AGRA conducted a vapor extraction feasibility test at the subject site. Vapor extraction feasibility test results indicate that vapor extraction is an applicable remedial alternative of the site. Appendix F describes the vapor extraction test and results.

RZA AGRA is of the opinion that vapor extraction of the vapor phase and possibly some of the residual phase volatile organic compounds would be the most cost effective remedial alternative. Moreover, Washington State Department of Ecology (Ecology) concurs with our recommendation that vapor extraction is the most appropriate remedial alternative. (see Appendix G). Remediation of vapor phase volatile organic compounds by vapor extraction is a proven technology. Remediation of residual phase DNAPL is possible but difficult due to the fact that residual DNAPL is difficult to mobilize with hydraulic forces. Nonetheless, vapor extraction could contain residual DNAPL from migrating and hence partially contain residual DNAPL zones. A containment barrier combined with vapor extraction which funnels effluent through a thermox unit would be a most efficient remedial alternative.

Alternatively, selective removal of (residual phase) DNAPL impacted soils in the suspect area of the former drain backfill, for incineration could be combined with vapor extraction as a remedial alternative. However, due to the fact that evidence exists for the biotransformation of tetrachloroethylene to vinyl chloride at the subject site, excavation would be costly because of the efforts needed to protect the safety of workers who would require self contained breathing apparati (SCBA) in the event of a health and safety upgrade.

As stated in the previous section, engineering design modifications may be necessary to our proposed vapor extraction remedial alternative due to the fact that vinyl chloride has been detected, in ambient air samples collected at the subject site.

8.0 CONCLUSIONS

Soil vapor and soil sample analytical test results indicate that residual phase and vapor phase components consisting mainly of PCE, with minor amounts of acetone, cis-1,2 DCE and TCE have impacted site soils.

Predominant spatial distributions of residual and vapor phase impacted soils appears to occur in vadose zone (fill) soils, which extend to approximately 6.5 to 7.5 feet below the subsurface, in the west central portion of the former dry cleaner in the vicinity of the former drain line. Residual phase PCE could possibly occur west (beneath Living Well Lady) and possibly south of SVS-2A (beneath the subject sites restrooms).

Sparsely distributed zones of residual and vapor phase PCE and acetone components may exist in fracture aperatures and more permeable zones of the native soils. However, the residual and vapor phases appear to have migrated preferentially (and laterally) through the relatively dry, poorly sorted, more permeable, fill soils.

A possible driving mechanism for dissolved phase concentrations of cis-1,2 dichloroethylene and tetrachloroethylene in groundwater (besides residual phase PCE) could be lateral and vertical diffusion enhanced by acetone and detergents. Acetone and detergents could enhance the solubility of PCE by as much as 50 times its normal solubility of 240 mg/l (Feenstra, 1992).

9.0 CLOSING

RZA AGRA appreciates the opportunity to offer our remediation services to Northwest Building Corporation. If you have any questions please do not hesitate to call at your earliest convenience.

Respectfully submitted,

RZA AGRA, Inc.

Dale A. Kramer

Dale A. Kramer
Project Scientist

Michael C. Moore

Michael C. Moore
Associate

DAK/MCM/LAD

cc: Steve Loitz, Ann Lawler Esq., Schwabe, Williamson, Ferguson & Burdell

REFERENCES

Feenstra, S., 1992. Site Characterization and Remediation of Dense, Immiscible Phase Liquid Contaminants (DNAPLS) in Porous and Fractured Media: Waterloo Center for Groundwater Research, Chicago, Illinois.

Kueper, B.H. and E.D. Frind, 1988. An Overview of Immiscible Fingering in Porous Media. Journal of Contaminant Hydrology. V.2, pp. 95-110.

TABLE 1 EMERGENCY RESPONSE SOILS ANALYTICAL TEST RESULTS; 10 JUNE 1992
FORMER Y-PAY-MOR DRYCLEANERS
W-7883-4

Boring ID	Sample ID	Approximate Depth (feet)	Acetone (ppm)	trans-DCE (ppm)	cis-DCE (ppm)	TCE (ppm)	1,1,2,2 PCA (ppm)	PCE (ppm)	2-Butanone (ppm)	Methylene Chloride (ppm)
BW-1	-2	10	0.015	ND	TI	ND	ND	TI	ND	TI
BW-1	-3	15	TI	ND	ND	ND	ND	ND	ND	ND
BW-1	-4	20	TI	ND	ND	ND	ND	ND	ND	A/FIB
BW-2	-1	5	A/FIB	5.6	3.9	7.5	3.1	>160	TI	A/FIB
BW-2	-2	10	TI	ND	ND	ND	ND	0.340	ND	A/FIB
BW-2	-3	15	0.017	ND	TI	ND	ND	0.055	ND	A/FIB
BW-2	-4	20	ND	ND	TI	ND	ND	>39	ND	A/FIB
BW-3	-1	5	0.047	ND	0.010	TI	ND	0.028	TI	A/FIB
BW-3	-2	10	0.021	ND	TI	TI	ND	TI	ND	A/FIB
BW-3	-3	15	ND	ND	ND	ND	ND	ND	ND	A/FIB
BW-4	-1	5	0.230	ND	0.066	ND	ND	0.013	0.032	0.011
BW-4	-2	10	0.019	ND	ND	ND	ND	ND	ND	A/FIB
BW-4	-3	15	TI	ND	ND	ND	ND	ND	ND	A/FIB
MTCA CLEANUP CRITERIA	N/A	N/A				0.5		0.5		0.5

DEFINITIONS:

- trans-DCE - trans-Dichloroethene
- cis-DCE - cis-1,2 Dichloroethene
- TCE - Trichloroethene
- 1,1,2,2 PCA - 1,1,2,2-Tetrachloroethane
- PCE - Tetrachloroethene
- MTCA - Model Toxics Control Act
- ND - Compound was analyzed, but was below laboratory detection limit
- TI - Compound identified, is estimated below laboratory detection limit but not listed in Table 1
- A/FIB - Compound was analyzed and found in the associated blank as well as the sample
- > - Compounds in which concentrations exceed the calibration range of the GC instrument
- 7.5 - Shaded value indicates concentrations which exceed MTCA Method A cleanup criteria

NOTES: All analytes are covered under EPA Method 8240 for volatile organics. This method covers a broad scan of analytes. Indicated above are the only analytes in the broad scan that were measured above the laboratory detection limit. Analytes not shown, but covered under method 8240 were below the laboratory detection for all samples.

TABLE 2A REMEDIAL INVESTIGATION SOILS ANALYTICAL TEST RESULTS; 25 THROUGH 28 AUGUST 1992
FORMER Y-PAY-MOR DRYCLEANERS
W-7883-4

Boring ID	Sample ID	Approximate Depth (feet)	HNU Reading (ppm)	Acetone (ppm)	trans-DCE (ppm)	cis-DCE (ppm)	PCE (ppm)	2-Butanone (ppm)	Methylene Chloride (ppm)
B5	S4	10	3.3	0.018	ND	ND	ND	ND	0.026
B5	S8	20	2.2	A/FIB	ND	ND	ND	ND	A/FIB
B6	S2	5	5.2	0.012	ND	TI	0.062	ND	0.013
B6	S3	7.5	1.8	0.110	ND	TI	TI	A/FIB	0.021
B7	S2	5	8.0	0.077	TI	>240	>460	ND	0.008
B7	S3	7.5	3.7	0.150	ND	ND	ND	A/FIB	0.006
B8	S2	5	4.1	0.098	ND	TI	ND	ND	0.008
B8	S3	7.5	2.1	0.077	ND	ND	ND	ND	TI
B9	S2	5	2.4	0.120	ND	0.011	0.015	A/FIB	TI
B9	S3	7.5	2.4	0.170	ND	ND	ND	TI	TI
B10	S1	2.5	131	A/FIB	ND	ND	ND	ND	A/FIB
B10	S2	5	130	A/FIB	ND	TI	ND	TI	A/FIB
B10	S3	7.5	22	0.150	ND	ND	ND	TI	0.008
MTCA CLEANUP CRITERIA	N/A	N/A	N/A				0.5		0.5

DEFINITIONS:
trans-DCE - trans-Dichloroethene
cis-DCE - cis-1,2 Dichloroethene
PCE - Tetrachloroethene
MTCA - Model Toxics Control Act
ND - Compound was analyzed, but was below laboratory detection limit
TI - Compound identified, is estimated below laboratory detection limit but not listed in Table 2A
A/FIB - Compound was analyzed and found in the associated blank as well as the sample
> - Compounds in which concentrations exceed the calibration range of the GC instrument
>460 - Shaded value indicates concentrations which exceed MTCA Method A cleanup criteria

NOTES: All analytes are covered under EPA Method 8240 for volatile organics. This method covers a broad scan of analytes. Indicated above are the only analytes in the broad scan that were measured above the laboratory detection limit. Analytes not shown, but covered under method 8240 were below the laboratory detection for all samples.

TABLE 2B REMEDIAL INVESTIGATION SOILS ANALYTICAL TEST RESULTS; 27 & 28 OCTOBER 1992
FORMER Y-PAY-MOR DRYCLEANERS
W-7883-6

Boring ID	Sample ID	Approximate Depth (feet)	HNU Reading (ppm)	Acetone (ppm)	cis-DCE (ppm)	PCE (ppm)	2-Butanone (ppm)	Methylene Chloride (ppm)
B11	S3	7.5	3.9	0.053	ND	ND	ND	TI
B11	S5	12.5	4.2	ND	ND	ND	ND	ND
B11	S6	15	4.2	ND	ND	ND	ND	TI
B12	S1	2.5	450.0	ND	ND	1700	ND	ND
B12	S2	5	250.0	ND	TI	11	TI	A/FIB
B12	S3	7.5	4.0	0.040	ND	0.007	ND	ND
B12	S3b*	10	4.0	0.021	ND	>1.2	ND	ND
B12	S4	12.5	4.1	ND	ND	ND	ND	ND
B12	S5	15	2.3	ND	ND	ND	ND	ND
MTCA CLEANUP CRITERIA	N/A	N/A	N/A			0.5		0.5

DEFINITIONS:

cis-DCE - cis-1,2 Dichloroethene
PCE - Tetrachloroethene
MTCA - Model Toxics Control Act
ND - Compound was analyzed, but was below laboratory detection limit
TI - Compound identified, is estimated below laboratory detection limit but not listed in Table 2B
A/FIB - Compound was analyzed and found in the associated blank as well as the sample
* - Reported as "S36" by analytical testing laboratory
> - Compounds in which concentrations exceed the calibration range of the GC instrument
1700 - Shaded value indicates concentrations which exceed MTCA Method A cleanup criteria

NOTES: All analytes are covered under EPA Method 8240 for volatile organics. This method covers a broad scan of analytes. Indicated above are the only analytes in the broad scan that were measured above the laboratory detection limit. Analytes not shown, but covered under method 8240 were below the laboratory detection for all samples.

TABLE 3 SOIL VAPOR SURVEY ANALYTICAL RESULTS
FORMER Y-PAY-MOR DRYCLEANERS
W-7883-4

Vapor Survey Sample ID	Approximate Depth Vapor Collected (feet)	OVM Reading (ppm)	Calculated Relative Concentration PCE & A/TCE (ppm)
SVS 1A	6	387.0	1400 (PCE) & 670 (A/TCE)
SVS 1B	10	NM	830 (PCE) & 620 (A/TCE)
SVS 2A	5	1094.0	3850 (PCE) & 110 (A/TCE)
SVS 2B	8.5	1000.0	520 (PCE) & 140 (A/TCE)
SVS 3A	5	370.0	1100 (PCE) & 20 (A/TCE)
SVS 3B	8	38.0	2900 (PCE) & 0.8 (A/TCE)
SVS 4A	5	22.0	430 (PCE) & 7 (A/TCE)
SVS 4B	10	5.5	<0.3 (PCE) & <0.1 (A/TCE)

DEFINITIONS:
PCE - Tetrachloroethylene
TCE - Trichloroethylene
A - Acetone
A/TCE - Represents calculated volume concentration of acetone/trichloroethylene components compared to GC standard
NM - Not Measured

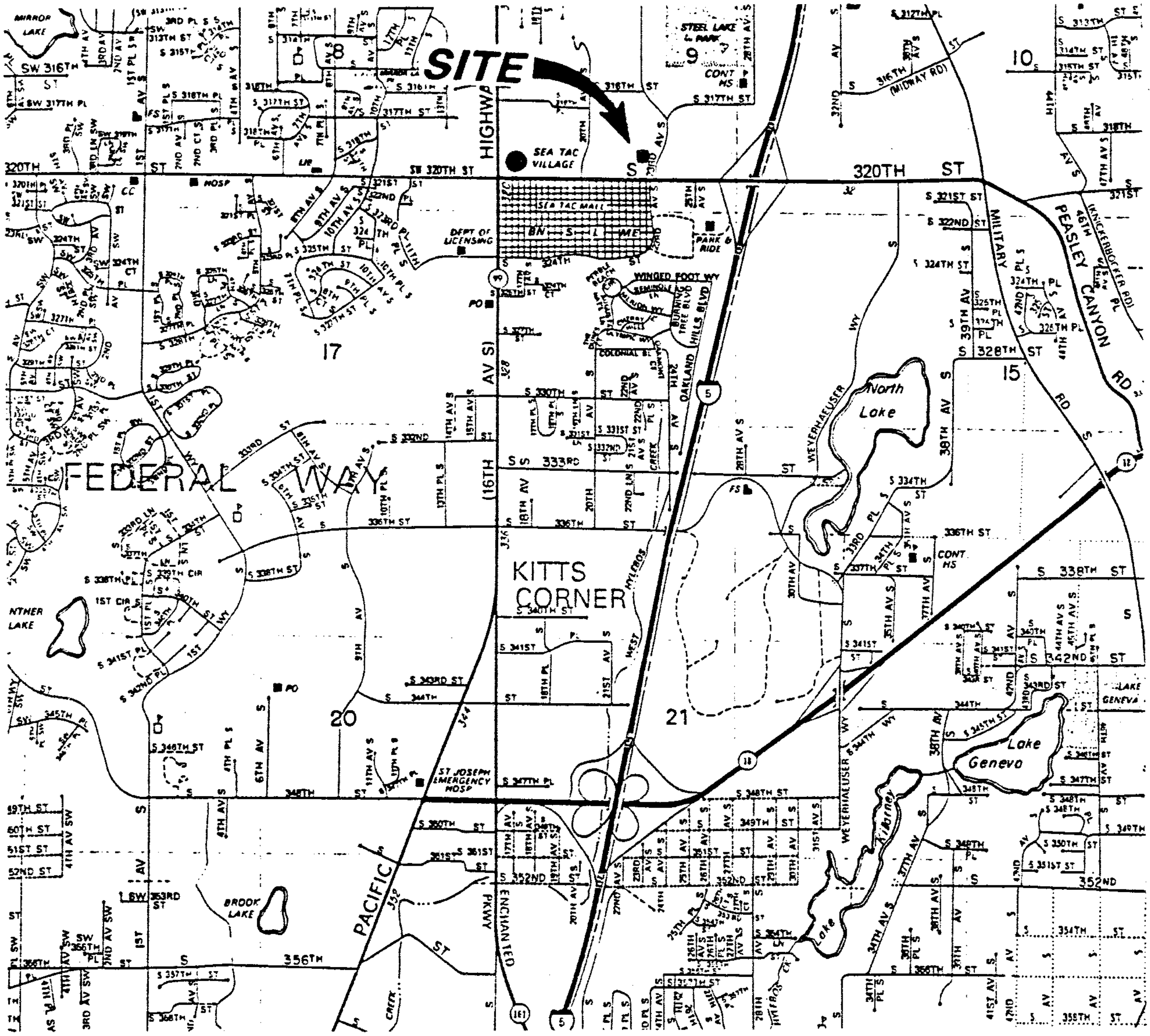
NOTES: OVM used contained an 11.8 eV ionization potential lamp. OVM vapor reading was taken from soil vapor effluent immediately after withdrawing soil vapor sample.

TABLE 4 **GROUNDWATER ANALYTICAL TEST RESULTS**
FORMER Y-PAY-MOR DRYCLEANERS
W-7883-4, W-7883-6

Sample ID	Date	Depth to Water* (feet)	Analytical LAB	Acetone (ppb)	cis-1,2 DCE (ppb)	TCE (ppb)	PCE (ppb)	2-Butanone (ppb)	Methylene Chloride (ppb)
MW-2	09/23/92	10.90	NCA	ND	ND	ND	ND	ND	ND
MW-2	09/23/92	10.90	PNEL	25	ND	ND	ND	ND	TI
MW-3	10/28/92	8.56	PNEL	ND	7	TI	TI	ND	ND
MW-3	11/13/92	8.15	NCA	ND	6.6	2.3	ND	ND	ND
MW-3	11/13/92	8.15	PNEL	ND	9.0	ND	2.0 (J)	ND	TI
B-12	10/28/92	12.50	PNEL	19	29	TI	>780	TI	TI
B-12	10/28/92	12.50	NCA	ND	ND	ND	1700	ND	ND
MTCA CLEANUP CRITERIA	N/A	N/A	N/A			5.0	5.0		

DEFINITIONS:
- cis-DCE - cis-1,2 Dichloroethene
- PCE - Tetrachloroethene
- TCE - Trichloroethene
- MTCA - Model Toxics Control Act
- ND - Compound was analyzed, but was below laboratory detection limit
- TI - Compound identified, is estimated below laboratory detection limit but not listed in Table 4
- --- - Not Measured
- > - Compounds in which concentrations exceed the calibration range of the GC instrument
- * - Measured from top of monitoring well casing
- 1700 - Shaded value indicates concentrations which exceed MTCA Method A cleanup criteria
- J- Estimated Value

NOTES: All analytes are covered under EPA Method 8240 for volatile organics. This method covers a broad scan of analytes. Indicated above are the only analytes in the broad scan that were measured above the laboratory detection limit. Analytes not shown, but covered under method 8240 were below the laboratory detection limit for all samples.



RZA-AGRA
ENGINEERING & ENVIRONMENTAL SERVICES

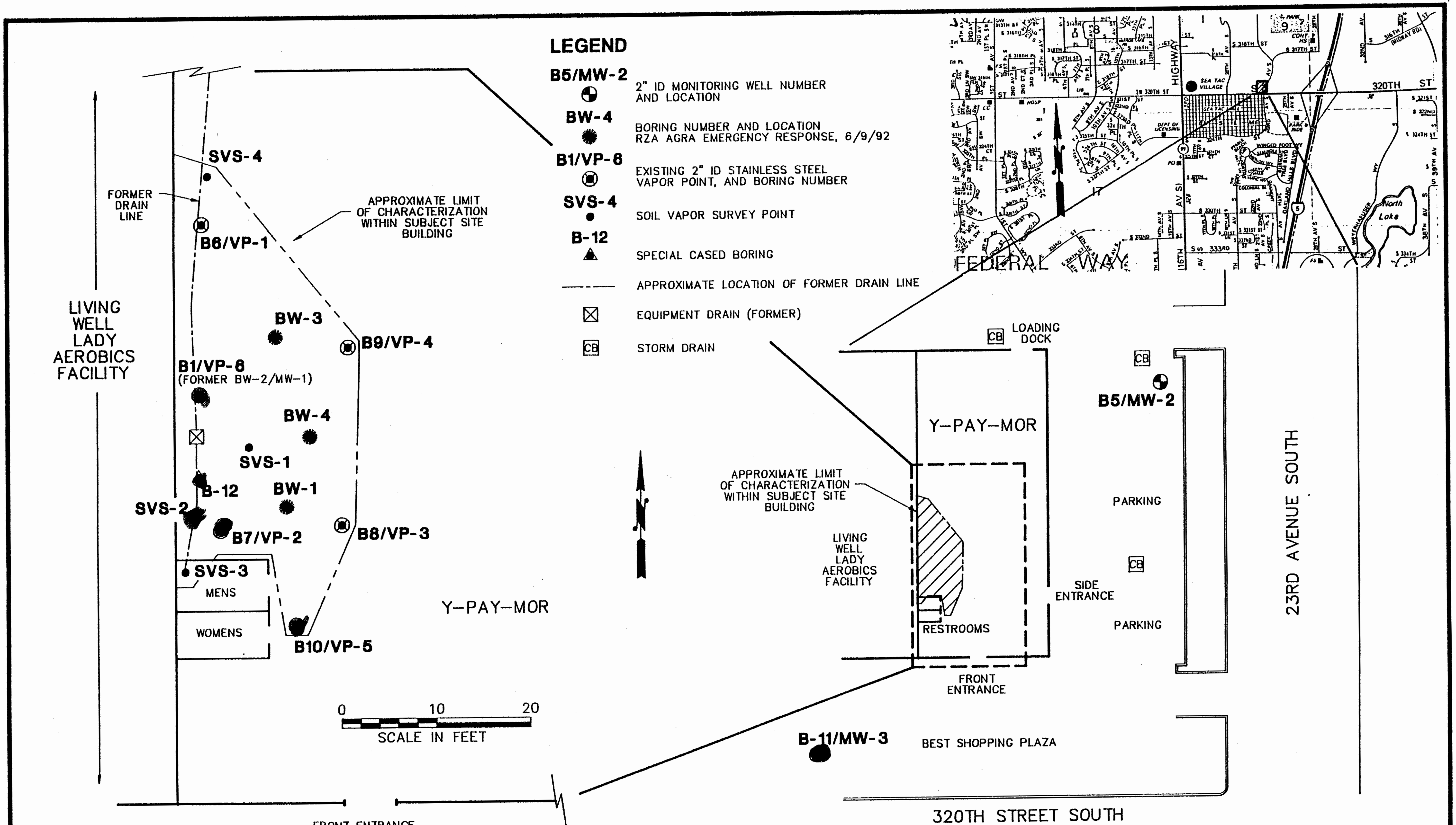
11335 N.E. 122nd Way
Suite 100
Kirkland, Washington
98034-6918

W.O.	W-7883-4
DESIGN	DAK
DRAWN	MJF
DATE	OCT 1992
SCALE	N.T.S.

Y-PAY-MOR DRY CLEANERS
2210 320TH STREET SOUTH
FEDERAL WAY, WASHINGTON

LOCATION MAP

FIGURE 1



RZA AGRA, INC.
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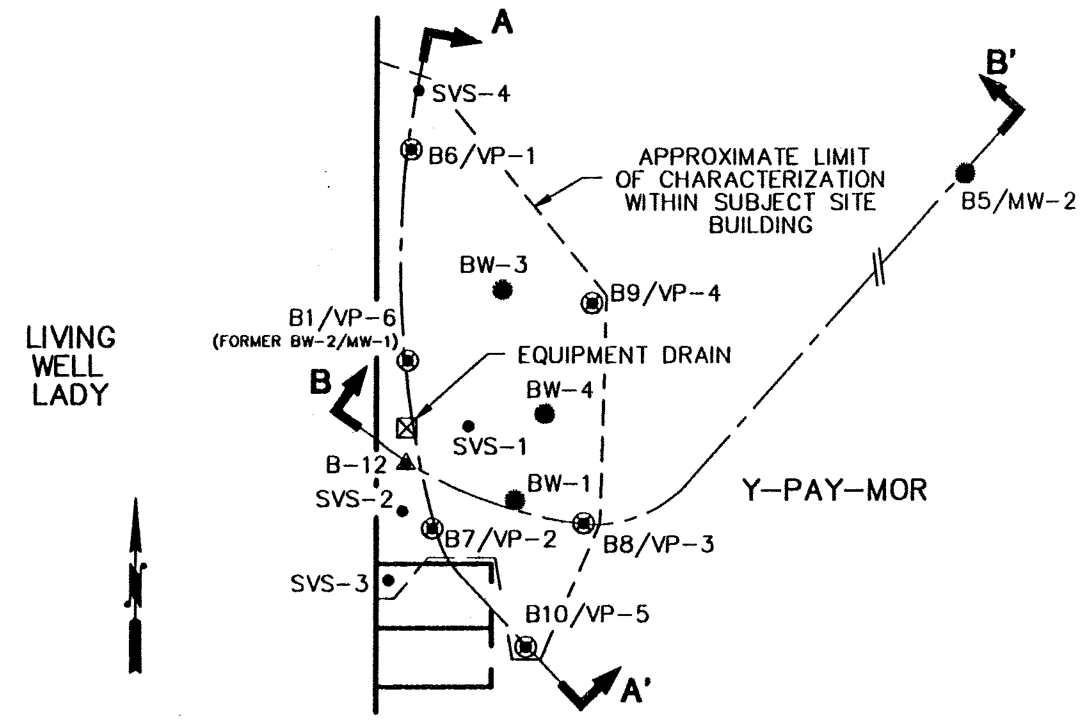
11335 N.E. 122nd Way
Suite 100
Kirkland, Washington 98034-6918

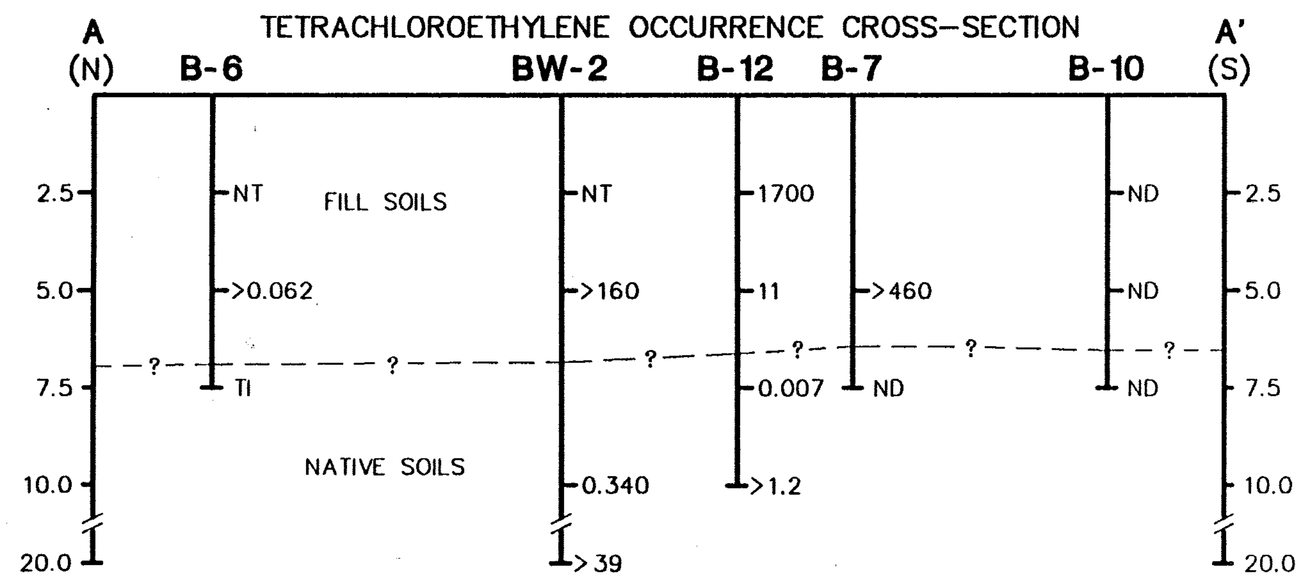
W.O.	W-7883-4
DESIGN	DAK
DRAWN	MJF
DATE	OCT 1992
SCALE	N.T.S.

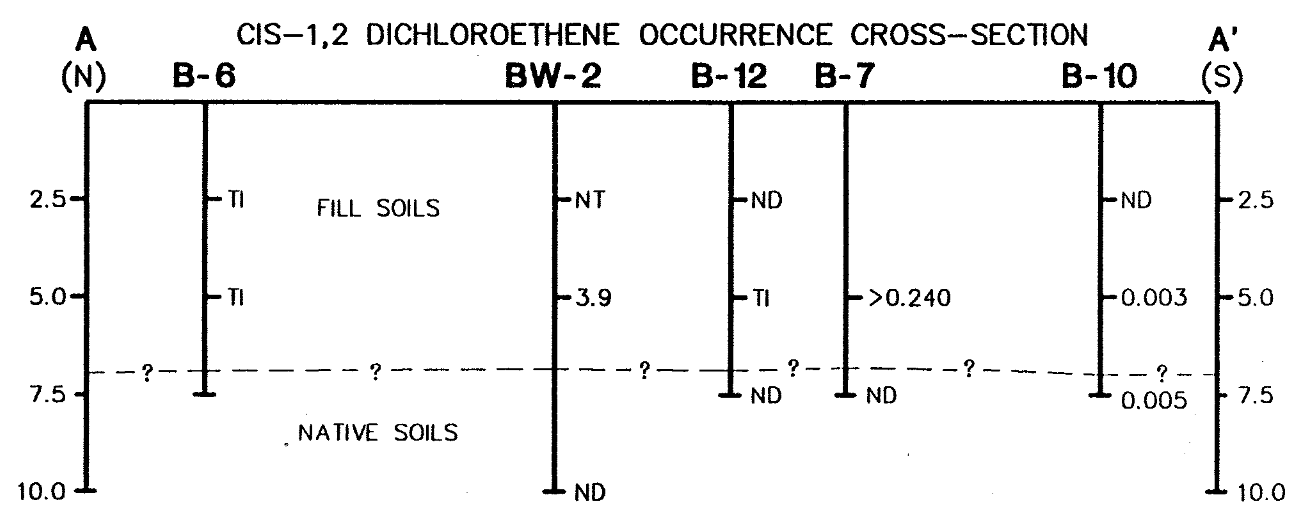
Y-PAY-MOR DRY CLEANERS
2210 320TH STREET SOUTH
FEDERAL WAY, WASHINGTON

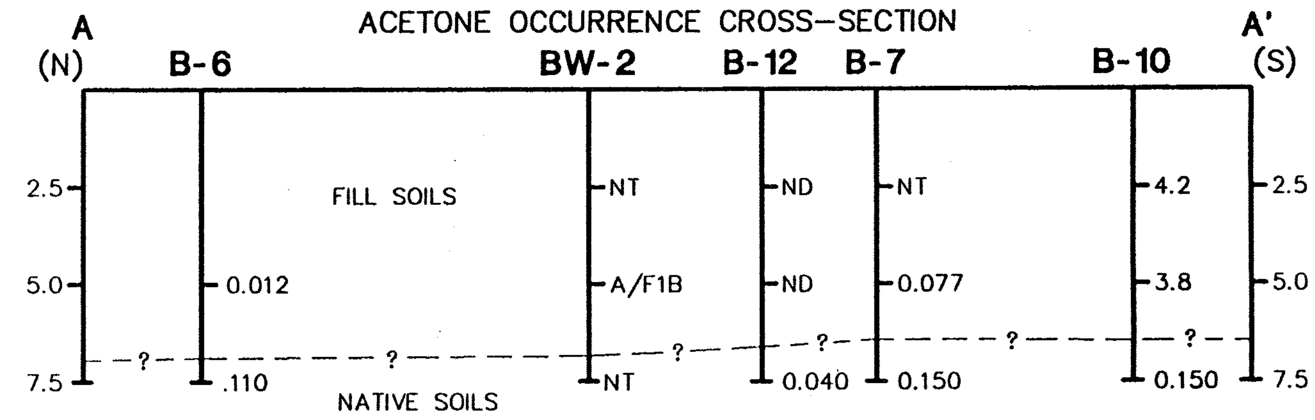
SITE AND EXPLORATION PLAN
FIGURE 2

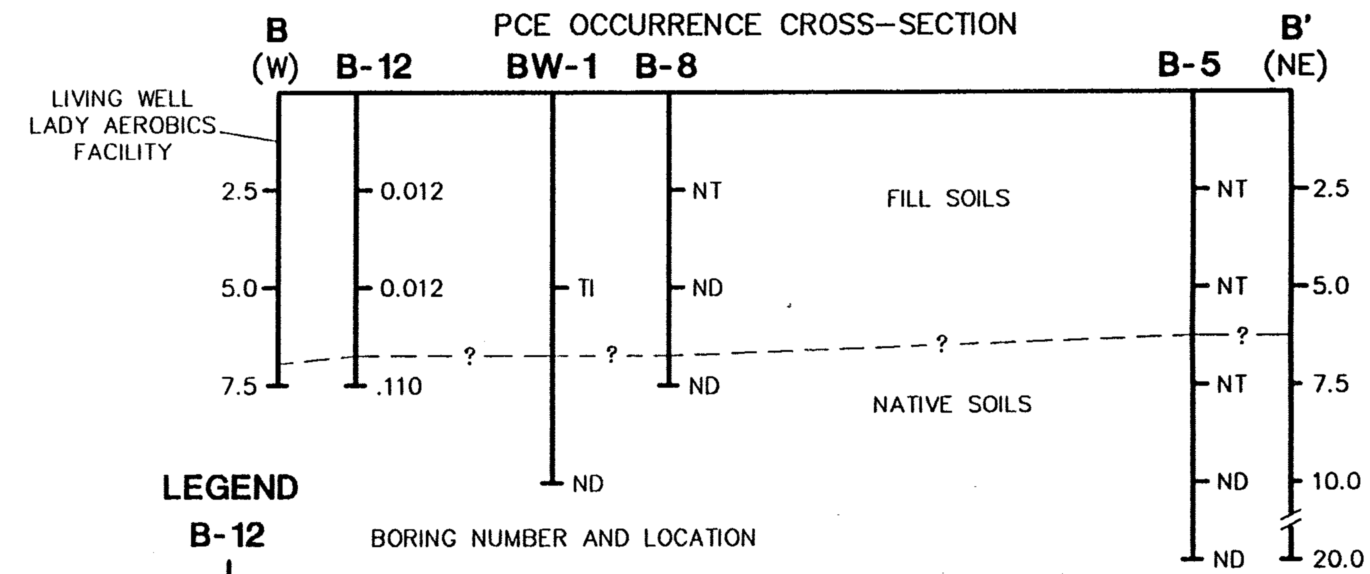
DRAWING NO. \78\W-7883-4\SITE.DWG











LEGEND

B-12	BORING NUMBER AND LOCATION
1700.0	CONCENTRATION IN PPM OF PERCHLOROETHENE OR CIS-DICHLOROETHENE REPORTED BY ANALYTICAL TESTING LAB
TI	COMPOUND IDENTIFIED IS ESTIMATED BELOW LABORATORY DETECTION LIMIT
>240.0	CONCENTRATIONS OF COMPOUNDS WHICH EXCEED CALIBRATED RANGE OF THE GC INSTRUMENT
A/F1B	COMPOUND ANALYZED AND FOUND IN ASSOCIATED BLANK
NT	NOT SUBMITTED FOR ANALYTICAL TESTING
ND	NOT DETECTED AT LABORATORY DETECTION LIMIT
— — ? — —	APPROXIMATE BOUNDARY DELINEATING FILL/NATIVE SOILS CONTACT
D D'	CROSS-SECTION DESIGNATION AND LOCATION

RZA AGRA, INC.
Engineering & Environmental Services

11335 N.E. 122nd Way
Suite 100
Kirkland, Washington 98034-6918

W.O.	W-7883-6
DESIGN	DAK
DRAWN	MJF
DATE	NOV 1992
SCALE	N.T.S.

Y-PAY-MOR DRY CLEANERS
2210 320TH STREET SOUTH
FEDERAL WAY, WASHINGTON

ANALYTICAL TEST RESULTS KEYED TO CROSS-SECTIONS

FIGURE 3

DRAWING NO. \7B\W-7883-6\X-S-AB.D

Appendix A

APPENDIX A

WASHINGTON DEPARTMENT OF ECOLOGY SPILL RESPONSE DOCUMENTATION

DEPARTMENT OF ECOLOGY
ERT SYSTEM - INITIAL REPORT/FOLLOWUP

COORDINATOR: BELINDA HOVDE   UNIQUE RECORD #: N5617   REGION: N

DATE/TIME REC'D: 08/08/91   12:00:00   REPORT TYPE: INITIAL

REPORTER'S NAME: LT. BRAD SMITH   BUSINESS NAME:
FEDERAL WAY F/D
ADDRESS: FEDERAL WAY   WA   BEST TIME
OR ANONYMOUS: TO CALL:
WORK PHONE: (206)-972-9649 EXT.   HOME PHONE:

DETAILS ON INCIDENT:
COUNTY: KING   NEAREST CITY: FEDERAL WAY
WATERWAY: WRIA #:
LOCATION: 2210 S 320, FEDERAL WAY

WEATHER: TIDE:

DETAILS ON ALLEGED VIOLATOR:
CONTACT'S NAME:
NAME & ADDRESS:
Y 'PAYMORE' CLEANERS   PHONE NUMBER AND EXT:
2210 S 320
FEDERAL WAY   WA 98003

VEHICLE INFORMATION:

DESCRIPTION OF CONTAMINANT: (PROVIDED BY REPORTER)
MEDIUM: BLDG/STRUC
MATERIAL: CHEMICALS   OTHER: DRY CLEAN CHEMICALS
QUANTITY: 6 GALLONS
SOURCE: COMMERCIAL

COMMENTS: DRY CLEANERS SPILLED 6 GALLONS OF DRY CLEANING SOLUTION. TETRACHLOROETHYLENE. TRIED TO ABSORB W/ BLANKETS. ONLY INSIDE BLDG. MACHINE OVERHEATED. PEOPLE HAVING REACTION TO CHEMICALS. HAZMET AT LEVEL B. MATERIAL IN DRUMS. CHEMPRO FINISHING. EVERYTHING OK.

REFERRED TO PROGRAM: SPILLS   SECTION HEAD: O'BRIEN

EXTERNAL REFERRAL? (Y/N): N

IF EXTERNAL, WHAT AGENCY: ____________________

INVESTIGATION COMPLETED? (Y/N): Y
IF YES, COMPLETE SECOND PAGE OF FORM.

****

CONTINUED ON PAGE 2

INTERNAL REFERRAL INFORMATION:

NAME OF STAFF PERSON: HOOVER
DATE RECEIVED: 08/06/91
DATE INVESTIGATED: 08/06/91
ACTION TAKEN: TELEPHONE
DATE COMPLETED: 08/06/91
CAUSE OF INCIDENT: EQUIP FAILURE
IMPACT: BOTH
LUST: N

NONPOINT: (UNK, GW, SW) POINT: (UNK, SW, PRETMT)

ACTUAL VIOLATOR INFORMATION:

NAME: Y 'PAYMORE' CLEANERS
CONTACT:
ADDRESS: 2210 S 320
CITY: FEDERAL WAY WA 98003
HOME:
WORK:

ACTUAL CONTAMINANT:

MEDIUM: BLDG/STRUC
MATERIAL: CHEMICALS
OTHER: DRY CLEAN CHEMICALS
QUANTITY: 6 GALLONS
SOURCE: COMMERCIAL

ENFORCEMENT SENSITIVE? (Y/N): N

CROSS-REFERENCES TO OTHER SYSTEMS:

OTHER RELEVANT INFORMATION:

SPOKE TO LT. SMITH. SITUATION HANDLED.

WRITE ANY ADDITIONAL INFORMATION ON BACK OF FORM:

DEPARTMENT OF ECOLOGY
ERT SYSTEM - INITIAL REPORT/FOLLOWUP

COORDINATOR: DAVID HOVIK   UNIQUE RECORD #: N6406   REGION: N

DATE/TIME REC'D: 10/04/91   16:46:37   REPORT TYPE: INITIAL

REPORTER'S NAME: LT BRAD SMITH   BUSINESS NAME: KING CO FD #39

ADDRESS: FEDERAL WAY   WA

OR ANONYMOUS: BEST TIME TO CALL:

WORK PHONE: (206)-948-2510 EXT. CELL   HOME PHONE: (206)-948-2511

DETAILS ON INCIDENT:

COUNTY: KING   NEAREST CITY: FEDERAL WAY

WATERWAY: WRIA #:

LOCATION:

WEATHER: UNKNOWN   TIDE:

DETAILS ON ALLEGED VIOLATOR:

NAME & ADDRESS:
Y PAYMOR CLEANERS
2210 S 320 ST
FEDERAL WAY   WA 98003

CONTACT'S NAME:
SOO KANG CHANG
PHONE NUMBER AND EXT:
(206)-946-2269

VEHICLE INFORMATION:

DESCRIPTION OF CONTAMINANT: (PROVIDED BY REPORTER)

MEDIUM: BLDG/STRUC
MATERIAL: HAZ MATERIAL   OTHER: PERCLORETHYLENE
QUANTITY: UNK
SOURCE: COMMERCIAL

COMMENTS: WASTE SPILL. 99.9% PERC SPILLED. ABOUT A 10X15 FT AREA INSIDE STORE. MACHINE STOPPED. AIR DOWN IN THAT AREA TO CONTAIN. THIS IS WASTE PRODUCT. NOT SAME AS SPILL ABOUT A MONTH AGO, BUT RELATED. ASKING FOR WHAT TO DO.

REFERRED TO PROGRAM: SPILLS   SECTION HEAD: O'BRIEN

EXTERNAL REFERRAL? (Y/N): N

IF EXTERNAL, WHAT AGENCY: ____________________

INVESTIGATION COMPLETED? (Y/N): Y
IF YES, COMPLETE SECOND PAGE OF FORM.

****

CONTINUED ON PAGE 2

INTERNAL REFERRAL INFORMATION:

NAME OF STAFF PERSON: HOOVER/RAUH
DATE RECEIVED: 10/04/91
DATE INVESTIGATED: 10/04/91
ACTION TAKEN: FIELD RESPONSE
DATE COMPLETED: 10/04/91
CAUSE OF INCIDENT: ACCIDENT
IMPACT: BOTH
LUST: N

NONPOINT: (UNK, GW, SW) POINT: (UNK, SW, PRETMT)

ACTUAL VIOLATOR INFORMATION:

NAME: Y PAYMOR CLEANERS
ADDRESS: 2210 S 320 ST
CITY: FEDERAL WAY WA 98003
HOME:
WORK: (206)-946-2269

CONTACT:
SOO KANG CHANG

ACTUAL CONTAMINANT:

MEDIUM: BLDG/STRUC
MATERIAL: HAZ MATERIAL
OTHER: PERCLORETHYLENE
QUANTITY: UNK
SOURCE: COMMERCIAL

ENFORCEMENT SENSITIVE? (Y/N): N

CROSS-REFERENCES TO OTHER SYSTEMS:

OTHER RELEVANT INFORMATION:

LT BRAD SMITH REQ DOE HELP. AS STORE OWNER IS RELUCTANT TO CLEAN UP MESS INSIDE THE STORE. THERE IS POTENTIAL FOR SEEPAGE INTO ADJOINING FACILITY. CHECKED W/ BRIDGET. ON SCENE 18:20. SPOKE W/ BRAD AND MR. CHANG (THROUGH INTERPRETER) MR. CHANG DECIDED TO CALL CHEMPRO TO CLEAN UP. F/D HAS CLOSED STORE UNTIL L+I. HEALTH AND CITY INSPECTS PREMEISES AS THIS IS THE 2ND EVENT IN 1 MONTH.

WRITE ANY ADDITIONAL INFORMATION ON BACK OF FORM:

Appendix B

APPENDIX B
BORING LOGS

PROJECT: Y-PAY-MOR W.O. W-7883 BORING NO. BW-1*

Elevation reference:	Well completed:	AS-BUILT DESIGN	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	Medium, moist, dark gray SILT, some sand and gravel	I	S-1	42	338		
10	Very dense, wet to saturated, gray SAND, some silt, trace gravel	I	S-2	76			8240
15	Very dense, wet to saturated, gray SAND, some silt, trace gravel	I	S-3	51			8240
20	Very dense, saturated, gray SAND, some silt	I	S-4	50/ 2"			8240
	Bottom of boring at 20 feet.						
25							
30							

LEGEND

I 2-inch O.D. split-spoon sample

ATD Observed groundwater level ATD = at time of drilling

8240 EPA Method 8240 Analysis

* Note: Soil log classification based on correlations with nearby borings

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

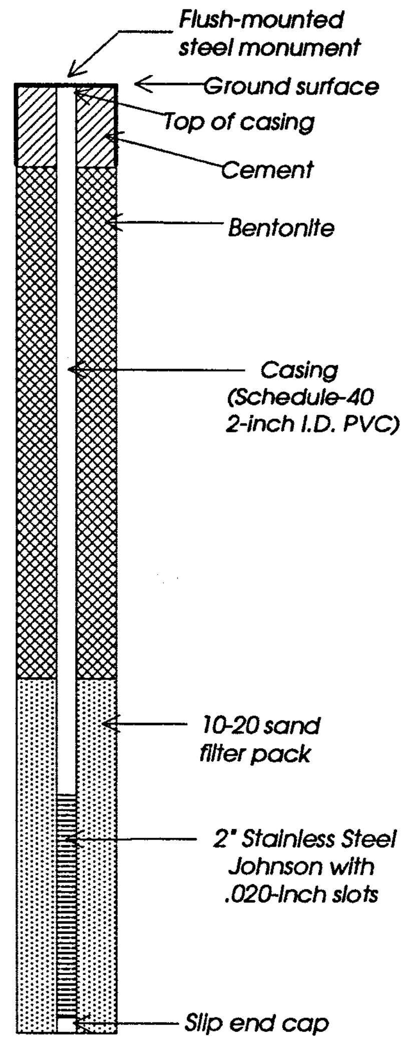
Drilling started: 9 June 1992 Drilling completed: 10 June 1992 Logged by: MLR

PROJECT: *Y-PAY-MOR* W.O. *W-7883* WELL NO. *BW-2,MW-1**

Elevation reference:
Ground surface elevation:
Well completed:
Casing elevation:

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	Medium, damp to moist, dark gray SILT, some sand and gravel with abundant organic material and peat	I	S-1	32	251		8240
10	As above, small sample volume obtained	I	S-2	53	750		8240
15	Medium, wet to saturated, SAND with silt and gravel	I	S-3	31	957		8240
20	Medium, wet to saturated, SAND with silt and gravel	I	S-4	38	1721		8240
	Bottom of boring at 20 feet.						
25							
30							



* Note: Monitoring well MW-1 was subsequently abandoned to 8 feet on 8-28-92, due to fact that well was separated at screen/pvc interface

See log B1,VP-6 for construction details of vapor point which was installed in the former boring to 8 foot depth.

LEGEND

I 2-inch O.D. split-spoon sample

ATD Observed groundwater level ATD = at time of drilling

8240 EPA Method 8240 Analysis

* Note: Soil log classification based on correlations with nearby borings

RZA AGRA, Inc.
Geotechnical & Environmental Group

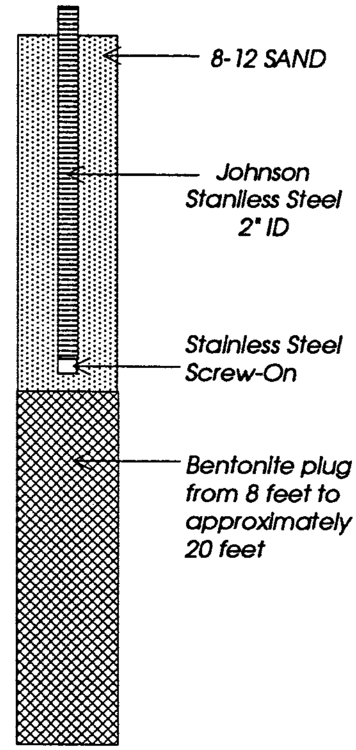
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 10 June 1992 Drilling completed: 10 June 1992 Logged by: MLR

PROJECT: *Y-PAY-MOR* W.O. *W-7883-4* VAPOR POINT *B-1,VP-6*

Elevation reference:	Well completed:	VAPOR POINT AS-BUILT DESIGN	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0	*See BW-2,MW-1 for soil description*						
5							
10	*Bottom of boring at 8.0 feet.*						
15							
20							
25							
30							



Note: Formerly BW-2,MW-1

LEGEND

RZA AGRA, Inc.
Geotechnical & Environmental Group
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *28 August 1992* Drilling completed: *28 August 1992* Logged by: *DAK*

PROJECT: *Y-PAY-MOR* W.O. *W-7883* BORING NO. *BW-3**

Elevation reference:	Well completed:	AS-BUILT DESIGN	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	*Very dense, moist, gray SILT, some organic material*	I	*S-1*	*73*			8240
10	*Very dense, moist, gray SILT, with clay*	I	*S-2*	*98*			8240
15	*Very dense, wet to saturated, gray SILT, some sand and gravel*	I	*S-3*				8240
	Bottom of boring at 15 feet.						
20							
25							
30							

LEGEND

I 2-inch O.D. split-spoon sample

Observed groundwater level ATD = at time of drilling

8240 EPA Method 8240 Analysis

** Note: Soil log classification based on correlations with nearby borings*

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *10 June 1992* Drilling completed: *10 June 1992* Logged by: *MLR*

PROJECT: *Y-PAY-MOR* W.O. *W-7883* BORING NO. *BW-4* *

Elevation reference:	Well completed:	AS-BUILT DESIGN	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0							
5	*Medium dense, moist, dark gray SILT, some sand with organics*	I	*S-1*	*47*			*8240*
10	*Medium dense, moist, dark gray SILT*	I	*S-2*	*30*			*8240*
15	*Very dense, saturated, dark gray SILT*	I	*S-3*	*56*			*8240*
	Bottom of boring at 15 feet.						
20							
25							
30							

LEGEND

- I — 2-inch O.D. split-spoon sample
- ATD — Observed groundwater level, ATD = at time of drilling
- 8240 — EPA Method 8240 Analysis

* *Note: Soil log classification based on correlations with nearby borings*

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

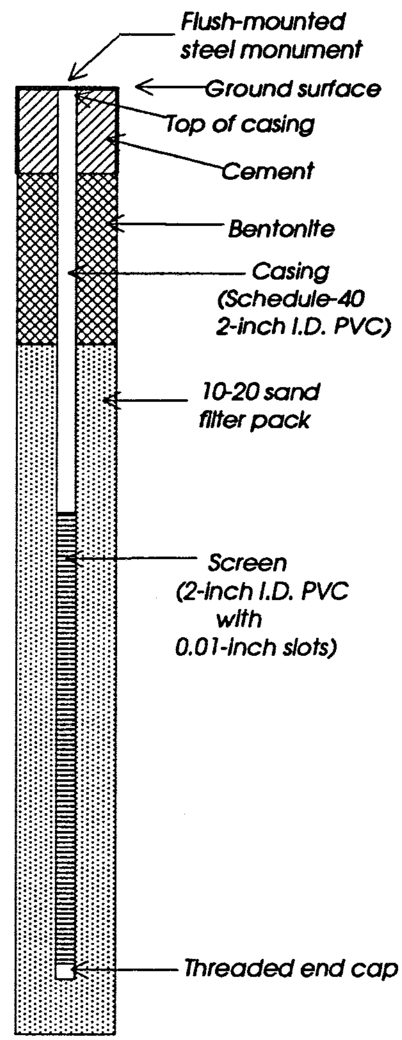
Drilling started: *10 June 1992* Drilling completed: *10 June 1992* Logged by: *MLR*

PROJECT: *Y-PAY-MOR* W.O. *W-7883-4* WELL NO. *B-5,MW-2*

Elevation reference: Well completed:
Ground surface elevation: Casing elevation:

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0							
	Medium, wet, dark gray SILT, some SAND and gravel.	I	S-1	29	0,2.5		
5	*Medium, damp to moist, dark gray SILT, some sand and gravel.*	I	S-2	28	0,2.2		
	Medium, damp, dark gray SILT, some sand and gravel	I	S-3	24	0,1.8		
10	*Loose, wet to saturated, coarse SAND, some silt, trace gravel.*	I	S-4	7	0,3.3		8240
	Dense, damp, gray SILT, some sand and gravel.	I	S-5	42	0,2.3	ATD	
15	*Stiff, wet to saturated, gray SILT, some sand and gravel.*	I	S-6	31	0,2.2		
	Stiff, wet to saturated, brown SILT, some sand.	I	S-7	15	0,2.2		
20	*Dense, saturated, gray SAND, some gravel.*	I	S-8	38	0,2.2		8240
	Bottom of boring at 20 feet.						
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

▼ ATD Observed groundwater level ATD = at time of drilling

8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

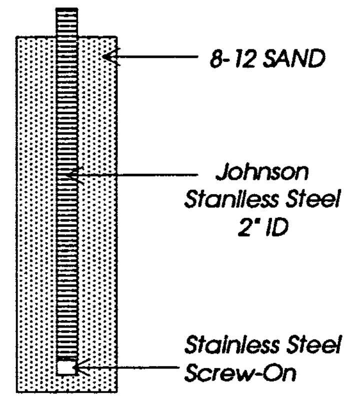
Drilling started: *25 August 1992* Drilling completed: *25 August 1992* Logged by: *DAK*

PROJECT: *Y-PAY-MOR* W.O. *W-7883-4* VAPOR POINT *B-6,VP-1*

Elevation reference:
Ground surface elevation:
Well completed:
Casing elevation:

VAPOR POINT AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0							
	Medium dense, brown SILT with gravel.	X	*S-1*	*27*			
5	*Medium dense, moist, gray SAND, some silt and gravel, peat, wood material 3" thick*	I	*S-2*	*22*	*3.6,5.2*		8240
	Medium dense, wet to saturated, brown SILT with sand, trace gravel	I	*S-3*	*30*	*0.0,1.8*		8240
10	*Bottom of boring at 7.5 feet.*						
15							
20							
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

X Sample not recovered

8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

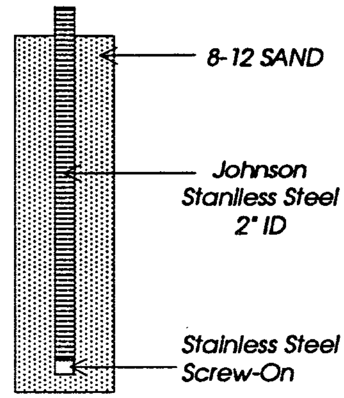
Drilling started: *26 August 1992* Drilling completed: *26 August 1992* Logged by: *DAK*

PROJECT: Y-PAY-MOR W.O. W-7883-4 VAPOR POINT B-7,VP-2

Elevation reference:
Ground surface elevation:
Well completed:
Casing elevation:

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0							
	Very dense, moist, gray GRAVEL with sand and silt.	I	S-1	73	79.0,24.0		
5	Very dense, moist, gray, SILT, with sand and trace of gravel.	I	S-2	50	38.0,8.0		8240
	Very dense, dry, gray, SILT, with sand and gravel.	I	S-3	50	25,3.7		8240
10	Bottom of boring at 7.5 feet.						
15							
20							
25							
30							

VAPOR POINT AS-BUILT DESIGN



LEGEND

I 2-inch O.D. split-spoon sample

X Sample not recovered

8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

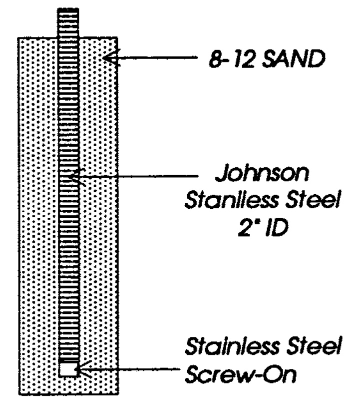
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 26 August 1992 Drilling completed: 26 August 1992 Logged by: DAK

PROJECT: *Y-PAY-MOR* W.O. *W-7883-4* VAPOR POINT *B-8,VP-3*

Elevation reference:	Well completed:	VAPOR POINT AS-BUILT DESIGN	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0							
	Very dense, moist to wet, gray SAND some silt and gravel	I	*S-1*	*58*	*22,4.1*		
5	*Dense, dry, dark gray to black SAND some silt and gravel. Peat and woody fragments abundant*	I	*S-2*	*31*	*16.7,4.1*		*8240*
	Stiff, damp, gray, silt.	I	*S-3*	*47*	*0.2.1*		*8240*
10	*Bottom of boring at 7.5 feet.*						
15							
20							
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

X Sample not recovered

8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

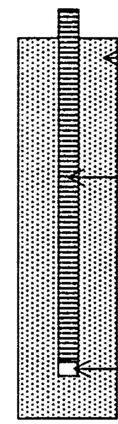
Drilling started: *27 August 1992* Drilling completed: *27 August 1992* Logged by: *DAK*

PROJECT: *Y-PAY-MOR* W.O. *W-7883-4* VAPOR POINT *B-9,VP-4*

Elevation reference:
Ground surface elevation:
Well completed:
Casing elevation:

VAPOR POINT AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0							
	Dense, damp, bark gray SAND some silt and gravel.	I	S-1	45	11.0.3.0		
5	*Loose to medium, damp, bark gray SAND, some gravel, abundant wood material.*	I	S-2	14	4.02.4		8240
	Medium, damp, gray SAND, some silt and gravel.	I	S-3	27	6.82.4		8240
10	*Bottom of boring at 8 feet.*						
15							
20							
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

X Sample not recovered

8240 EPA Method 8240 Analysis

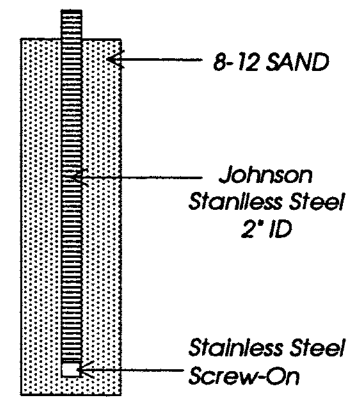
RZA AGRA, Inc.
Geotechnical & Environmental Group
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *27 August 1992* Drilling completed: *27 August 1992* Logged by: *DAK*

PROJECT: Y-PAY-MOR W.O. W-7883-4 VAPOR POINT B-10,VP-5

Elevation reference:	Well completed:	VAPOR POINT AS-BUILT DESIGN	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	M-TIP HNU	GROUND WATER	TESTING
0							
	Very dense, moist, gray GRAVEL some silt and sand.	I	S-1	72	240,131		
5	Very dense, moist, gray GRAVEL some silt and sand.	I	S-2	51	425,130		8240
	Very dense, moist, gray SILT some silt and gravel.	I	S-3	50	68,22		8240
10	Bottom of boring at 7.5 feet.						
15							
20							
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

X Sample not recovered

8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

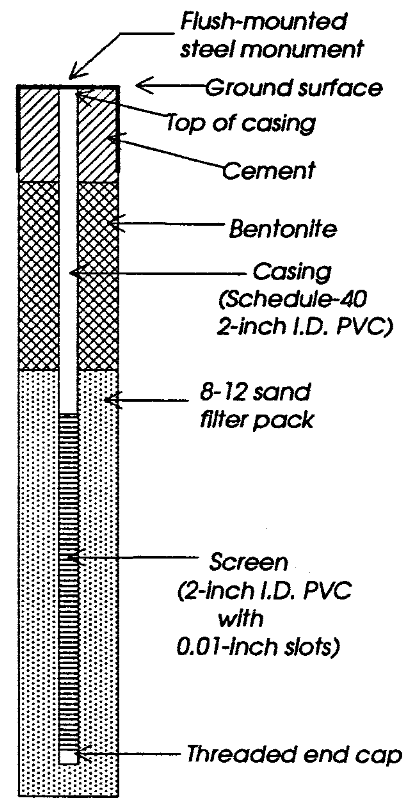
Drilling started: 28 August 1992 Drilling completed: 28 August 1992 Logged by: DAK

PROJECT: *Y-PAY-MOR* W.O. *W-7883-6* WELL NO. *B-11,MW-3*

Elevation reference:
Ground surface elevation:
Well completed:
Casing elevation:

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HNU	GROUND WATER	TESTING
0							
	Medium, wet, gray SAND, some silt and gravel (Fill)	I	S-1	14	2.8		
5	*Loose, wet, gray, SAND, with gravel and silt (Fill)*	I	S-2	4	3.0		
	Very dense, wet then dry, gray-black SAND, Abundant organic matter (Weathered Till)	I	S-3	51	3.9		8240
10	*Stiff, wet, gray, SILT, some gravel (Weathered Till)*	I	S-4	12	4.0		
	Meldum, saturated, gray-brown SAND, some gravel	I	S-5	23	4.2	ATD	8240
15	*Medium, saturated, gray-brown SAND with gravel*	I	S-6	30	4.2		8240
	Bottom of boring at 15 feet.						
20							
25							
30							



LEGEND

I 2-inch O.D. split-spoon sample

▼ ATD Observed groundwater level ATD = at time of drilling

8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

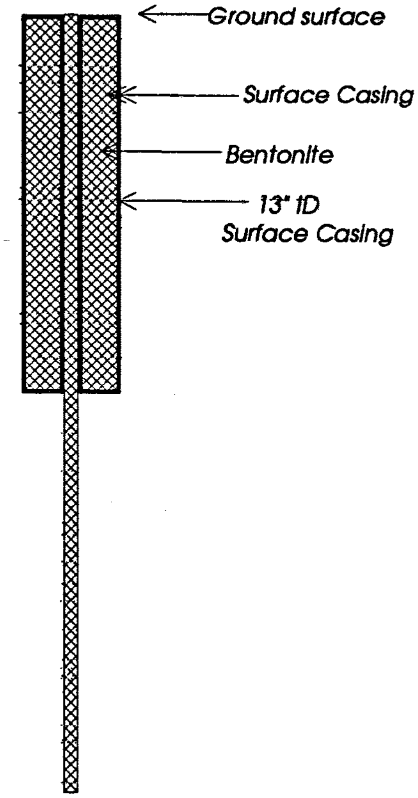
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *27 October 1992* Drilling completed: *27 October 1992* Logged by: *DAK*

PROJECT: *Y-PAY-MOR* W.O. *W-7883-6* BORING *B-12*

Elevation reference:	Well completed:	AS-BUILT DESIGN SURFACE CASED BORING	Page 1 of 1
Ground surface elevation:	Casing elevation:		

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HNU	GROUND WATER	TESTING
0							
	Moist, gray, brown SAND with silt	Grab	*S-1*	*N/A*	*450.0*		8240
5	*Very dense, moist, gray SAND, with silt, some organic matter*	Split-spoon	*S-2*	*52*	*250.0*		8240
	Hard, moist to wet, gray SILT, some gravel	Split-spoon	*S-3*	*66*	*4.0*		8240
10	*As above*	Split-spoon	*S-3b* *	*50*	*4.0*		8240
	Hard, saturated, orange-brown SILT with sand and gravel	Split-spoon	*S-4*	*50*	*4.1*	ATD	8240
15		Split-spoon	*S-5*	*65*	*2.3*		
	Bottom of boring at 16.5 feet.						
20							
25							
30							



Note: Boring B-12 was advanced to 16.5 feet through a 13:(ID) surface casing which was advanced to approximately 6.5 feet

Boring B-12 was abandoned from 0 feet to 16.5' with bentonite slurry.

LEGEND

- 2-inch O.D. split-spoon sample
- Grab sample
- * Reported as "S-36" by Analytical Testing Lab
- Observed groundwater level ATD = at time of drilling
- 8240 EPA Method 8240 Analysis

RZA AGRA, Inc.
Geotechnical & Environmental Group

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *27 October 1992* Drilling completed: *28 October 1992* Logged by: *DAK*

Appendix C

APPENDIX C

SOILS AND GROUNDWATER ANALYTICAL TEST RESULTS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-1-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-02______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8241______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __11 Date Analyzed: 06/15/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	15	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	2	J
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-1-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-02______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8241______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __11 Date Analyzed: 06/15/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	11.98	2.2	J
2.	Unknown alkylcyclohexane	12.87	16	JN
3.	Unknown C4-alkylbenzene	14.15	3.4	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-1-3

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-03

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8226

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 12 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	11	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-1-3

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-03______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8226______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __12 Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-1-4

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-04______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8231______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __14 Date Analyzed: 06/12/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	9	B
67-64-1	Acetone	7	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-1-4

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-04______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8231______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __14 Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-2-1

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-05______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1129______

Level: (low/med) MED___ Date Received: 06/11/92

% Moisture: not dec. __18 Date Analyzed: 06/11/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	530	J
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	880	B
67-64-1	Acetone	1200	BJ
75-15-0	Carbon Disulfide	760	U
75-35-4	1,1-Dichloroethene	760	U
75-34-3	1,1-Dichloroethane	760	U
156-60-5	trans-1,2-Dichloroethene	5600	
156-59-2	cis-1,2-Dichloroethene	3900	
67-66-3	Chloroform	760	U
107-06-2	1,2-Dichloroethane	760	U
78-93-3	2-Butanone	690	J
71-55-6	1,1,1-Trichloroethane	760	U
56-23-5	Carbon Tetrachloride	760	U
108-05-4	Vinyl Acetate	1500	U
75-27-4	Bromodichloromethane	760	U
78-87-5	1,2-Dichloropropane	760	U
10061-01-5	cis-1,3-Dichloropropene	760	U
79-01-6	Trichloroethene	7500	
124-48-1	Dibromochloromethane	760	U
79-00-5	1,1,2-Trichloroethane	760	U
71-43-2	Benzene	760	U
10061-02-6	trans-1,3-Dichloropropene	760	U
75-25-2	Bromoform	760	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	160000	E
79-34-5	1,1,2,2-Tetrachloroethane	3100	
108-88-3	Toluene	760	U
108-90-7	Chlorobenzene	760	U
100-41-4	Ethylbenzene	760	U
100-42-5	Styrene	760	U
1330-20-7	Xylene (total)	760	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-2-3

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8233

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 11 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	B
67-64-1	Acetone	17	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	1	J
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	55	
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-2-4

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-08

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1132

Level: (low/med) MED Date Received: 06/11/92

% Moisture: not dec. 20 Date Analyzed: 06/11/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1600	U
74-83-9	Bromomethane	1600	U
75-01-4	Vinyl Chloride	1600	U
75-00-3	Chloroethane	1600	U
75-09-2	Methylene Chloride	460	BJ
67-64-1	Acetone	1600	U
75-15-0	Carbon Disulfide	780	U
75-35-4	1,1-Dichloroethene	780	U
75-34-3	1,1-Dichloroethane	780	U
156-60-5	trans-1,2-Dichloroethene	780	U
156-59-2	cis-1,2-Dichloroethene	250	J
67-66-3	Chloroform	780	U
107-06-2	1,2-Dichloroethane	780	U
78-93-3	2-Butanone	1600	U
71-55-6	1,1,1-Trichloroethane	780	U
56-23-5	Carbon Tetrachloride	780	U
108-05-4	Vinyl Acetate	1600	U
75-27-4	Bromodichloromethane	780	U
78-87-5	1,2-Dichloropropane	780	U
10061-01-5	cis-1,3-Dichloropropene	780	U
79-01-6	Trichloroethene	780	U
124-48-1	Dibromochloromethane	780	U
79-00-5	1,1,2-Trichloroethane	780	U
71-43-2	Benzene	780	U
10061-02-6	trans-1,3-Dichloropropene	780	U
75-25-2	Bromoform	780	U
108-10-1	4-Methyl-2-Pentanone	1600	U
591-78-6	2-Hexanone	1600	U
127-18-4	Tetrachloroethene	39000	E
79-34-5	1,1,2,2-Tetrachloroethane	780	U
108-88-3	Toluene	780	U
108-90-7	Chlorobenzene	780	U
100-41-4	Ethylbenzene	780	U
100-42-5	Styrene	780	U
1330-20-7	Xylene (total)	780	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-2-1

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-05

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1129

Level: (low/med) MED Date Received: 06/11/92

% Moisture: not dec. 18 Date Analyzed: 06/11/92

Column (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:
Number TICs found: 0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-2-1DL

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-05DL

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1149

Level: (low/med) MED Date Received: 06/11/92

% Moisture: not dec. 18 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	15000	U
74-83-9	Bromomethane	15000	U
75-01-4	Vinyl Chloride	15000	U
75-00-3	Chloroethane	15000	U
75-09-2	Methylene Chloride	7600	U
67-64-1	Acetone	5300	BDJ
75-15-0	Carbon Disulfide	7600	U
75-35-4	1,1-Dichloroethene	7600	U
75-34-3	1,1-Dichloroethane	7600	U
156-60-5	trans-1,2-Dichloroethene	7600	U
156-59-2	cis-1,2-Dichloroethene	4500	DJ
67-66-3	Chloroform	7600	U
107-06-2	1,2-Dichloroethane	7600	U
78-93-3	2-Butanone	15000	U
71-55-6	1,1,1-Trichloroethane	7600	U
56-23-5	Carbon Tetrachloride	7600	U
108-05-4	Vinyl Acetate	15000	U
75-27-4	Bromodichloromethane	7600	U
78-87-5	1,2-Dichloropropane	7600	U
10061-01-5	cis-1,3-Dichloropropene	7600	U
79-01-6	Trichloroethene	7600	U
124-48-1	Dibromochloromethane	7600	U
79-00-5	1,1,2-Trichloroethane	7600	U
71-43-2	Benzene	7600	U
10061-02-6	trans-1,3-Dichloropropene	7600	U
75-25-2	Bromoform	7600	U
108-10-1	4-Methyl-2-Pentanone	15000	U
591-78-6	2-Hexanone	15000	U
127-18-4	Tetrachloroethene	260000	D
79-34-5	1,1,2,2-Tetrachloroethane	7600	U
108-88-3	Toluene	7600	U
108-90-7	Chlorobenzene	7600	U
100-41-4	Ethylbenzene	7600	U
100-42-5	Styrene	7600	U
1330-20-7	Xylene (total)	7600	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-2-1DL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-05DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1149______

Level: (low/med) MED___ Date Received: 06/11/92

% Moisture: not dec. __18 Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 10______

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-2-2

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-06

Sample wt/vol: 1.0 (g/mL) G Lab File ID: B8225

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 13 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	57	U
74-83-9	Bromomethane	57	U
75-01-4	Vinyl Chloride	57	U
75-00-3	Chloroethane	57	U
75-09-2	Methylene Chloride	31	B
67-64-1	Acetone	51	J
75-15-0	Carbon Disulfide	29	U
75-35-4	1,1-Dichloroethene	29	U
75-34-3	1,1-Dichloroethane	29	U
156-60-5	trans-1,2-Dichloroethene	29	U
156-59-2	cis-1,2-Dichloroethene	29	U
67-66-3	Chloroform	29	U
107-06-2	1,2-Dichloroethane	29	U
78-93-3	2-Butanone	57	U
71-55-6	1,1,1-Trichloroethane	29	U
56-23-5	Carbon Tetrachloride	29	U
108-05-4	Vinyl Acetate	57	U
75-27-4	Bromodichloromethane	29	U
78-87-5	1,2-Dichloropropane	29	U
10061-01-5	cis-1,3-Dichloropropene	29	U
79-01-6	Trichloroethene	29	U
124-48-1	Dibromochloromethane	29	U
79-00-5	1,1,2-Trichloroethane	29	U
71-43-2	Benzene	29	U
10061-02-6	trans-1,3-Dichloropropene	29	U
75-25-2	Bromoform	29	U
108-10-1	4-Methyl-2-Pentanone	57	U
591-78-6	2-Hexanone	57	U
127-18-4	Tetrachloroethene	340	
79-34-5	1,1,2,2-Tetrachloroethane	29	U
108-88-3	Toluene	29	U
108-90-7	Chlorobenzene	29	U
100-41-4	Ethylbenzene	29	U
100-42-5	Styrene	29	U
1330-20-7	Xylene (total)	29	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-2-2

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-06

Sample wt/vol: 1.0 (g/mL) G Lab File ID: B8225

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 13 Date Analyzed: 06/12/92

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B7-S3

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-06______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8814______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __11 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-2-3

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8233

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 11 Date Analyzed: 06/12/92

Column (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 2

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	16.03	2.2	J
2.	Bicycloheptanone, trimethyl-	17.30	3.4	JN

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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-2-4

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL___ Lab Sample ID: 4121-08______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1132______

Level: (low/med) MED___ Date Received: 06/11/92

% Moisture: not dec. __20 Date Analyzed: 06/11/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-2-4DL

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-08DL

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1181

Level: (low/med) MED Date Received: 06/11/92

% Moisture: not dec. 20 Date Analyzed: 06/17/92

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	3100	U
74-83-9	Bromomethane	3100	U
75-01-4	Vinyl Chloride	3100	U
75-00-3	Chloroethane	3100	U
75-09-2	Methylene Chloride	1200	BDJ
67-64-1	Acetone	3100	U
75-15-0	Carbon Disulfide	1600	U
75-35-4	1,1-Dichloroethene	1600	U
75-34-3	1,1-Dichloroethane	1600	U
156-60-5	trans-1,2-Dichloroethene	1600	U
156-59-2	cis-1,2-Dichloroethene	1400	DJ
67-66-3	Chloroform	1600	U
107-06-2	1,2-Dichloroethane	1600	U
78-93-3	2-Butanone	3100	U
71-55-6	1,1,1-Trichloroethane	1600	U
56-23-5	Carbon Tetrachloride	1600	U
108-05-4	Vinyl Acetate	3100	U
75-27-4	Bromodichloromethane	1600	U
78-87-5	1,2-Dichloropropane	1600	U
10061-01-5	cis-1,3-Dichloropropene	1600	U
79-01-6	Trichloroethene	1600	U
124-48-1	Dibromochloromethane	1600	U
79-00-5	1,1,2-Trichloroethane	1600	U
71-43-2	Benzene	1600	U
10061-02-6	trans-1,3-Dichloropropene	1600	U
75-25-2	Bromoform	1600	U
108-10-1	4-Methyl-2-Pentanone	3100	U
591-78-6	2-Hexanone	3100	U
127-18-4	Tetrachloroethene	53000	D
79-34-5	1,1,2,2-Tetrachloroethane	1600	U
108-88-3	Toluene	1600	U
108-90-7	Chlorobenzene	1600	U
100-41-4	Ethylbenzene	1600	U
100-42-5	Styrene	1600	U
1330-20-7	Xylene (total)	1600	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-2-4DL

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-08DL

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1181

Level: (low/med) MED Date Received: 06/11/92

% Moisture: not dec. 20 Date Analyzed: 06/17/92

Column (pack/cap) CAP Dilution Factor: 2.0

CONCENTRATION UNITS:

Number TICs found: 0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

000020

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-3-1

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-09

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8234

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 25 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	9	B
67-64-1	Acetone	47	
75-15-0	Carbon Disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
156-60-5	trans-1,2-Dichloroethene	7	U
156-59-2	cis-1,2-Dichloroethene	10	
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	12	J
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	7	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-Dichloropropene	7	U
75-25-2	Bromoform	7	U
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	28	
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	7	U
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Xylene (total)	7	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-3-1

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: ______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-09______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8234______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __25 Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: __7

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown terpene	12.06	21	JN
2.	Unknown terpene	12.48	5.3	JN
3.	Unknown alkylcyclohexane	12.93	44	JN
4.	Bicycloheptane, trimethyl-	13.08	12	JN
5.	Unknown terpene	14.14	8.0	JN
6.	Unknown	16.04	4.0	JN
7.	Bicycloheptanone, trimethyl-	17.32	5.3	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-3-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-10______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8235______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __20 Date Analyzed: 06/12/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	6	BJ
67-64-1	Acetone	21	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	2	J
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	J
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-3-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-10______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8235______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __20 Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-3-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-11_____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8216______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __11 Date Analyzed: 06/11/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	BJ
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-3-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-11______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8216______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __11 Date Analyzed: 06/11/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-3-3B

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) WATER Lab Sample ID: 4121-12

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: A1152

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	5	BJ
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	2	J
156-59-2	cis-1,2-Dichloroethene	48	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	33	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	20	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-3-3B

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) WATER_ Lab Sample ID: 4121-12______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A1152______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. ____ Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-4-1

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-13

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8232

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 30 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14	U
74-83-9	Bromomethane	14	U
75-01-4	Vinyl Chloride	14	U
75-00-3	Chloroethane	14	U
75-09-2	Methylene Chloride	13	B
67-64-1	Acetone	190	
75-15-0	Carbon Disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
156-60-5	trans-1,2-Dichloroethene	7	U
156-59-2	cis-1,2-Dichloroethene	66	
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	32	
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	7	U
108-05-4	Vinyl Acetate	14	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-Dichloropropene	7	U
75-25-2	Bromoform	7	U
108-10-1	4-Methyl-2-Pentanone	14	U
591-78-6	2-Hexanone	14	U
127-18-4	Tetrachloroethene	13	
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	6	J
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Xylene (total)	7	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-4-1

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-13

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8232

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 30 Date Analyzed: 06/12/92

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 7

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	12.04	4.3	J
2.	Unknown alkylcyclohexane	12.90	400	JN
3.	Bicycloheptane, trimethyl-	13.05	40	JN
4.	Unknown hydrocarbon	13.23	4.3	JN
5.	Unknown C4-alkylbenzene	14.17	11	JN
6.	Bicycloheptanone, trimethyl-	16.01	74	JN
7.	Bicycloheptanone, trimethyl-	17.28	29	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-4-1RE

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-13RE____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8239______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __30 Date Analyzed: 06/15/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14	U
74-83-9	Bromomethane	14	U
75-01-4	Vinyl Chloride	14	U
75-00-3	Chloroethane	14	U
75-09-2	Methylene Chloride	11	
67-64-1	Acetone	230	
75-15-0	Carbon Disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
156-60-5	trans-1,2-Dichloroethene	7	U
156-59-2	cis-1,2-Dichloroethene	56	
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	32	
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	7	U
108-05-4	Vinyl Acetate	14	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-Dichloropropene	7	U
75-25-2	Bromoform	7	U
108-10-1	4-Methyl-2-Pentanone	14	U
591-78-6	2-Hexanone	14	U
127-18-4	Tetrachloroethene	11	
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	6	J
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Xylene (total)	7	U

000031

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-4-1RE

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-13RE____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8239______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __30 Date Analyzed: 06/15/92

Column (pack/cap) CAP____ Dilution Factor: 1.0_____

Number TICs found: __5

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown alkylcyclohexane	12.85	210	JN
2.	Bicycloheptane, trimethyl-	13.00	23	JN
3.	Unknown C4-alkylbenzene	14.12	10	JN
4.	Bicycloheptanone, trimethyl-	15.96	59	JN
5.	Bicycloheptanone, trimethyl-	17.24	21	JN

000032

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-4-2

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-14

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8228

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 14 Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	7	B
67-64-1	Acetone	19	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

000033

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-4-2

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: 4121-14

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8228

Level: (low/med) LOW Date Received: 06/11/92

% Moisture: not dec. 14 Date Analyzed: 06/12/92

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

000034

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BW-4-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-15______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8229______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __12 Date Analyzed: 06/12/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	19	B
67-64-1	Acetone	7	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

BW-4-3

Lab Name: PNELI______________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: 4121-15______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8229______

Level: (low/med) LOW___ Date Received: 06/11/92

% Moisture: not dec. __12 Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: __0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBD

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: VBLKBD

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8205

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 06/11/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBD

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBD_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8205______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/11/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAW

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAW_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1125______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/11/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	350	J
67-64-1	Acetone	1100	J
75-15-0	Carbon Disulfide	620	U
75-35-4	1,1-Dichloroethene	620	U
75-34-3	1,1-Dichloroethane	620	U
156-60-5	trans-1,2-Dichloroethene	620	U
156-59-2	cis-1,2-Dichloroethene	620	U
67-66-3	Chloroform	620	U
107-06-2	1,2-Dichloroethane	620	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	620	U
56-23-5	Carbon Tetrachloride	620	U
108-05-4	Vinyl Acetate	1200	U
75-27-4	Bromodichloromethane	620	U
78-87-5	1,2-Dichloropropane	620	U
10061-01-5	cis-1,3-Dichloropropene	620	U
79-01-6	Trichloroethene	620	U
124-48-1	Dibromochloromethane	620	U
79-00-5	1,1,2-Trichloroethane	620	U
71-43-2	Benzene	620	U
10061-02-6	trans-1,3-Dichloropropene	620	U
75-25-2	Bromoform	620	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	420	J
127-18-4	Tetrachloroethene	620	U
79-34-5	1,1,2,2-Tetrachloroethane	620	U
108-88-3	Toluene	620	U
108-90-7	Chlorobenzene	620	U
100-41-4	Ethylbenzene	620	U
100-42-5	Styrene	620	U
1330-20-7	Xylene (total)	620	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAW

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAW_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1125______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/11/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAX

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: VBLKAX

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1146

Level: (low/med) MED Date Received:

% Moisture: not dec. Date Analyzed: 06/12/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	510	J
67-64-1	Acetone	710	J
75-15-0	Carbon Disulfide	620	U
75-35-4	1,1-Dichloroethene	620	U
75-34-3	1,1-Dichloroethane	620	U
156-60-5	trans-1,2-Dichloroethene	620	U
156-59-2	cis-1,2-Dichloroethene	620	U
67-66-3	Chloroform	620	U
107-06-2	1,2-Dichloroethane	620	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	620	U
56-23-5	Carbon Tetrachloride	620	U
108-05-4	Vinyl Acetate	1200	U
75-27-4	Bromodichloromethane	620	U
78-87-5	1,2-Dichloropropane	620	U
10061-01-5	cis-1,3-Dichloropropene	620	U
79-01-6	Trichloroethene	620	U
124-48-1	Dibromochloromethane	620	U
79-00-5	1,1,2-Trichloroethane	620	U
71-43-2	Benzene	620	U
10061-02-6	trans-1,3-Dichloropropene	620	U
75-25-2	Bromoform	620	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	620	U
79-34-5	1,1,2,2-Tetrachloroethane	620	U
108-88-3	Toluene	620	U
108-90-7	Chlorobenzene	620	U
100-41-4	Ethylbenzene	620	U
100-42-5	Styrene	620	U
1330-20-7	Xylene (total)	620	U

000041

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAX

Lab Name: PNELI____________________ Contract: __________

Lab Code: PNELI__ Case No.: BLANK_ SAS No.: _______ SDG No.: ______

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAX_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1146______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. _____ Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: __0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBD

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBD______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8222______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/12/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBD

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBD_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8222______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/12/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBF

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBF_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8239______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/15/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

000045

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBF

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBF_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8238______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/15/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAZ

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4121 SAS No.: SDG No.: BW-1-1

Matrix: (soil/water) SOIL Lab Sample ID: VBLKAZ

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1179

Level: (low/med) MED Date Received:

% Moisture: not dec. Date Analyzed: 06/17/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	180	J
67-64-1	Acetone	200	J
75-15-0	Carbon Disulfide	620	U
75-35-4	1,1-Dichloroethene	620	U
75-34-3	1,1-Dichloroethane	620	U
156-60-5	trans-1,2-Dichloroethene	620	U
156-59-2	cis-1,2-Dichloroethene	620	U
67-66-3	Chloroform	620	U
107-06-2	1,2-Dichloroethane	620	U
78-93-3	2-Butanone	540	J
71-55-6	1,1,1-Trichloroethane	620	U
56-23-5	Carbon Tetrachloride	620	U
108-05-4	Vinyl Acetate	1200	U
75-27-4	Bromodichloromethane	620	U
78-87-5	1,2-Dichloropropane	620	U
10061-01-5	cis-1,3-Dichloropropene	620	U
79-01-6	Trichloroethene	620	U
124-48-1	Dibromochloromethane	620	U
79-00-5	1,1,2-Trichloroethane	620	U
71-43-2	Benzene	620	U
10061-02-6	trans-1,3-Dichloropropene	620	U
75-25-2	Bromoform	620	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	620	U
79-34-5	1,1,2,2-Tetrachloroethane	620	U
108-88-3	Toluene	620	U
108-90-7	Chlorobenzene	620	U
100-41-4	Ethylbenzene	620	U
100-42-5	Styrene	620	U
1330-20-7	Xylene (total)	620	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAZ

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4121__ SAS No.: _______ SDG No.: BW-1-1

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAZ_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1179______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 06/17/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S1

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-22______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8854______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. ___9 Date Analyzed: 09/09/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	1	BJ
67-64-1	Acetone	4200	BE
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B10-S1

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-22______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8854______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. ___9 Date Analyzed: 09/09/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: __1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 67630	2-Propanol	4.07	7000	JN

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S1DL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-22DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1940______

Level: (low/med) MED___ Date Received: 08/31/92

% Moisture: not dec. ___9 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	1200	BD
67-64-1	Acetone	4400	BD
75-15-0	Carbon Disulfide	690	U
75-35-4	1,1-Dichloroethene	690	U
75-34-3	1,1-Dichloroethane	690	U
156-60-5	trans-1,2-Dichloroethene	690	U
156-59-2	cis-1,2-Dichloroethene	690	U
67-66-3	Chloroform	690	U
107-06-2	1,2-Dichloroethane	690	U
78-93-3	2-Butanone	1100	BDJ
71-55-6	1,1,1-Trichloroethane	690	U
56-23-5	Carbon Tetrachloride	690	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	690	U
78-87-5	1,2-Dichloropropane	690	U
10061-01-5	cis-1,3-Dichloropropene	690	U
79-01-6	Trichloroethene	690	U
124-48-1	Dibromochloromethane	690	U
79-00-5	1,1,2-Trichloroethane	690	U
71-43-2	Benzene	690	U
10061-02-6	trans-1,3-Dichloropropene	690	U
75-25-2	Bromoform	690	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	690	U
79-34-5	1,1,2,2-Tetrachloroethane	690	U
108-88-3	Toluene	690	U
108-90-7	Chlorobenzene	690	U
100-41-4	Ethylbenzene	690	U
100-42-5	Styrene	690	U
1330-20-7	Xylene (total)	690	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B10-S1DL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-22DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1940______

Level: (low/med) MED___ Date Received: 08/31/92

% Moisture: not dec. ___9 Date Analyzed: 09/03/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __1 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 735428	2-Propanol (ACN)(9CI)	1.89	11000	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-11_____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8853______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. ___8 Date Analyzed: 09/09/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	3	BJ
67-64-1	Acetone	3800	BE
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	3	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	6	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B10-S2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-11______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8853______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. ___8 Date Analyzed: 09/09/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 67630	2-Propanol	3.55	4100	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S2MS

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-11MS____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1942______

Level: (low/med) MED___ Date Received: 08/31/92

% Moisture: not dec. ___8 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	310	BJ
67-64-1	Acetone	11000	B
75-15-0	Carbon Disulfide	680	U
75-35-4	1,1-Dichloroethene	680	U
75-34-3	1,1-Dichloroethane	680	U
156-60-5	trans-1,2-Dichloroethene	680	U
156-59-2	cis-1,2-Dichloroethene	270	J
67-66-3	Chloroform	680	U
107-06-2	1,2-Dichloroethane	680	U
78-93-3	2-Butanone	1200	BJ
71-55-6	1,1,1-Trichloroethane	680	U
56-23-5	Carbon Tetrachloride	680	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	680	U
78-87-5	1,2-Dichloropropane	680	U
10061-01-5	cis-1,3-Dichloropropene	680	U
79-01-6	Trichloroethene	680	U
124-48-1	Dibromochloromethane	680	U
79-00-5	1,1,2-Trichloroethane	680	U
71-43-2	Benzene	680	U
10061-02-6	trans-1,3-Dichloropropene	680	U
75-25-2	Bromoform	680	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	680	U
79-34-5	1,1,2,2-Tetrachloroethane	680	U
108-88-3	Toluene	680	U
108-90-7	Chlorobenzene	680	U
100-41-4	Ethylbenzene	680	U
100-42-5	Styrene	680	U
1330-20-7	Xylene (total)	680	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S2MSD

Lab Name: PNELI______________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-11MSD___

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1943______

Level: (low/med) MED___ Date Received: 08/31/92

% Moisture: not dec. ___8 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	390	BJ
67-64-1	Acetone	12000	B
75-15-0	Carbon Disulfide	680	U
75-35-4	1,1-Dichloroethene	680	U
75-34-3	1,1-Dichloroethane	680	U
156-60-5	trans-1,2-Dichloroethene	680	U
156-59-2	cis-1,2-Dichloroethene	290	J
67-66-3	Chloroform	680	U
107-06-2	1,2-Dichloroethane	680	U
78-93-3	2-Butanone	1600	B
71-55-6	1,1,1-Trichloroethane	680	U
56-23-5	Carbon Tetrachloride	680	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	680	U
78-87-5	1,2-Dichloropropane	680	U
10061-01-5	cis-1,3-Dichloropropene	680	U
79-01-6	Trichloroethene	680	U
124-48-1	Dibromochloromethane	680	U
79-00-5	1,1,2-Trichloroethane	680	U
71-43-2	Benzene	680	U
10061-02-6	trans-1,3-Dichloropropene	680	U
75-25-2	Bromoform	680	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	680	U
79-34-5	1,1,2,2-Tetrachloroethane	680	U
108-88-3	Toluene	680	U
108-90-7	Chlorobenzene	680	U
100-41-4	Ethylbenzene	680	U
100-42-5	Styrene	680	U
1330-20-7	Xylene (total)	680	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S2DL

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-11DL

Sample wt/vol: 4.0 (g/mL) G Lab File ID: A1941

Level: (low/med) MED Date Received: 08/31/92

% Moisture: not dec. 8 Date Analyzed: 09/03/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	470	BDJ
67-64-1	Acetone	12000	BD
75-15-0	Carbon Disulfide	680	U
75-35-4	1,1-Dichloroethene	680	U
75-34-3	1,1-Dichloroethane	680	U
156-60-5	trans-1,2-Dichloroethene	680	U
156-59-2	cis-1,2-Dichloroethene	340	DJ
67-66-3	Chloroform	680	U
107-06-2	1,2-Dichloroethane	680	U
78-93-3	2-Butanone	1700	BD
71-55-6	1,1,1-Trichloroethane	680	U
56-23-5	Carbon Tetrachloride	680	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	680	U
78-87-5	1,2-Dichloropropane	680	U
10061-01-5	cis-1,3-Dichloropropene	680	U
79-01-6	Trichloroethene	680	U
124-48-1	Dibromochloromethane	680	U
79-00-5	1,1,2-Trichloroethane	680	U
71-43-2	Benzene	680	U
10061-02-6	trans-1,3-Dichloropropene	680	U
75-25-2	Bromoform	680	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	680	U
79-34-5	1,1,2,2-Tetrachloroethane	680	U
108-88-3	Toluene	680	U
108-90-7	Chlorobenzene	680	U
100-41-4	Ethylbenzene	680	U
100-42-5	Styrene	680	U
1330-20-7	Xylene (total)	680	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B10-S2DL

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-11DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1941______

Level: (low/med) MED___ Date Received: 08/31/92

% Moisture: not dec. ___8 Date Analyzed: 09/03/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __1 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 1001050	ISOPROPANOL	1.89	16000	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B10-S3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-12______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8825______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. ___9 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	8	
67-64-1	Acetone	150	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B10-S3

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-12______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8825______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. ___9 Date Analyzed: 09/03/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 67630	isopropanol	3.43	6.6	JN

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B5-S4

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-02______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8810______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __16 Date Analyzed: 09/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	26	
67-64-1	Acetone	18	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B5-S4

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-02______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8810______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __16 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: __0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B5-S8

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8841

Level: (low/med) LOW Date Received: 08/31/92

% Moisture: not dec. 13 Date Analyzed: 09/04/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	16	B
67-64-1	Acetone	13	B
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B5-S8

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-01______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8841______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/04/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: __0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B5-S8MS

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-01MS____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8831______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	8	
67-64-1	Acetone	14	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B5-S8MSD

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-01MSD___

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8833______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	12	
67-64-1	Acetone	15	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B6-S2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-03______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8811______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	13	
67-64-1	Acetone	12	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	3	J
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	62	
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B6-S2

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-03______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8811______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B6-S3

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-04______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8812______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __31 Date Analyzed: 09/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14	U
74-83-9	Bromomethane	14	U
75-01-4	Vinyl Chloride	14	U
75-00-3	Chloroethane	14	U
75-09-2	Methylene Chloride	21	
67-64-1	Acetone	110	
75-15-0	Carbon Disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
156-60-5	trans-1,2-Dichloroethene	7	U
156-59-2	cis-1,2-Dichloroethene	3	J
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	10	BJ
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	7	U
108-05-4	Vinyl Acetate	14	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-Dichloropropene	7	U
75-25-2	Bromoform	7	U
108-10-1	4-Methyl-2-Pentanone	14	U
591-78-6	2-Hexanone	14	U
127-18-4	Tetrachloroethene	4	J
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	7	U
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Xylene (total)	7	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B6-S3

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-04______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8812______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __31 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __4 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	12.12	5.8	JN
2.	UNKNOWN ALKYLCYCLOALKANE	12.99	36	JN
3.	Bicycloheptane, trimethyl-	13.14	4.3	JN
4.	UNKNOWN C4 ALKYLBENZENE	14.26	14	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B7-S2

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-05

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8813

Level: (low/med) LOW Date Received: 08/31/92

% Moisture: not dec. 13 Date Analyzed: 09/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	8	
67-64-1	Acetone	77	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	3	J
156-59-2	cis-1,2-Dichloroethene	240	E
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	460	E
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	1	J
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B7-S2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-05______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8813______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __3

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN ALKYLCYCLOALKANE	13.02	62	JN
2.	Bicycloheptanone, trimethyl-	16.14	3.4	JN
3.	Bicycloheptanone, trimethyl-	17.40	3.4	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B7-S2DL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-05DL____

Sample wt/vol: __1.0 (g/mL) G___ Lab File ID: B8834______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __13 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	57	U
74-83-9	Bromomethane	57	U
75-01-4	Vinyl Chloride	57	U
75-00-3	Chloroethane	57	U
75-09-2	Methylene Chloride	90	D
67-64-1	Acetone	120	D
75-15-0	Carbon Disulfide	29	U
75-35-4	1,1-Dichloroethene	29	U
75-34-3	1,1-Dichloroethane	29	U
156-60-5	trans-1,2-Dichloroethene	29	U
156-59-2	cis-1,2-Dichloroethene	420	D
67-66-3	Chloroform	29	U
107-06-2	1,2-Dichloroethane	29	U
78-93-3	2-Butanone	57	U
71-55-6	1,1,1-Trichloroethane	29	U
56-23-5	Carbon Tetrachloride	29	U
108-05-4	Vinyl Acetate	57	U
75-27-4	Bromodichloromethane	29	U
78-87-5	1,2-Dichloropropane	29	U
10061-01-5	cis-1,3-Dichloropropene	29	U
79-01-6	Trichloroethene	29	U
124-48-1	Dibromochloromethane	29	U
79-00-5	1,1,2-Trichloroethane	29	U
71-43-2	Benzene	29	U
10061-02-6	trans-1,3-Dichloropropene	29	U
75-25-2	Bromoform	29	U
108-10-1	4-Methyl-2-Pentanone	57	U
591-78-6	2-Hexanone	57	U
127-18-4	Tetrachloroethene	570	D
79-34-5	1,1,2,2-Tetrachloroethane	29	U
108-88-3	Toluene	29	U
108-90-7	Chlorobenzene	29	U
100-41-4	Ethylbenzene	29	U
100-42-5	Styrene	29	U
1330-20-7	Xylene (total)	29	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B7-S2DL

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-05DL

Sample wt/vol: 1.0 (g/mL) G Lab File ID: B8834

Level: (low/med) LOW Date Received: 08/31/92

% Moisture: not dec. 13 Date Analyzed: 09/03/92

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 67630	ISOPROPANOL	3.47	46	J
2.	UNKNOWN ALKYLCYCLOHEXANE	13.02	140	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B7-S3

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: ______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-06_____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8814_____

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __11 Date Analyzed: 09/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	
67-64-1	Acetone	150	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	4	BJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B8-S2

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8823

Level: (low/med) LOW Date Received: 08/31/92

% Moisture: not dec. 15 Date Analyzed: 09/03/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	8	
67-64-1	Acetone	98	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	1	J
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B8-S2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-07______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8823______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __15 Date Analyzed: 09/03/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __4

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN ALKYLCYCLOHEXANE	12.99	49	JN
2.	Bicycloheptane, trimethyl-	13.15	7.1	JN
3.	Bicycloheptanone, trimethyl-	16.12	4.7	JN
4.	Bicycloheptanone, trimethyl-	17.38	3.5	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B8-S3

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-08

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8816

Level: (low/med) LOW Date Received: 08/31/92

% Moisture: not dec. 11 Date Analyzed: 09/02/92

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	77	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B8-S3

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: ______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-08_____

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8816_____

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __11 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __1 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN ALKYLCYCLOHEXANE	13.02	3.4	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B9-S2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-09______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8815______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __17 Date Analyzed: 09/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	5	J
67-64-1	Acetone	120	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	11	
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	3	BJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	15	
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B9-S2

Lab Name: PNELI______________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-09______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8815______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __17 Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __6

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN TERPENE	12.15	29	JN
2.	UNKNOWN TERPENE	12.57	6.0	JN
3.	UNKNOWN ALKYLCYCLOHEXANE	13.02	22	JN
4.	UNKNOWN	13.19	7.2	JN
5.	UNKNOWN TERPENE	14.23	11	JN
6.	Bicycloheptanone, trimethyl-	16.15	6.0	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B9-S3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: 4329-10______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8824______

Level: (low/med) LOW___ Date Received: 08/31/92

% Moisture: not dec. __12 Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	J
67-64-1	Acetone	170	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	8	J
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B9-S3

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: 4329-10

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8824

Level: (low/med) LOW Date Received: 08/31/92

% Moisture: not dec. 12 Date Analyzed: 09/03/92

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

2B

SOIL VOLATILE SURROGATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Level:(low/med) LOW___ ___

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	B10-S1	103	98	102	0	0
02	B10-S2	101	92	101	0	0
03	B10-S3	102	97	101	0	0
04	B5-S4	105	95	101	0	0
05	B5-S8	108	101	104	0	0
06	B6-S2	109	101	96	0	0
07	B6-S3	98	100	97	0	0
08	B7-S2	107	77	97	0	0
09	B7-S2DL	101	98	105	0	0
10	B7-S3	101	99	95	0	0
11	B8-S2	106	97	107	0	0
12	B8-S3	100	99	100	0	0
13	B9-S2	110	88	104	0	0
14	B9-S3	104	92	99	0	0
15	B5-S8MS	94	91	95	0	0
16	B5-S8MSD	105	101	111	0	0
17	VBLKBN	101	97	96	0	0
18	VBLKBO	94	93	105	0	0
19	VBLKBP	105	100	105	0	0
20	VBLKBQ	98	96	95	0	0

		QC LIMITS
S1 (TOL)	= Toluene-d8	(81-117)
S2 (BFB)	= Bromofluorobenzene	(74-121)
S3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2B

SOIL VOLATILE SURROGATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Level:(low/med) MED___ ___

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	B10-S1DL	96	93	94	0	0
02	B10-S2DL	103	101	98	0	0
03	B10-S2MS	102	103	102	0	0
04	B10-S2MSD	103	102	105	0	0
05	VBLKAR	102	102	97	0	0

	QC LIMITS
S1 (TOL) = Toluene-d8	(81-117)
S2 (BFB) = Bromofluorobenzene	(74-121)
S3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix Spike - EPA Sample No.: B10-S2DL_____ Level:(low/med) MED___

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene______	6790	0	4700	69	59-172
Trichloroethene________	6790	0	6700	99	62-137
Benzene________________	6790	0	6900	102	66-142
Toluene________________	6790	0	6640	98	59-139
Chlorobenzene__________	6790	0	6880	101	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene______	6790	4840	71	-3	22	59-172
Trichloroethene________	6790	6790	100	-1	24	62-137
Benzene________________	6790	6780	100	2	21	66-142
Toluene________________	6790	6660	98	0	21	59-139
Chlorobenzene__________	6790	6980	103	-2	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: __0 out of __5 outside limits
Spike Recovery: __0 out of _10 outside limits

COMMENTS: 4239-11 B10-S2
INST.ID:HPMSD-A (30M

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix Spike - EPA Sample No.: B5-S8________ Level:(low/med) LOW___

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene_____	57.5	0	54.8	95	59-172
Trichloroethene________	57.5	0	62.0	108	62-137
Benzene________________	57.5	0	61.7	107	66-142
Toluene________________	57.5	0	60.3	105	59-139
Chlorobenzene__________	57.5	0	61.5	107	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene_____	57.5	60.1	104	-9	22	59-172
Trichloroethene________	57.5	62.8	109	-1	24	62-137
Benzene________________	57.5	61.4	107	0	21	66-142
Toluene________________	57.5	64.9	113	-7	21	59-139
Chlorobenzene__________	57.5	63.4	110	-3	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: __0 out of __5 outside limits
Spike Recovery: __0 out of _10 outside limits

COMMENTS: 4329-01 B5-S8
INST.ID:HPMSD-B (30M

VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID: B8808______ Lab Sample ID: VBLKBN_______

Date Analyzed: 09/02/92 Time Analyzed: 1113____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B5-S4	4329-02	B8810	1228
02	B6-S2	4329-03	B8811	1300
03	B6-S3	4329-04	B8812	1332
04	B7-S2	4329-05	B8813	1526
05	B7-S3	4329-06	B8814	1607
06	B8-S3	4329-08	B8816	1711
07	B9-S2	4329-09	B8815	1639

COMMENTS: VBLKBN
INST.ID:HPMSD-B (30M

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID: B8822______ Lab Sample ID: VBLKBO_______

Date Analyzed: 09/03/92 Time Analyzed: 0847____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B10-S3	4329-12	B8825	1027
02	B7-S2DL	4329-05DL	B8834	1720
03	B8-S2	4329-07	B8823	0925
04	B9-S3	4329-10	B8824	0956
05	B5-S8MS	4329-01MS	B8831	1614
06	B5-S8MSD	4329-01MSD	B8833	1645

COMMENTS: VBLKBO
INST.ID:HPMSD-B (30M

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID: A1938______ Lab Sample ID: VBLKAR_______

Date Analyzed: 09/03/92 Time Analyzed: 1336____

Matrix: (soil/water) SOIL__ Level:(low/med) MED___

Instrument ID: HPMSD-A_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B10-S1DL	4329-22DL	A1940	1449
02	B10-S2DL	4329-11DL	A1941	1529
03	B10-S2MS	4329-11MS	A1942	1602
04	B10-S2MSD	4329-11MSD	A1943	1636

COMMENTS: VBLKAR
INST.ID:HPMSD-A (30M

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID: B8840______ Lab Sample ID: VBLKBP_______

Date Analyzed: 09/04/92 Time Analyzed: 0936____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B5-S8	4329-01	B8841	1015

COMMENTS: VBLKBP
INST.ID:HPMSD-B (30M

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID: B8840______ Lab Sample ID: VBLKBP_______

Date Analyzed: 09/04/92 Time Analyzed: 0936____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B5-S8	4329-01	B8841	1015

COMMENTS: VBLKBP
INST.ID:HPMSD-B (30M

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI_____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID: B8852______ Lab Sample ID: VBLKBQ_______

Date Analyzed: 09/09/92 Time Analyzed: 0935____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B10-S1	4329-22	B8854	1046
02	B10-S2	4329-11	B8853	1012

COMMENTS: VBLKBQ
INST.ID:HPMSD-B (30M

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBN

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBN_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8808______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	2	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBN

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBN_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8808______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBO

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBO_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8822______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBO

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBO_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8822______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/03/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAR

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAR_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1938______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/03/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	360	J
67-64-1	Acetone	520	J
75-15-0	Carbon Disulfide	620	U
75-35-4	1,1-Dichloroethene	620	U
75-34-3	1,1-Dichloroethane	620	U
156-60-5	trans-1,2-Dichloroethene	620	U
156-59-2	cis-1,2-Dichloroethene	620	U
67-66-3	Chloroform	620	U
107-06-2	1,2-Dichloroethane	620	U
78-93-3	2-Butanone	1100	J
71-55-6	1,1,1-Trichloroethane	620	U
56-23-5	Carbon Tetrachloride	620	U
108-05-4	Vinyl Acetate	1200	U
75-27-4	Bromodichloromethane	620	U
78-87-5	1,2-Dichloropropane	620	U
10061-01-5	cis-1,3-Dichloropropene	620	U
79-01-6	Trichloroethene	620	U
124-48-1	Dibromochloromethane	620	U
79-00-5	1,1,2-Trichloroethane	620	U
71-43-2	Benzene	620	U
10061-02-6	trans-1,3-Dichloropropene	620	U
75-25-2	Bromoform	620	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	620	U
79-34-5	1,1,2,2-Tetrachloroethane	620	U
108-88-3	Toluene	620	U
108-90-7	Chlorobenzene	620	U
100-41-4	Ethylbenzene	620	U
100-42-5	Styrene	620	U
1330-20-7	Xylene (total)	620	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAR

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAR_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A1938______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/03/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBP

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBP_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8840______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/04/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	6	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBP

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4329 SAS No.: ______ SDG No.: B5-S4

Matrix: (soil/water) SOIL Lab Sample ID: VBLKBP

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B8840

Level: (low/med) LOW Date Received: ______

% Moisture: not dec. ____ Date Analyzed: 09/04/92

Column (pack/cap) CAP Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 67630	ISOPROPANOL	3.42	4.0	JN

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBQ

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBQ______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8852_____

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 09/09/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBQ

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4329__ SAS No.: ______ SDG No.: B5-S4_

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBQ______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B8852_____

Level: (low/med) LOW___ Date Received: _______

% Moisture: not dec. ____ Date Analyzed: 09/09/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID (Standard): A1937______ Date Analyzed: 09/03/92

Instrument ID: HPMSD-A_ Time Analyzed: 1244____

Matrix:(soil/water) SOIL__ Level:(low/med) MED___ Column:(pack/cap) CAP___

		IS1(BCM) AREA	#	RT	IS2(DFB) AREA	#	RT	IS3(CBZ) AREA	#	RT
	12 HOUR STD	73324		3.22	329000		4.75	258589		10.04
	UPPER LIMIT	146648			658000			517178		
	LOWER LIMIT	36662			164500			129294		
	EPA SAMPLE NO.									
01	B10-S1DL	65209		3.21	310187		4.73	241936		10.04
02	B10-S2DL	63591		3.21	279897		4.73	228259		10.04
03	B10-S2MS	64195		3.22	291818		4.73	237049		10.04
04	B10-S2MSD	63826		3.21	304013		4.73	240877		10.03
05	VBLKAR	70035		3.23	311869		4.74	246463		10.04

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8A

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID (Standard): B8807______ Date Analyzed: 09/02/92

Instrument ID: HPMSD-B_ Time Analyzed: 1024____

Matrix:(soil/water) SOIL__ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	87326	5.16	428308	6.41	343590	10.42
	UPPER LIMIT	174652		856616		687180	
	LOWER LIMIT	43663		214154		171795	
	EPA SAMPLE NO.						
01	B5-S4	72367	5.17	373491	6.43	285942	10.45
02	B6-S2	72551	5.19	358951	6.46	263310	10.48
03	B6-S3	68874	5.20	350398	6.45	266079	10.47
04	B7-S2	69316	5.20	336937	6.47	240629	10.50
05	B7-S3	64676	5.19	320843	6.46	252499	10.48
06	B8-S3	59737	5.19	293496	6.47	228322	10.49
07	B9-S2	55790	5.21	269447	6.48	191717	10.50
08	VBLKBN	84055	5.15	417682	6.42	324075	10.44

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

8A

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID (Standard): B8821______ Date Analyzed: 09/03/92

Instrument ID: HPMSD-B_ Time Analyzed: 0802____

Matrix:(soil/water) SOIL__ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	94330	5.19	425068	6.45	341229	10.46
	UPPER LIMIT	188660		850136		682458	
	LOWER LIMIT	47165		212534		170614	
	EPA SAMPLE NO.						
01	B10-S3	69331	5.19	344198	6.45	266762	10.48
02	B7-S2DL	63275	5.24	301346	6.49	229129	10.52
03	B8-S2	72511	5.20	355760	6.45	251654	10.46
04	B9-S3	71577	5.22	361527	6.48	278119	10.49
05	B5-S8MS	69268	5.20	322901	6.46	257201	10.51
06	B5-S8MSD	60269	5.21	306289	6.47	244145	10.49
07	VBLKBO	83690	5.20	410231	6.45	329015	10.45

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID (Standard): B8839______ Date Analyzed: 09/04/92

Instrument ID: HPMSD-B_ Time Analyzed: 0851____

Matrix:(soil/water) SOIL__ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	76729	5.20	334899	6.46	281711	10.48
	UPPER LIMIT	153458		669798		563422	
	LOWER LIMIT	38364		167450		140856	
	EPA SAMPLE NO.						
01	B5-S8	72531	5.19	355069	6.44	268838	10.44
02	VBLKBP	71678	5.17	343236	6.43	273110	10.47

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4329__ SAS No.: _______ SDG No.: B5-S4_

Lab File ID (Standard): B8851______ Date Analyzed: 09/09/92

Instrument ID: HPMSD-B_ Time Analyzed: 0852____

Matrix:(soil/water) SOIL__ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	87536	5.18	422586	6.44	338024	10.48
	UPPER LIMIT	175072		845172		676048	
	LOWER LIMIT	43768		211293		169012	
	EPA SAMPLE NO.						
01	B10-S1	79415	5.21	438338	6.46	331487	10.45
02	B10-S2	82342	5.21	441777	6.46	326970	10.49
03	VBLKBQ	85406	5.17	407153	6.41	322195	10.44

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B11_S-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-01______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9360______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __15 Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	53	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B11_S-3

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-01______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9360______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __15 Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B11_S-5

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-02______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9342______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __10 Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B11_S-5

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-02______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9342______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __10 Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B11_S-6

Lab Name: PNELI______________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-06______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9343______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __12 Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	J
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B11_S-6

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-06______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9343______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __12 Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_H2O

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-13______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2513______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	19	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	29	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	2	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	4	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	780	E
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_H2O

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-13______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2513______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown C4-alkylbenzene	14.89	6.0	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_H2ODL

Lab Name: PNELI_ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-13DL____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2526______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 50______

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	500	U
74-83-9	Bromomethane	500	U
75-01-4	Vinyl Chloride	500	U
75-00-3	Chloroethane	500	U
75-09-2	Methylene Chloride	250	U
67-64-1	Acetone	500	U
75-15-0	Carbon Disulfide	250	U
75-35-4	1,1-Dichloroethene	250	U
75-34-3	1,1-Dichloroethane	250	U
156-60-5	trans-1,2-Dichloroethene	250	U
156-59-2	cis-1,2-Dichloroethene	250	U
67-66-3	Chloroform	250	U
107-06-2	1,2-Dichloroethane	250	U
78-93-3	2-Butanone	500	U
71-55-6	1,1,1-Trichloroethane	250	U
56-23-5	Carbon Tetrachloride	250	U
108-05-4	Vinyl Acetate	500	U
75-27-4	Bromodichloromethane	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
79-01-6	Trichloroethene	250	U
124-48-1	Dibromochloromethane	250	U
79-00-5	1,1,2-Trichloroethane	250	U
71-43-2	Benzene	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
75-25-2	Bromoform	250	U
108-10-1	4-Methyl-2-Pentanone	500	U
591-78-6	2-Hexanone	500	U
127-18-4	Tetrachloroethene	1200	D
79-34-5	1,1,2,2-Tetrachloroethane	250	U
108-88-3	Toluene	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
100-42-5	Styrene	250	U
1330-20-7	Xylene (total)	250	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_H2ODL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-13DL____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2526______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 50______

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-1

Lab Name: PNELI_________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: ______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-07_____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2520_____

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. ___9 Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 10_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14000	U
74-83-9	Bromomethane	14000	U
75-01-4	Vinyl Chloride	14000	U
75-00-3	Chloroethane	14000	U
75-09-2	Methylene Chloride	6900	U
67-64-1	Acetone	14000	U
75-15-0	Carbon Disulfide	6900	U
75-35-4	1,1-Dichloroethene	6900	U
75-34-3	1,1-Dichloroethane	6900	U
156-60-5	trans-1,2-Dichloroethene	6900	U
156-59-2	cis-1,2-Dichloroethene	6900	U
67-66-3	Chloroform	6900	U
107-06-2	1,2-Dichloroethane	6900	U
78-93-3	2-Butanone	14000	U
71-55-6	1,1,1-Trichloroethane	6900	U
56-23-5	Carbon Tetrachloride	6900	U
108-05-4	Vinyl Acetate	14000	U
75-27-4	Bromodichloromethane	6900	U
78-87-5	1,2-Dichloropropane	6900	U
10061-01-5	cis-1,3-Dichloropropene	6900	U
79-01-6	Trichloroethene	6900	U
124-48-1	Dibromochloromethane	6900	U
79-00-5	1,1,2-Trichloroethane	6900	U
71-43-2	Benzene	6900	U
10061-02-6	trans-1,3-Dichloropropene	6900	U
75-25-2	Bromoform	6900	U
108-10-1	4-Methyl-2-Pentanone	14000	U
591-78-6	2-Hexanone	14000	U
127-18-4	Tetrachloroethene	1700000	E
79-34-5	1,1,2,2-Tetrachloroethane	6900	U
108-88-3	Toluene	6900	U
108-90-7	Chlorobenzene	6900	U
100-41-4	Ethylbenzene	6900	U
100-42-5	Styrene	6900	U
1330-20-7	Xylene (total)	6900	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-1

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-07______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2520______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. ___9 Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 10______

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-1DL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-07DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2524______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. ___9 Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1000____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400000	U
74-83-9	Bromomethane	1400000	U
75-01-4	Vinyl Chloride	1400000	U
75-00-3	Chloroethane	1400000	U
75-09-2	Methylene Chloride	690000	U
67-64-1	Acetone	1400000	U
75-15-0	Carbon Disulfide	690000	U
75-35-4	1,1-Dichloroethene	690000	U
75-34-3	1,1-Dichloroethane	690000	U
156-60-5	trans-1,2-Dichloroethene	690000	U
156-59-2	cis-1,2-Dichloroethene	690000	U
67-66-3	Chloroform	690000	U
107-06-2	1,2-Dichloroethane	690000	U
78-93-3	2-Butanone	1400000	U
71-55-6	1,1,1-Trichloroethane	690000	U
56-23-5	Carbon Tetrachloride	690000	U
108-05-4	Vinyl Acetate	1400000	U
75-27-4	Bromodichloromethane	690000	U
78-87-5	1,2-Dichloropropane	690000	U
10061-01-5	cis-1,3-Dichloropropene	690000	U
79-01-6	Trichloroethene	690000	U
124-48-1	Dibromochloromethane	690000	U
79-00-5	1,1,2-Trichloroethane	690000	U
71-43-2	Benzene	690000	U
10061-02-6	trans-1,3-Dichloropropene	690000	U
75-25-2	Bromoform	690000	U
108-10-1	4-Methyl-2-Pentanone	1400000	U
591-78-6	2-Hexanone	1400000	U
127-18-4	Tetrachloroethene	7200000	D
79-34-5	1,1,2,2-Tetrachloroethane	690000	U
108-88-3	Toluene	690000	U
108-90-7	Chlorobenzene	690000	U
100-41-4	Ethylbenzene	690000	U
100-42-5	Styrene	690000	U
1330-20-7	Xylene (total)	690000	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-1DL

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-07DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2524______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. ___9 Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 1000____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-08______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2519______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. __12 Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	180	BJ
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	710	U
75-35-4	1,1-Dichloroethene	710	U
75-34-3	1,1-Dichloroethane	710	U
156-60-5	trans-1,2-Dichloroethene	710	U
156-59-2	cis-1,2-Dichloroethene	260	J
67-66-3	Chloroform	710	U
107-06-2	1,2-Dichloroethane	710	U
78-93-3	2-Butanone	1200	J
71-55-6	1,1,1-Trichloroethane	710	U
56-23-5	Carbon Tetrachloride	710	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	710	U
78-87-5	1,2-Dichloropropane	710	U
10061-01-5	cis-1,3-Dichloropropene	710	U
79-01-6	Trichloroethene	710	U
124-48-1	Dibromochloromethane	710	U
79-00-5	1,1,2-Trichloroethane	710	U
71-43-2	Benzene	710	U
10061-02-6	trans-1,3-Dichloropropene	710	U
75-25-2	Bromoform	710	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	11000	
79-34-5	1,1,2,2-Tetrachloroethane	710	U
108-88-3	Toluene	710	U
108-90-7	Chlorobenzene	710	U
100-41-4	Ethylbenzene	710	U
100-42-5	Styrene	710	U
1330-20-7	Xylene (total)	710	U

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

B12_S-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-08______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2519______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. __12 Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-09______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9344______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ___9 Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	40	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	7	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-09______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9344______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ___9 Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-36

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-10______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9345______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __11 Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	21	
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	1200	E
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-36

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-10______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9345______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __11 Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	12.21	3.4	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-36DL

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-10DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2523______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. __11 Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	310	BDJ
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	700	U
75-35-4	1,1-Dichloroethene	700	U
75-34-3	1,1-Dichloroethane	700	U
156-60-5	trans-1,2-Dichloroethene	700	U
156-59-2	cis-1,2-Dichloroethene	700	U
67-66-3	Chloroform	700	U
107-06-2	1,2-Dichloroethane	700	U
78-93-3	2-Butanone	1100	DJ
71-55-6	1,1,1-Trichloroethane	700	U
56-23-5	Carbon Tetrachloride	700	U
108-05-4	Vinyl Acetate	1400	U
75-27-4	Bromodichloromethane	700	U
78-87-5	1,2-Dichloropropane	700	U
10061-01-5	cis-1,3-Dichloropropene	700	U
79-01-6	Trichloroethene	700	U
124-48-1	Dibromochloromethane	700	U
79-00-5	1,1,2-Trichloroethane	700	U
71-43-2	Benzene	700	U
10061-02-6	trans-1,3-Dichloropropene	700	U
75-25-2	Bromoform	700	U
108-10-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	1200	D
79-34-5	1,1,2,2-Tetrachloroethane	700	U
108-88-3	Toluene	700	U
108-90-7	Chlorobenzene	700	U
100-41-4	Ethylbenzene	700	U
100-42-5	Styrene	700	U
1330-20-7	Xylene (total)	700	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-36DL

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-10DL____

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2523______

Level: (low/med) MED___ Date Received: 10/27/92

% Moisture: not dec. __11 Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-4

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-11______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9350______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __11 Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-4

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-11______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9350______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __11 Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B12_S-5

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-12______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9347______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __10 Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
156-60-5	trans-1,2-Dichloroethene	6	U
156-59-2	cis-1,2-Dichloroethene	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B12_S-5

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: 4518-12______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9347______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. __10 Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-14______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2512______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	7	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	2	J
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	2	J

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-3

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-14______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2512______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIP_BLANK

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-15______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2511______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	7	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TRIP_BLANK

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: 4518-15______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2511______

Level: (low/med) LOW___ Date Received: 10/27/92

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown siloxane	13.90	3.0	J

2A
WATER VOLATILE SURROGATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	B12_H2O	85 *	91	94	0	1
02	B12_H2ODL	95	98	101	0	0
03	MW-3	90	94	97	0	0
04	TRIP_BLANK	93	90	96	0	0
05	VBLKAC	101	102	99	0	0

		QC LIMITS
S1 (TOL)	= Toluene-d8	(88-110)
S2 (BFB)	= Bromofluorobenzene	(86-115)
S3 (DCE)	= 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2B

SOIL VOLATILE SURROGATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Level:(low/med) LOW___ ___

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	B11_S-3	106	93	97	0	0
02	B11_S-5	103	99	96	0	0
03	B11_S-6	97	96	96	0	0
04	B12_S-3	100	98	100	0	0
05	B12_S-36	102	99	96	0	0
06	B12_S-4	103	101	95	0	0
07	B12_S-5	101	91	95	0	0
08	VBLKBA	98	96	94	0	0
09	VBLKBB	98	97	90	0	0

	QC LIMITS
S1 (TOL) = Toluene-d8	(81-117)
S2 (BFB) = Bromofluorobenzene	(74-121)
S3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2B

SOIL VOLATILE SURROGATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Level:(low/med) MED___ ___

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	B12_S-1	100	113	111	0	0
02	B12_S-1DL	0 D	0 D	0 D	0	0
03	B12_S-2	103	104	112	0	0
04	B12_S-36DL	107	108	113	0	0
05	VBLKAE	101	99	97	0	0

	QC LIMITS
S1 (TOL) = Toluene-d8	(81-117)
S2 (BFB) = Bromofluorobenzene	(74-121)
S3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3A
WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix Spike - EPA Sample No.: 4522-16______ _______

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene_____	50.00	0	53.80	108	61-145
Trichloroethene________	50.00	0	56.90	114	71-120
Benzene________________	50.00	0	57.20	114	76-127
Toluene________________	50.00	0	58.90	118	76-125
Chlorobenzene__________	50.00	0	57.40	115	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene_____	50.00	53.10	106	2	14	61-145
Trichloroethene________	50.00	52.90	106	7	14	71-120
Benzene________________	50.00	52.20	104	9	11	76-127
Toluene________________	50.00	49.50	99	18 *	13	76-125
Chlorobenzene__________	50.00	54.40	109	5	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: __1 out of __5 outside limits
Spike Recovery: __0 out of _10 outside limits

COMMENTS: 4522-16
INST.ID:HPMSD-A (30M

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix Spike - EPA Sample No.: 4516-01______ Level:(low/med) LOW___

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene_____	58.10	0	54.30	93	59-172
Trichloroethene________	58.10	0	60.47	104	62-137
Benzene________________	58.10	0	58.14	100	66-142
Toluene________________	58.10	0	61.16	105	59-139
Chlorobenzene__________	58.10	0	62.33	107	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene_____	58.10	51.63	89	4	22	59-172
Trichloroethene________	58.10	59.54	102	2	24	62-137
Benzene________________	58.10	59.07	102	2	21	66-142
Toluene________________	58.10	61.74	106	1	21	59-139
Chlorobenzene__________	58.10	62.33	107	0	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: __0 out of __5 outside limits
Spike Recovery: __0 out of _10 outside limits

COMMENTS: 4516-01
INST.ID:HPMSD-B (30M

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix Spike - EPA Sample No.: 4511-01______ Level:(low/med) MED___

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene_____	48100	0	26880	56 *	59-172
Trichloroethene________	48100	0	26080	54 *	62-137
Benzene________________	48100	0	29310	61 *	66-142
Toluene________________	48100	0	29730	62	59-139
Chlorobenzene__________	48100	0	29500	61	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene_____	48100	25880	54 *	4	22	59-172
Trichloroethene________	48100	26730	56 *	4	24	62-137
Benzene________________	48100	30080	63 *	3	21	66-142
Toluene________________	48100	31580	66	6	21	59-139
Chlorobenzene__________	48100	29150	61	0	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: __0 out of __5 outside limits
Spike Recovery: __6 out of _10 outside limits

COMMENTS: 4511-01
INST.ID:HPMSD-A (30M

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID: B9341______ Lab Sample ID: VBLKBA_______

Date Analyzed: 10/30/92 Time Analyzed: 0918____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B11_S-5	4518-02	B9342	1011
02	B11_S-6	4518-06	B9343	1046
03	B12_S-3	4518-09	B9344	1120
04	B12_S-36	4518-10	B9345	1156
05	B12_S-4	4518-11	B9350	1537
06	B12_S-5	4518-12	B9347	1354

COMMENTS: VBLKBA
INST.ID:HPMSD-B (30M

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID: A2497______ Lab Sample ID: VBLKAC_______

Date Analyzed: 10/30/92 Time Analyzed: 1021____

Matrix: (soil/water) WATER_ Level:(low/med) LOW___

Instrument ID: HPMSD-A_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B12_H2O	4518-13	A2513	1919
02	MW-3	4518-14	A2512	1843
03	TRIP_BLANK	4518-15	A2511	1808

COMMENTS: VBLKAC
INST.ID:HPMSD-A (30M

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4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID: B9356______ Lab Sample ID: VBLKBB_______

Date Analyzed: 11/02/92 Time Analyzed: 0807____

Matrix: (soil/water) SOIL__ Level:(low/med) LOW___

Instrument ID: HPMSD-B_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B11_S-3	4518-01	B9360	1046

COMMENTS: VBLKBB
INST.ID:HPMSD-B (30M

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID: A2517______ Lab Sample ID: VBLKAE_______

Date Analyzed: 11/02/92 Time Analyzed: 0952____

Matrix: (soil/water) SOIL__ Level:(low/med) MED___

Instrument ID: HPMSD-A_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	B12_H2ODL	4518-13DL	A2526	1517
02	B12_S-1	4518-07	A2520	1138
03	B12_S-1DL	4518-07DL	A2524	1401
04	B12_S-2	4518-08	A2519	1104
05	B12_S-36DL	4518-10DL	A2523	1319

COMMENTS: VBLKAE
INST.ID:HPMSD-A (30M

page 1 of 1

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBA

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBA_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9341______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBA

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBA_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9341______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAC

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: VBLKAC_______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2497______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAC

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) WATER_ Lab Sample ID: VBLKAC_______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2497______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 10/30/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:

Number TICs found: __0 (ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKBB

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKBB_______

Sample wt/vol: __5.0 (g/mL) G___ Lab File ID: B9356______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 11/02/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKBB

Lab Name: PNELI Contract: Y-PAY-MOR

Lab Code: PNELI Case No.: 4518 SAS No.: SDG No.: B11_S-

Matrix: (soil/water) SOIL Lab Sample ID: VBLKBB

Sample wt/vol: 5.0 (g/mL) G Lab File ID: B9356

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 11/02/92

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAE

Lab Name: PNELI   Contract: Y-PAY-MOR

Lab Code: PNELI   Case No.: 4518   SAS No.: ______   SDG No.: B11_S-

Matrix: (soil/water) SOIL   Lab Sample ID: VBLKAE

Sample wt/vol: 4.0 (g/mL) G   Lab File ID: A2517

Level: (low/med) MED   Date Received: ________

% Moisture: not dec. ____   Date Analyzed: 11/02/92

Column: (pack/cap) CAP   Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	150	J
67-64-1	Acetone	1200	U
75-15-0	Carbon Disulfide	620	U
75-35-4	1,1-Dichloroethene	620	U
75-34-3	1,1-Dichloroethane	620	U
156-60-5	trans-1,2-Dichloroethene	620	U
156-59-2	cis-1,2-Dichloroethene	620	U
67-66-3	Chloroform	620	U
107-06-2	1,2-Dichloroethane	620	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	620	U
56-23-5	Carbon Tetrachloride	620	U
108-05-4	Vinyl Acetate	1200	U
75-27-4	Bromodichloromethane	620	U
78-87-5	1,2-Dichloropropane	620	U
10061-01-5	cis-1,3-Dichloropropene	620	U
79-01-6	Trichloroethene	620	U
124-48-1	Dibromochloromethane	620	U
79-00-5	1,1,2-Trichloroethane	620	U
71-43-2	Benzene	620	U
10061-02-6	trans-1,3-Dichloropropene	620	U
75-25-2	Bromoform	620	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	620	U
79-34-5	1,1,2,2-Tetrachloroethane	620	U
108-88-3	Toluene	620	U
108-90-7	Chlorobenzene	620	U
100-41-4	Ethylbenzene	620	U
100-42-5	Styrene	620	U
1330-20-7	Xylene (total)	620	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAE

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Matrix: (soil/water) SOIL__ Lab Sample ID: VBLKAE_______

Sample wt/vol: __4.0 (g/mL) G___ Lab File ID: A2517______

Level: (low/med) MED___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 11/02/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
Number TICs found: __0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID (Standard): A2495______ Date Analyzed: 10/30/92

Instrument ID: HPMSD-A_ Time Analyzed: 0900____

Matrix:(soil/water) WATER_ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	83418	3.64	365348	5.50	286313	10.80
	UPPER LIMIT	166836		730696		572626	
	LOWER LIMIT	41709		182674		143156	
	EPA SAMPLE NO.						
01	B12_H2O	76115	3.61	330696	5.45	261272	10.63
02	MW-3	76572	3.62	331791	5.46	252694	10.62
03	TRIP_BLANK	66724	3.64	287744	5.48	212333	10.71
04	VBLKAC	79428	3.65	352536	5.50	267192	10.78

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID (Standard): A2516______ Date Analyzed: 11/02/92

Instrument ID: HPMSD-A_ Time Analyzed: 0841____

Matrix:(soil/water) SOIL__ Level:(low/med) MED___ Column:(pack/cap) CAP___

		IS1(BCM) AREA #	RT	IS2(DFB) AREA #	RT	IS3(CBZ) AREA #	RT
	12 HOUR STD	84759	3.62	341401	5.48	262988	10.72
	UPPER LIMIT	169518		682802		525976	
	LOWER LIMIT	42380		170700		131494	
	EPA SAMPLE NO.						
01	B12_H20DL	79362	3.64	356471	5.48	283174	10.74
02	B12_S-1	75716	3.63	344018	5.48	275386	10.70
03	B12_S-1DL	82729	3.65	353711	5.50	271254	10.79
04	B12_S-2	75939	3.60	348359	5.47	279825	10.66
05	B12_S-36DL	73670	3.58	346474	5.43	271181	10.62
06	VBLKAE	88155	3.64	404900	5.50	302325	10.72

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

8A

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID (Standard): B9340______ Date Analyzed: 10/30/92

Instrument ID: HPMSD-B_ Time Analyzed: 0833____

Matrix:(soil/water) SOIL__ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	44390	5.35	203236	6.59	152461	10.63
	UPPER LIMIT	88780		406472		304922	
	LOWER LIMIT	22195		101618		76230	
	EPA SAMPLE NO.						
01	B11_S-5	38895	5.34	189793	6.55	140169	10.60
02	B11_S-6	30780	5.35	144656	6.57	111352	10.63
03	B12_S-3	39784	5.36	188358	6.59	141830	10.64
04	B12_S-36	41281	5.38	189152	6.60	141711	10.62
05	B12_S-4	37401	5.36	170651	6.56	128094	10.61
06	B12_S-5	39989	5.38	186963	6.59	142053	10.62
07	VBLKBA	46136	5.37	209020	6.61	159461	10.63

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8A

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4518__ SAS No.: _______ SDG No.: B11_S-

Lab File ID (Standard): B9355______ Date Analyzed: 11/02/92

Instrument ID: HPMSD-B_ Time Analyzed: 0721____

Matrix:(soil/water) SOIL__ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	46274	5.32	210776	6.54	162709	10.61
	UPPER LIMIT	92548		421552		325418	
	LOWER LIMIT	23137		105388		81354	
	EPA SAMPLE NO.						
01	B11_S-3	41746	5.41	194244	6.63	141954	10.67
02	VBLKBB	52290	5.36	227139	6.60	177019	10.63

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix: (soil/water) WATER_ Lab Sample ID: 4439-01______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2223______

Level: (low/med) LOW___ Date Received: 09/24/92

% Moisture: not dec. ____ Date Analyzed: 10/06/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	25	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-2

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix: (soil/water) WATER_ Lab Sample ID: 4439-01______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2223______

Level: (low/med) LOW___ Date Received: 09/24/92

% Moisture: not dec. ____ Date Analyzed: 10/06/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

Number TICs found: __3

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN C4-ALKYLBENZENE	14.85	8.0	JN
2.	UNKNOWN TERPENONE	16.69	5.0	JN
3.	UNKNOWN TERPENONE	17.95	5.0	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2MS

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix: (soil/water) WATER_ Lab Sample ID: 4439-01MS____

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2224______

Level: (low/med) LOW___ Date Received: 09/24/92

% Moisture: not dec. ____ Date Analyzed: 10/06/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	25	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	5	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	0.2	J
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	2	J
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2MSD

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix: (soil/water) WATER_ Lab Sample ID: 4439-01MSD___

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2225______

Level: (low/med) LOW___ Date Received: 09/24/92

% Moisture: not dec. ____ Date Analyzed: 10/06/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	24	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	4	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	0.1	J
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

2A
WATER VOLATILE SURROGATE RECOVERY

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4439__ SAS No.: ______ SDG No.: MW-2__

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	MW-2	96	91	94	0	0
02	MW-2MS	104	95	96	0	0
03	MW-2MSD	104	92	93	0	0
04	VBLKAJ	107	96	90	0	0

	QC LIMITS
S1 (TOL) = Toluene-d8	(88-110)
S2 (BFB) = Bromofluorobenzene	(86-115)
S3 (DCE) = 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix Spike - EPA Sample No.: MW-2_________ ____

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene_____	50.0	0	43.9	88	61-145
Trichloroethene________	50.0	0	50.5	101	71-120
Benzene________________	50.0	0	53.4	107	76-127
Toluene________________	50.0	0	63.1	126 *	76-125
Chlorobenzene__________	50.0	0	53.7	107	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene_____	50.0	44.8	90	-2	14	61-145
Trichloroethene________	50.0	52.8	106	-5	14	71-120
Benzene________________	50.0	54.5	109	-2	11	76-127
Toluene________________	50.0	62.8	126 *	0	13	76-125
Chlorobenzene__________	50.0	53.7	107	0	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: __0 out of __5 outside limits _ _
Spike Recovery: __2 out of _10 outside limits _ __

COMMENTS: 4439-01 MW-2
INST.ID:HPMSD-A (30M

VOLATILE METHOD BLANK SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Lab File ID: A2222______ Lab Sample ID: VBLKAJ_______

Date Analyzed: 10/06/92 Time Analyzed: 0726____

Matrix: (soil/water) WATER_ Level:(low/med) LOW___

Instrument ID: HPMSD-A_ _______

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	MW-2	4439-01	A2223	0819
02	MW-2MS	4439-01MS	A2224	0859
03	MW-2MSD	4439-01MSD	A2225	0940

COMMENTS: VBLKAJ
INST.ID:HPMSD-A (30M

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKAJ

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix: (soil/water) WATER_ Lab Sample ID: VBLKAJ_______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2222______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 10/06/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKAJ

Lab Name: PNELI___________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Matrix: (soil/water) WATER_ Lab Sample ID: VBLKAJ_______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2222______

Level: (low/med) LOW___ Date Received: ________

% Moisture: not dec. ____ Date Analyzed: 10/06/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

Number TICs found: __0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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8A

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Lab File ID (Standard): A2221______ Date Analyzed: 10/06/92

Instrument ID: HPMSD-A_ Time Analyzed: 0632____

Matrix:(soil/water) WATER_ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	82307	3.48	346055	5.32	278557	10.56
	UPPER LIMIT	164614		692110		557114	
	LOWER LIMIT	41154		173028		139278	
	EPA SAMPLE NO.						
01	MW-2	82177	3.53	349092	5.37	273906	10.64
02	MW-2MS	79973	3.51	348294	5.31	272978	10.66
03	MW-2MSD	88426	3.55	353334	5.37	284229	10.71
04	VBLKAJ	87536	3.53	350765	5.35	279318	10.69

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

8A

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: PNELI____________________ Contract: Y-PAY-MOR__ _____

Lab Code: PNELI__ Case No.: 4439__ SAS No.: _______ SDG No.: MW-2__

Lab File ID (Standard): A2221______ Date Analyzed: 10/06/92

Instrument ID: HPMSD-A_ Time Analyzed: 0632____

Matrix:(soil/water) WATER_ Level:(low/med) LOW___ Column:(pack/cap) CAP___

		IS1 (BCM) AREA #	RT	IS2 (DFB) AREA #	RT	IS3 (CBZ) AREA #	RT
	12 HOUR STD	82307	3.48	346055	5.32	278557	10.56
	UPPER LIMIT	164614		692110		557114	
	LOWER LIMIT	41154		173028		139278	
	EPA SAMPLE NO.						
01	MW-2	82177	3.53	349092	5.37	273906	10.64
02	MW-2MS	79973	3.51	348294	5.31	272978	10.66
03	MW-2MSD	88426	3.55	353334	5.37	284229	10.71
04	VBLKAJ	87536	3.53	350765	5.35	279318	10.69

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

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RZA/AGRA	Client Project ID: Y-PAY-MOR, #W-7883-4	Sampled:	Sep 23, 1992
11335 NE 122nd Way, #100	Sample Descript: Water, MW-2	Received:	Sep 24, 1992
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Oct 7, 1992
Attention: Dale Kramer	Sample Number: 209-1097	Reported:	Oct 13, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	92
Toluene-d8	99
4-Bromofluorobenzene	86

Steven G. Mayer
Project Manager

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RZA/AGRA	Client Project ID:	Y-PAY-MOR, #W-7883-4		Sampled:	Sep 23, 1992
11335 NE 122nd Way, #100	Sample Descript:	Water, Trip Blank		Received:	Sep 24, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260		Analyzed:	Oct 7, 1992
Attention: Dale Kramer	Sample Number:	209-1098		Reported:	Oct 13, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	93
Toluene-d8	98
4-Bromofluorobenzene	97

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RZA/AGRA	Client Project ID:	Y-PAY-MOR, #W-7883-4	Sampled:	Sep 23, 1992
11335 NE 122nd Way, #100	Sample Descript:	Water, Rinsate Blank	Received:	Sep 24, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260	Analyzed:	Oct 7, 1992
Attention: Dale Kramer	Sample Number:	209-1099	Reported:	Oct 13, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	7.3
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	93
Toluene-d8	99
4-Bromofluorobenzene	86

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RZA/AGRA	Client Project ID: Y-PAY-MOR, #W-7883-4		
11335 NE 122nd Way, #100	Sample Descript: Method Blank		
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Oct 7, 1992
Attention: Dale Kramer	Sample Number: BLK100792	Reported:	Oct 13, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	99
Toluene-d8	102
4-Bromofluorobenzene	86

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RZA/AGRA	Client Project ID: Y-PAY-MOR, #W-7883-4	Sampled:	Sep 23, 1992
11335 NE 122nd Way, #100	Sample Descript: Water, 5 GAL Bucket	Received:	Sep 24, 1992
Kirkland, WA 98034	Analysis Method: EPA 3810/8015 Modified	Analyzed:	Oct 7, 1992
Attention: Dale Kramer	Sample Number: 209-1100	Reported:	Oct 13, 1992

INDUSTRIAL SOLVENTS SCAN

Analyte	Detection Limit mg/L (ppm)	Sample Results mg/L (ppm)
Acetone	2,000	N.D.
Acetonitrile	5,000	N.D.
Benzene	50	N.D.
iso-Butanol	1,000	N.D.
n-Butanol	2,500	N.D.
sec-Butanol	1,000	N.D.
t-Butanol	1,000	N.D.
Carbon tetrachloride	1,000	N.D.
Chloroform	500	N.D.
Cyclohexane	50	N.D.
1, 2-Dichloroethane	500	N.D.
t-1, 2-Dichloroethene	200	N.D.
Ethanol	5,000	N.D.
Ethyl acetate	500	N.D.
Ethyl benzene	50	N.D.
Ethyl ether	100	N.D.
Hexane	50	N.D.
Methanol	5,000	N.D.
Methyl ethyl ketone	1,000	N.D.
Methyl isobutyl ketone	250	N.D.
Isopropanol	3,000	N.D.
Methyl ethyl ketone	1,000	N.D.
Methyl Isobutyl Ketone	250	N.D.
Methylene chloride	500	N.D.
iso-Octane	50	N.D.
iso-Propanol	3,000	N.D.
n-Propanol	3,000	N.D.
n-Propyl benzene	50	N.D.
Tetrachloroethylene	200	640,000
Tetrahydrofuran	500	N.D.
1, 1, 1-Trichloroethane	500	N.D.
Trichloroethylene	200	N.D.
Trichlorotrifluoroethane (Freon 113)	100	N.D.
Toluene	50	N.D.
m-Xylene	50	N.D.
o-Xylene	50	N.D.
p-Xylene	50	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

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Please Note:
Due to the insolubility of this sample in water the above concentration is estimated.

Steven G. Mayer
Project Manager

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RZA/AGRA 11335 NE 122nd Way, #100 Kirkland, WA 98034 Attention: Dale Kramer	Client Project ID: Y-PAY-MOR, #W-7883-4 EPA Method: 8240 Sample Matrix : Water Units: μg/L (ppb) QC Sample #: 209-1098	Analyst: J. Kimball Analyzed: Oct 7, 1992 Reported: Oct 13, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-DCE	Benzene	TCE	Toluene	Chloro-benzene
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	10	10
Conc. Matrix Spike:	6.1	9.9	9.7	9.8	9.8
Matrix Spike % Recovery:	61%	99%	97%	98%	98%
Conc. Matrix Spike Dup.:	6.1	10	9.6	10	9.8
Matrix Spike Duplicate % Recovery:	61%	100%	96%	100%	98%
Upper Control Limit %:	107	118	106	122	111
Lower Control Limit %:	69	83	81	66	86
Relative % Difference:	0%	1%	1%	2%	0%
Maximum RPD:	19	8.0	10	10	9.0

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Steven G. Mayer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}} \times 100$

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3

Lab Name: PNELI________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4574__ SAS No.: _______ SDG No.: MW-3__

Matrix: (soil/water) WATER_ Lab Sample ID: 4574-01______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2639______

Level: (low/med) LOW___ Date Received: 11/16/92

% Moisture: not dec. ____ Date Analyzed: 11/16/92

Column: (pack/cap) CAP___ Dilution Factor: 1.0_____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L_	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	BJ
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	9	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-3

Lab Name: PNELI__________________ Contract: Y-PAY-MOR__

Lab Code: PNELI__ Case No.: 4574__ SAS No.: _______ SDG No.: MW-3__

Matrix: (soil/water) WATER_ Lab Sample ID: 4574-01______

Sample wt/vol: __5.0 (g/mL) ML__ Lab File ID: A2639______

Level: (low/med) LOW___ Date Received: 11/16/92

% Moisture: not dec. ____ Date Analyzed: 11/16/92

Column (pack/cap) CAP___ Dilution Factor: 1.0_____

Number TICs found: __1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L_

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 541059	Cyclotrisiloxane, hexamethyl	9.75	5.0	JN

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RZA/AGRA	Client Project ID:	Why Pay More, #W-7883-7		Sampled:	Nov 13, 1992
11335 NE 122nd Way, #100	Sample Descript:	Water, MW-3		Received:	Nov 16, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260		Analyzed:	Nov 17, 1992
Attention: Dale Kramer	Sample Number:	211-0521		Reported:	Nov 20, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	6.6
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	2.3
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	85
Toluene-d8	97
4-Bromofluorobenzene	81

Steven G. Mayer
Project Manager

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RZA/AGRA	Client Project ID: Why Pay More, #W-7883-7	Sampled:	Nov 13, 1992
11335 NE 122nd Way, #100	Sample Descript: Water, Trip Blank	Received:	Nov 16, 1992
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Nov 17, 1992
Attention: Dale Kramer	Sample Number: 211-0522	Reported:	Nov 20, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	108
Toluene-d8	97
4-Bromofluorobenzene	91

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

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RZA/AGRA	Client Project ID: Why Pay More, #W-7883-7		
11335 NE 122nd Way, #100	Sample Descript: Method Blank		
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Nov 17, 1992
Attention: Dale Kramer	Sample Number: BLK111792	Reported:	Nov 20, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	10	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	108
Toluene-d8	98
4-Bromofluorobenzene	89

Steven G. Mayer
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RZA/AGRA
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Dale Kramer

Client Project ID: Why Pay More, #W-7883-7
EPA Method: 8240
Sample Matrix : Water
Units: $\mu g/L$ (ppb)
QC Sample #: 211-0470

Analyst: J. Kimball

Analyzed: Nov 17, 1992
Reported: Nov 20, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-DCE	Benzene	TCE	Toluene	Chloro-benzene
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	10	10
Conc. Matrix Spike:	10	11	11	12	11
Matrix Spike % Recovery:	100%	110%	110%	120%	110%
Conc. Matrix Spike Dup.:	11	11	12	12	12
Matrix Spike Duplicate % Recovery:	110%	110%	120%(*)	120%	120%
Upper Control Limit %:	107	119	113	124	129
Lower Control Limit %:	69	81	75	71	63
Relative % Difference:	10%	0%	9%	0%	9%
Maximum RPD:	19	7.8	6.2	6.9	16

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Steven G. Mayer
Project Manager

Please Note:
(*) = The Matrix Spike Recovery for this sample is outside of North Creek Analytical's established control limits.

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RZA/AGRA	Client Project ID:	Y-Pay-Mor, #W-7883-6		Sampled:	Oct 28, 1992
11335 NE 122nd Way, #100	Sample Descript:	Water, B12		Received:	Oct 29, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260		Analyzed:	Oct 29, 1992
Attention: Dale Kramer	Sample Number:	210-1324		Reported:	Oct 30, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	1,000	N.D.
Benzene	200	N.D.
Bromodichloromethane	200	N.D.
Bromoform	200	N.D.
Bromomethane	200	N.D.
2-Butanone	1,000	N.D.
Carbon disulfide	200	N.D.
Carbon tetrachloride	200	N.D.
Chlorobenzene	200	N.D.
Chloroethane	200	N.D.
2-Chloroethyl vinyl ether	1,000	N.D.
Chloroform	200	N.D.
Chloromethane	200	N.D.
Dibromochloromethane	200	N.D.
1,1-Dichloroethane	200	N.D.
1,2-Dichloroethane	200	N.D.
1,1-Dichloroethene	200	N.D.
cis 1,2-Dichloroethene	200	N.D.
trans 1,2-Dichloroethene	200	N.D.
1,2-Dichloropropane	200	N.D.
cis 1,3-Dichloropropene	200	N.D.
trans 1,3-Dichloropropene	200	N.D.
Ethylbenzene	200	N.D.
2-Hexanone	1,000	N.D.
Methylene chloride	1,000	N.D.
4-Methyl-2-pentanone	1,000	N.D.
Styrene	200	N.D.
1,1,2,2-Tetrachloroethane	200	N.D.
Tetrachloroethene	200	1,700
Toluene	200	N.D.
1,1,1-Trichloroethane	200	N.D.
1,1,2-Trichloroethane	200	N.D.
Trichloroethene	200	N.D.
Trichlorofluoromethane	200	N.D.
Vinyl chloride	200	N.D.
Total Xylenes	200	N.D.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	92
Toluene-d8	96
4-Bromofluorobenzene	85

Steven G. Mayer
Project Manager

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RZA/AGRA	Client Project ID: Y-Pay-Mor, #W-7883-6		
11335 NE 122nd Way, #100	Sample Descript: Method Blank		
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Oct 29, 1992
Attention: Dale Kramer	Sample Number: BLK102992	Reported:	Oct 30, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Acetone	10.0	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	2.0	N.D.
2-Butanone	10.0	N.D.
Carbon disulfide	2.0	N.D.
Carbon tetrachloride	2.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	10.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	2.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10.0	N.D.
Methylene chloride	10.0	N.D.
4-Methyl-2-pentanone	10.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	2.0	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	2.0	N.D.
Vinyl chloride	2.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	96
Toluene-d8	97
4-Bromofluorobenzene	90

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RZA/AGRA 11335 NE 122nd Way, #100 Kirkland, WA 98034 Attention: Dale Kramer	Client Project ID: Y-Pay-Mor, #W-7883-6 EPA Method: 8240 Sample Matrix : Water Units: μg/L (ppb) QC Sample #: BLK102992	Analyst: Analyzed: Reported:	J. Kimball Oct 29, 1992 Oct 30, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-DCE	Benzene	TCE	Toluene	Chloro-benzene
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	10	10
Conc. Matrix Spike:	6.5	10	9.7	11	10
Matrix Spike % Recovery:	65%(1)	100%	97%	110%	100%
Conc. Matrix Spike Dup.:	6.5	10	9.6	10	10
Matrix Spike Duplicate % Recovery:	65%(1)	100%	96%	100%	100%
Upper Control Limit %:	107	119	113	124	129
Lower Control Limit %:	69(1)	81	75	71	63
Relative % Difference:	0%	0%	1%	10%	0%
Maximum RPD:	19	7.8	6.2	6.9	16

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Project Manager

Please Note:
(1) = The Laboratory Control Sample is outside of North Creek Analytical's established control limits.

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RZA/AGRA	Client Project ID: Y-Pay-Mor, #W-7883-6	Analyst:	J. Kimball
11335 NE 122nd Way, #100	EPA Method: 8240		
Kirkland, WA 98034	Sample Matrix : Water		
Attention: Dale Kramer	Units: $\mu g/L$ (ppb)	Analyzed:	Oct 29, 1992
	QC Sample #: BLK102992	Reported:	Oct 30, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-DCE	Benzene	TCE	Toluene	Chloro-benzene
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	10	10
Conc. Matrix Spike:	6.5	10	9.7	11	10
Matrix Spike % Recovery:	65%(1)	100%	97%	110%	100%
Conc. Matrix Spike Dup.:	6.5	10	9.6	10	10
Matrix Spike Duplicate % Recovery:	65%(1)	100%	96%	100%	100%
Upper Control Limit %:	107	119	113	124	129
Lower Control Limit %:	69(1)	81	75	71	63
Relative % Difference:	0%	0%	1%	10%	0%
Maximum RPD:	19	7.8	6.2	6.9	16

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

Please Note:
(1) = The Laboratory Control Sample is outside of North Creek Analytical's established control limits.

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RZA/AGRA	Client Project ID:	Y-PAY-MOR, W-7833-4	Sampled:	Aug 26, 1992
11335 NE 122nd Way, #100	Sample Descript:	Soil, B-7, S-2	Received:	Sep 11, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260	Analyzed:	Sep 11, 1992
Attention: Dale Kramer	Sample Number:	209-0464	Reported:	Sep 14, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	5.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	5.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	5.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	53
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	5.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	74
Toluene	0.1	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	5.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	97
Toluene-d8	99
4-Bromofluorobenzene	89

Steve Mayer
Project Manager

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RZA/AGRA	Client Project ID: Y-PAY-MOR, W-7833-4	Sampled:	Aug 26, 1992
11335 NE 122nd Way, #100	Sample Descript: Soil, B-7, S-3	Received:	Sep 11, 1992
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Sep 11, 1992
Attention: Dale Kramer	Sample Number: 209-0465	Reported:	Sep 14, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acetone	10	18
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	5.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	5.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	5.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	5.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	0.1	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	5.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	93
Toluene-d8	99
4-Bromofluorobenzene	92

Steve Mayer
Project Manager

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RZA/AGRA	Client Project ID:	Y-PAY-MOR, W-7833-4		Sampled:	Aug 26, 1992
11335 NE 122nd Way, #100	Sample Descript:	Soil, B-10, S-2		Received:	Sep 11, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260		Analyzed:	Sep 11, 1992
Attention: Dale Kramer	Sample Number:	209-0470		Reported:	Sep 14, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	5.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	5.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	5.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	11
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	5.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	0.1	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	5.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Steve Mayer
Project Manager

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	71
Toluene-d8	104
4-Bromofluorobenzene	91

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RZA/AGRA	Client Project ID: Y-PAY-MOR, W-7833-4	Sampled:	Aug 26, 1992
11335 NE 122nd Way, #100	Sample Descript: Soil, B-10, S-3	Received:	Sep 11, 1992
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Sep 11, 1992
Attention: Dale Kramer	Sample Number: 209-0471	Reported:	Sep 14, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acetone	10	44
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	5.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	5.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	5.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	5.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	0.1	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	5.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	95
Toluene-d8	100
4-Bromofluorobenzene	89

Steve Mayer
Project Manager

NORTH
CREEK
ANALYTICAL

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RZA/AGRA	Client Project ID:	Y-PAY-MOR, W-7833-4		Sampled:	Aug 26, 1992
11335 NE 122nd Way, #100	Sample Descript:	Soil, B-10, S-1		Received:	Sep 11, 1992
Kirkland, WA 98034	Analysis Method:	EPA 8240/8260		Analyzed:	Sep 11, 1992
Attention: Dale Kramer	Sample Number:	209-0473		Reported:	Sep 14, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	5.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	5.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	5.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	5.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	0.1	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	5.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	73
Toluene-d8	98
4-Bromofluorobenzene	90

Steve Mayer
Project Manager

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RZA/AGRA	Client Project ID: Y-PAY-MOR, W-7833-4		
11335 NE 122nd Way, #100	Sample Descript: Method Blank		
Kirkland, WA 98034	Analysis Method: EPA 8240/8260	Analyzed:	Sep 11, 1992
Attention: Dale Kramer	Sample Number: BLK091192	Reported:	Sep 14, 1992

VOLATILE ORGANICS by GC/MS (EPA 8240/8260)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Acetone	10	N.D.
Benzene	2.0	N.D.
Bromodichloromethane	2.0	N.D.
Bromoform	2.0	N.D.
Bromomethane	5.0	N.D.
2-Butanone	10	N.D.
Carbon disulfide	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	2.0	N.D.
Chloroethane	2.0	N.D.
2-Chloroethyl vinyl ether	5.0	N.D.
Chloroform	2.0	N.D.
Chloromethane	2.0	N.D.
Dibromochloromethane	5.0	N.D.
1,1-Dichloroethane	2.0	N.D.
1,2-Dichloroethane	2.0	N.D.
1,1-Dichloroethene	2.0	N.D.
cis 1,2-Dichloroethene	2.0	N.D.
trans 1,2-Dichloroethene	2.0	N.D.
1,2-Dichloropropane	2.0	N.D.
cis 1,3-Dichloropropene	2.0	N.D.
trans 1,3-Dichloropropene	2.0	N.D.
Ethylbenzene	2.0	N.D.
2-Hexanone	10	N.D.
Methylene chloride	10	N.D.
4-Methyl-2-pentanone	5.0	N.D.
Styrene	2.0	N.D.
1,1,2,2-Tetrachloroethane	2.0	N.D.
Tetrachloroethene	2.0	N.D.
Toluene	0.1	N.D.
1,1,1-Trichloroethane	2.0	N.D.
1,1,2-Trichloroethane	2.0	N.D.
Trichloroethene	2.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	5.0	N.D.
Total Xylenes	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL inc

Steve Mayer
Project Manager

Surrogate Standards Percent Recovery:	
1,2-Dichloroethane-d4	96
Toluene-d8	98
4-Bromofluorobenzene	91

NORTH CREEK ANALYTICAL

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RZA/AGRA 11335 NE 122nd Way, #100 Kirkland, WA 98034 Attention: Dale Kramer	Client Project ID: Y-PAY-MOR, W-7833-4 EPA Method: 8240 Sample Matrix : Soil Units: mg/kg (ppm) QC Sample #: BLK	Analyst: J. Kimball Analyzed: Reported: Sep 14, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-DCE	Benzene	TCE	Toluene	Chloro-benzene
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	50	50	50	50	50
Conc. Matrix Spike:	48	51	50	52	53
Matrix Spike % Recovery:	96%	104%	102%	106%	100%
Conc. Matrix Spike Dup.:	47	51	49	49	49
Matrix Spike Duplicate % Recovery:	94%	102%	98%	98%	98%
Relative % Difference:	2.1%	1.9%	4.0%	7.8%	1.9%

NORTH CREEK ANALYTICAL inc

Steve Mayer
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}}$ x 100

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}}$ x 100

Appendix D

APPENDIX D

REMEDIAL INVESTIGATION WORK PLAN

APPENDIX D
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REMEDIAL INVESTIGATION WORK PLAN

LIST OF FIGURES

REMEDIAL INVESTIGATION WORK PLAN
Y-PAY-MOR DRY CLEANERS
FEDERAL WAY, WASHINGTON

1.0 INTRODUCTION

Tetrachloroethylene spills have been documented at the Y-Pay-Mor dry cleaning facility located in the Best Shopping Plaza at 2210 South 320th Street in Federal Way, Washington (See Figure 1 & 2, Vicinity Map & Site Exploration Plan, in the text of this report). Pursuant to the request of Northwest Building Corporation, we are conducted this investigation with the following objectives:

- To assess subsurface soils and groundwater conditions w.r.t. occurrence of
- To better define the lateral and vertical extent of chlorinated solvents;
- To better define the source of the contamination;
- To select and design a remediation option from alternatives in order to decrease concentrations of volatile organic compounds;

Subsequent to this investigation, and prior to renovation of the former Y-Pay-Mor facility, an appropriate remediation system will be installed. This investigation is being conducted in accordance with requirements set forth Chapters 173-340-350 through WAC-173-340-360 of the Washington Administrative Code (WAC).

The major elements of this investigation include, but are not limited to the following activities:

- Preparation of health and safety, sampling and analysis, quality assurance/quality control and subsurface exploration plans;
- Characterization of subsurface conditions a the site;
- Laboratory analysis of soil and water samples collected during the investigation;
- Evaluation of analytical data; and,
- Preparation of a report documenting the study.

The objective of this Remedial Investigation Work Plan is to provide appropriate techniques and procedures for sampling and well installation. This will ensure that representative soil and groundwater samples are obtained and that cross-contamination of soils and groundwater is prevented. This plan also describes the soils and groundwater occurrence at the site, rationale for test boring and well locations, drilling procedures, well installation procedures, well development procedures, and sampling.

2.0 SITE LOCATION AND DESCRIPTION

The site is located west of 23rd Avenue South and north of South 320th Street at 2210 South 320th Street in Federal Way Washington. The building is the easternmost business in the Best Plaza. Y-Pay-Mor is bounded on the north, east, and south by parking area and easements. It is bounded to the west by the Living Well Lady, an aerobics facility.

The subject site has been unoccupied since approximately 15 June 1992. The remainder of the space in the shopping mall is occupied by retail and service outlets. In general, the site is level, with topography increasing in relative elevation to the east-northeast. There is approximately fifteen to eighteen feet of relief across the site, relative to 23rd Avenue South.

3.0 GEOLOGIC SETTING

Site soils are varied beneath the site. In general, soils consist of a 6.5 to 7.5 thick underlain by a 3-5" layer of fill material laterally discontinuous organic-rich layer, weathered glacial till which inform is underlain by glacial till. The glacial till is a compact mixture of gravel and occasional cobbles in a clayey, silty, sandy, matrix.

Within undifferentiated glacial till of this type, "perched" groundwater conditions may occur. A perched water table occurs where a shallow impervious stratum such as a clay bed prevents downward percolation of water and causes groundwater to accumulate in a limited area above the stratum. This type of situation is typical of sites underlain by glacial till. Although water resource data for the Federal Way area show some groundwater resource development for municipal use, our review of published geological and groundwater literature, as well as Washington State Department of Ecology (Ecology) water well records, indicates that currently there are no major developed groundwater resources within 500 feet of the project site.

MONITORING WELL AS-BUILT DESIGN

3.1 Summary of RZA AGRA Prior Activities On Site

In June 1992, four borings were advanced beneath the former Y-Pay-Mor facility at the east end of the mall. One of these borings was completed as a two-inch diameter groundwater monitoring well, in order to facilitate assessment of soil conditions. Elevated concentrations of tetrachloroethylene (PCE) and trichloroethylene (TCE) were detected in soil samples obtained during the initial investigation.

Concentrations of PCE and TCE measured 160,000 and 7,500 parts per billion (ppb), respectively, in a soil sample obtained from at a depth of approximately 5 feet in boring BW-2.

Based on the preliminary data obtained during the June 1992 emergency response investigation, soils and possibly groundwater contamination exists in the vicinity of the soil borings. A potential source of the contamination was the on-site use of PCE, a common dry-cleaning agent. The other halocarbons present are likely PCE degradation by-products. Because PCE is denser, and yet more viscous than water, a potential exists that groundwater is contaminated.

4.0 EXPLORATION LOCATIONS

4.1 Soils at Depth

The investigation of the vertical and horizontal extent of contamination involves the collection and analysis of subsurface soil samples. The protocol for subsurface soil sampling is presented in detail in Section 5.5, and drilling methods are outlined in Section 5.0 of this work plan. We are proposing that a total of five additional borings be advanced at the subject site, including four within the former dry cleaners and one located outside, in the east or northeast vapor points portion of the parking lot. We propose completing three of the five borings as groundwater monitoring wells, if warranted by actual conditions observed at the time of drilling. Soil samples will be taken at two and one-half to five foot intervals at each soil boring. Proposed boring locations are indicated on Figure 2, the Site Exploration Plan, in the text of this report.

4.2 Groundwater

Stainless steel groundwater monitoring wells for vapor extraction have been proposed in order to better define the extent of potential groundwater contamination. Wells could extend to the first aquitard, approximately 25 feet below the ground surface.

Groundwater samples will be collected from all monitoring wells. Samples will be collected at the base of each well, utilizing double-check valve, disposable bailers.

5.0 DRILLING PROCEDURES

The drilling procedures outlined in this section will enable the proper installation of monitoring wells, as well as the proper collection of soil and groundwater samples. This protocol will also facilitate the monitoring and evaluation of the potential vertical variation in physical or chemical groundwater properties. We propose the following drilling procedures:

1. Obtain necessary permits for monitoring well installation in the City of Federal Way, Washington.
2. Have all underground utilities and pipelines located at the site by the appropriate utility representative.
3. Finalize drilling arrangements with the contract drilling company.
4. Install all wells under the direction of a qualified hydrogeologist. Well installation protocol will be in accordance with specifications outlined in Section 6.0.
5. Provide a well construction design which will facilitate unrestricted movement of groundwater into the well bore to obtain a sufficient supply of groundwater for well development, sampling, and monitoring procedures.

5.1 Equipment

Borings will be advanced using a bobcat-mounted drill rig equipped with a nominal 4-inch inside diameter, hollow-stem auger. The rig will be equipped with a cathead-operated, 140-pound drop hammer with a 30-inch trip; a water storage tank; and, an on-board pump capable of supplying water and mixing grout for the installation of well seals.

5.2 Technique

The auger will be advanced into the ground in 5-foot sections which are threaded together or linked by two short, high-strength bolts. Rotation of the auger cuts a minimum 7-inch diameter borehole and advances the bit. This allows cuttings to ascend up the flights and accumulate on the ground surface. Samplers, rods, plugs and well pipe access the bottom of the boring through the hollow-stem auger. To sample soil, an 18-inch long, 2-inch outside diameter, split-barrel sampler attached to the end of the drill rod will be driven into undisturbed soil below the auger bit by means of the 140-pound hammer.

5.3 Drilling Protocol

Prior to locating the drill rig for boring advancement, the site will be checked by appropriate authorities for underground utilities. Drilling will only proceed where underground services are at least 5 feet away from the drill locations and overhead power lines are at least 20 feet from the drill tower. The drill rig will be decontaminated prior to advancement at each boring location and before leaving the subject site. Equipment decontamination is discussed in Section 10.0.

5.4 Sample Classification

Soils collected during boring of the monitoring wells will be visually classified according to the Unified Soil Classification System.

5.5 Soil Sampling Procedures

The following procedures will be followed for collection of soil samples for the remedial investigation phase of the project:

- Collect soil samples at 2.5-foot intervals to a depth of 12.5 feet and thereafter at 5-foot intervals;
- Each time a split-spoon is extracted from the boring the soil will be scanned with an HV and/or microtip (with 11.8 eV ionization potnetial lamp) to assess the relative level of contamination.
- Immediately following sample collection, the samples will be labeled and logged on a chain-of-custody form. The samples will then be stored in a cold ice chest for preservation.
- Selected samples from each borehole will be analyzed by a contract lab for volatiles by EPA Method 8240.
- The split-spoon sampler will be decontaminated prior to each use. Sampling equipment decontamination procedures are discussed in Section 10.0 below.

6.0 WELL/VAPOR POINT INSTALLATION

6.1 Installation Protocol

Upon completion of drilling, the following protocol will be followed to install the monitoring or vapor well:

- Place a stainless steel well screen and riser through the hollow-stem auger from the bottom of the boring to 12 to 18 inches above the ground surface;
- Gradually pull back the auger and install a sand pack through the annular opening between the auger and the stainless steel riser. Sand will be continually added to the annular space so that

no less than 12 inches of sand exists inside the hollow-stem during auger retrieval and sand pack installation;

- Continue removing augers (in 5 foot sections) and installing sand until the top of the sand pack is at least 2 feet above the top of the well screen;
- Install a minimum of 2 feet of bentonite seal through the annular space on top of the sand pack;
- Place a mixture of non-shrinking cement grout on top of the bentonite seal and bring to the ground surface;
- Install steel monument;
- Complete an as-built Monitoring Well Construction Diagram as discussed in Section 11.2.

6.2 Well Design

The design of all monitoring wells or vapor extraction wells will be similar to that shown in Figure 1 and in accordance with WAC Chapter 173-160. The depth of the various components will depend upon the depth of the uppermost water-bearing stratum. Placement of the well screen with respect to the water table is important, and a number of factors need to be considered. These factors include partial or total screening of the water bearing strata, seasonal groundwater fluctuations, location of contaminants within the water table and accuracy of in-situ permeability tests. The top of the well screen will be placed at least 2 feet below the water table to maximize well screen saturation.

6.3 Well Casing and Screen Materials

6.3.1 Well Casing (Riser)

All vapor well casing will consist of new, threaded, flush joint Johnson stainless steel with a minimum inside diameter of 2 inches. The riser pipe will, at a minimum, conform to ASTM:D 1785 specifications.

6.3.2 Well Screen

All well screens will consist of new, commercially fabricated, threaded, flush joint, 2-inch inside diameter slotted stainless steel. Screen slot size will be 0.010 inch. A threaded stainless steel end cap will be provided for the bottom of the well. The end cap provides approximately 6 inches of open space below the screen and acts as a sediment trap.

6.4 Artificial Sand Pack

An artificial sand pack will be installed in the annular space between the borehole and the well screen. The sand pack will consist of clean, 8-12 Colorado silica sand or equivalent and will be placed from the bottom of the bore hole to approximately 2 feet above the top of the well screen.

6.5 Bentonite Seal

The bentonite seal will consist of a granulated or pelletized bentonite placed with two times an equivalent volume of water. The bentonite seal will be a minimum of 2 feet in length.

6.6 Grout Mixture

A cement-bentonite grout mixture will be placed in the annular space between the borehole and the well casing from the top of the bentonite seal to the ground surface. The grout will consist of a 20:1 (100 pounds to 5 pounds) Portland cement (ASTM:C 150) to bentonite mixture combined with seven to eight gallons of water. The addition of bentonite to the grout mixture will help to reduce shrinkage.

6.7 Flush Monuments

A round steel security monument, with sufficient diameter to allow easy access to the well, will be installed within a concrete pad approximately 2-feet square surrounding each monitoring well. The security cap will have a water-tight, locking lid . The steel security monument will be completed flush with the ground surface.

7.0 WELL LOCATION SURVEY

The interpretation of well data and the preparation of a site plan will require the completion of a site survey. Horizontal measurements (to the closest 1.0 foot) and elevations (to the closest .01 foot) will be established for each well if three wells are installed. The horizontal measurements will be referenced to existing structures; the elevations will be referenced to an existing local vertical datum. If these are not readily available at the site, an on-site datum will be assumed. A final site plan at an appropriate scale will be completed from existing site drawings and the survey data. In the event that two monitoring wells are installed, nor survey will be conducted and all groundwater measurements will be referenced from the top of the well casing.

8.0 WELL DEVELOPMENT PROCEDURES

Well development will begin no sooner than 48 hours after placement of the grout seal. Data acquired during well development will be recorded on the Groundwater Monitoring Form as discussed in Section 11.3. During well development, the following protocol will be observed:

- Measure and record the static water level from the top of the stainless steel riser using an electronic Actac water level sounder. A mark will be placed upon the well casing so future measurements can be taken from the same datum.
- Measure the total well depth from the measuring point.
- Remove a minimum of four casing volumes (or until dry) by hand using a stainless steel bailer [or hand pump (e.g., Brainard-Kilman). The well will be purged during development to ensure that the sediment trap is free of accumulated material prior to sampling. Development will continue until the well water is reasonably free of suspended material. Experience has shown that these procedures are sufficient to adequately develop a 2-inch-diameter well in this geologic environment. The development water will be placed in a 55-gallon drum.

9.0 GROUNDWATER SAMPLING

Groundwater samples will be collected from all monitoring wells, and analyzed for volatile organic compounds by EPA Method 8240.

After the monitoring wells are developed and recharged, water samples will be obtained from each location. Water sampling will be performed carefully to minimize interaction of the sample with the surface environment. Groundwater sampling will be conducted as follows:

- Static water level will be measured and recorded using an electronic Actac water level sounder.

- The well will be purged prior to sampling by removing approximately three to four casing volumes of water, using a stainless steel bailer. If the well is bailed dry or insufficient water remains for obtaining a sample, the well will be allowed to recover a maximum of 24 hours before sampling.

- Water samples will be obtained with a stainless steel bailer. The bailer will be lowered slowly into the well to minimize surface disturbance, allowed to fill with well water, and carefully withdrawn. The contents will be gently discharged into the sample containers. This process will be repeated as necessary to fill the required number of containers. If the well is incapable of producing a sufficient sampling volume at each event, the largest quantity possible will be obtained.

9.1 Sample Collection

Once a well has been properly purged, sample collection will follow the procedure outlined in Section 2.4 of the QA/QC Sampling Plan located in Appendix E.

10.0 DECONTAMINATION PROCEDURES

In order to prevent cross-contamination between sampling events, the operating and sampling equipment will be decontaminated according to the following procedures:

- Pressure wash the drill rig with a steam cleaner prior to, and upon leaving, the site;
- Pressure wash augers and rods with a steam cleaner prior to arrival, between borings, and prior to leaving the site;
- Pressure wash split spoon sampler with steam cleaner prior to arrival and upon leaving the site. Hand wash with Alconox, rinse with tap water and distilled water between sampling events;
- Pressure wash buckets with steam cleaner between sampling locations, or as needed during sampling at a particular location;
- Pressure wash stainless steel well casing with steam cleaner prior to installation;
- Wash stainless steel bailer with Alconox, rinse with tap water and distilled water prior to, and subsequent to, bailing each well;
- Wash well-sounder with Alconox, rinse with tap water and distilled water prior to, and subsequent to, each use;
- Wash backhoe and bucket, if utilized, with Alconox and rinse with tap water prior to, and subsequent to, each separate use;
- Wash stainless steel spoon and pan with Alconox, rinse with tap water prior to use at each well.
- Allow equipment to air dry.

11.0 DOCUMENTATION

Thorough documentation will be maintained during field activities to provide a complete work record. Notes and documents will be kept on Rite-in-the-Rain, water-proof paper. The material described below is documentation related to well installation and sampling. Additional documentation on soil sampling and laboratory procedures is presented in the Quality Assurance/Quality Control Plan located in Appendix E.

11.1 Boring logs

As drilling or excavation progresses and subsurface soil samples are obtained, a qualified field representative will record on a boring log the drilling or excavation conditions and the nature of the samples collected. See Figure 2 for an example of this form. Soil samples will be described in accordance with the Visual-Manual Description Procedure (Method ASTM D 2488). Samples of other materials encountered will be described in similar terms, but without field particle size assessment. Soil photoionization detector measurements will be recorded on the boring or test pit logs, when appropriate.

11.2 As-Built Monitoring Well Construction Diagrams

Specific well installation procedures and construction details will be reported for each well on the Monitoring Well As-Built Diagram, noted in Figure 2. Specific information entered on the form will include well depth, screen type and slot size, sand pack interval, grout type, grout mixture, grout volume, added water, and construction materials.

11.3 Groundwater Monitoring Form

The Well Development Data Form, noted in Figure 3, will be used to record data obtained during sampling and development of the monitoring wells. The form includes such data as the date the well was developed, static water levels before and after development, and volume of water removed during development.

11.4 Groundwater Sampling Log

The groundwater sampling log, shown in Figure 4, will be used each time that a well is sampled. The data and time of sampling will be recorded. The volume of standing water in the well will be calculated using the depth of the well and the water level to obtain the length of the water column, which is then multiplied by the volume of water per foot of casing. The volume of water removed before the well is sampled will be recorded. The type of pumping and sampling systems will be noted, as well as the number of samples taken for field and laboratory analyses.

11.5 Sample Label/Tag

Figure 5 shows a typical label that is affixed to each sample bottle provided by the analytical testing lab. The label is filled out in the field at the time of collection.

11.6 Chain-of-Custody

A Chain-of-Custody Form, shown in Figure 6, will be used to record the samples taken and the laboratory analyses requested. Information taken includes time and date of sample collection, sample number, the type of sample, the sampler's signature, and the required analysis. The remainder of the form is used to document the custody of the sample until it reaches the laboratory. A copy of the Chain-of-Custody Form will be retained by the sampler prior to shipment.

11.7 Field Logbooks

Field logbooks or Daily Field Reports will be maintained by the Field Geologist during field activities, in order to record pertinent information regarding the field sampling program and the equipment preparation efforts. Logbooks or daily field logs will be kept in the project files and will contain the following:

- Name and location of site;
- Date(s) and times of sampling events;
- Name of the project manager;
- Field observations;
- Summary of equipment preparation procedures;
- Number and type of samples taken and sample identification numbers;
- A description of, and rationale for, any deviations from the work plan or standard operating procedures.

In addition, the following observations about each sample obtained will be recorded in the logbooks, as appropriate:

- Sample depth;
- Color and texture;
- Physical description;
- Type(s) of laboratory analyses requested;
- Time of sample collection; and
- Any changes in sampling locations (these changes are also to be indicated on annotated maps).

12.0 WASTE MANAGEMENT

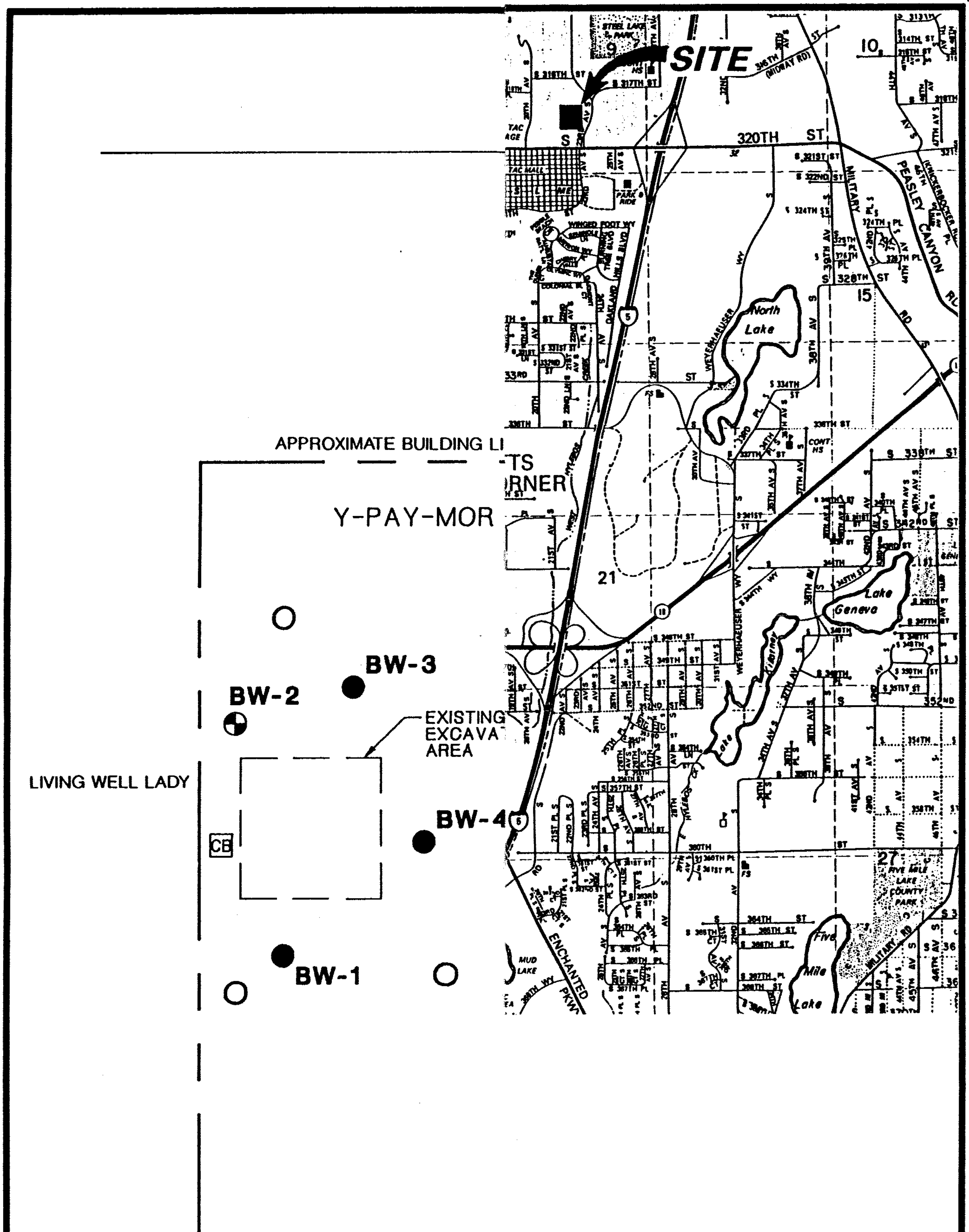
The soil cuttings generated during the drilling of the boreholes will be temporarily placed between plastic sheeting or in 55 gallon drums in order to fully enclose the soil until permanent soils disposal can be arranged.

Well water will be placed in a 55 gallon drum on site, which will be sealed and locked following each use.

Soils and groundwater containing elevated levels of contaminants will be treated, or disposed of, in accordance with current regulations. Material that is found to have contaminant concentrations below current clean-up action levels will remain at the site.

FIGURE 1

SITE AND EXPLORATION PLAN



Y-PAY-MOR DRY CLEANING FACILITY
FEDERAL WAY, WASHINGTON

SITE AND EXPLORATION PLAN
WITH LOCATION MAP

FIGURE 1

DRAWING NO. \7B\W-7883-4\SITE.DWG

FIGURE 2

MONITORING WELLS AS-BUILT-DESIGN

FIGURE 2

MONITORING WELLS AS-BUILT-DESIGN

RZA AGRA, Inc.

Engineering and Environmental Services

MONITORING WELL AS-BUILT REPORT

Job No.: ____________________

Project Name: ____________________

Boring/Well I.D.: ____________________

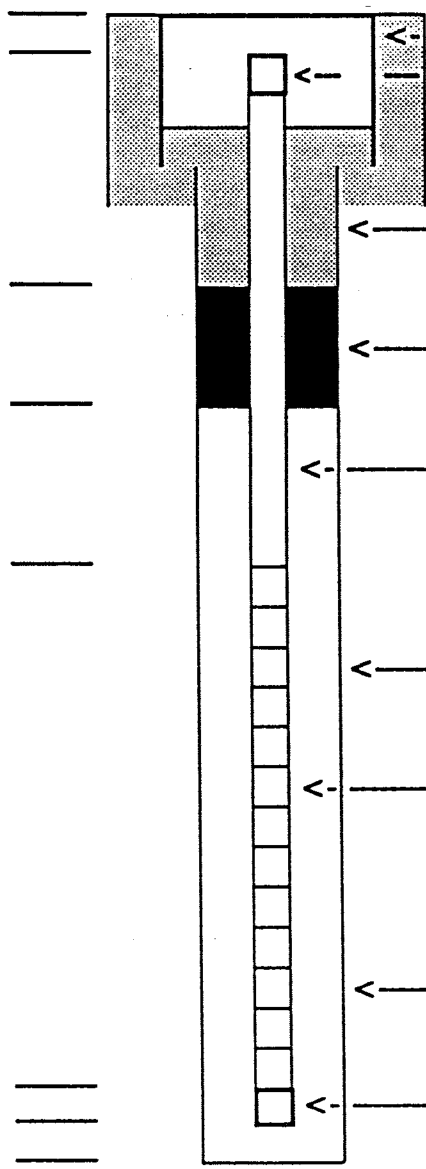
Date: ____________________

Location ____________________

Observed by: ____________________

Driller/Installer: ____________________

Soil Type | Depth (in feet below ground surface)



Stick-up Height (if applicable) ____________

Monument Type ____________

Well Cap Type ____________

Grout Type/#Sacks ____________

Bentonite Seal/#Sacks ____________

Well Casing I.D.: ____________

Type of casing ____________

Type of connection ____________

Filter Pack/size/#Sacks ____________

Well Screen I.D ____________

Type of Screen ____________

Slot size ____________

Diameter of borehole ____________

Endcap Type ____________

Remarks: ____

FIGURE 3

BORING LOG FORM

RZA AGRA, Inc.

Geology and Soils Engineering

TEST BORING LOG

LOCATION

WEATHER

HOLE NO.
SHEET ____ OF
TOTAL DEPTH
DATE BEGUN
DATE COMPLETED

SAMPLING: SAMPLING METHOD | SAMPLE NUMBER | BLOW COUNT | DEPTH SAMPLED | RECOVERY

DEPTH IN FEET

GROUNDWATER TABLE

WD = WHILE DRILLING AB = AFTER BORING PIEZO.

DEPTH IN FT.			
TIME			
DATE			

PROJECT NAME
PROJECT NUMBER
GEOLOGIST/ENGINEER
DRILLING CONTRACTOR/CREW
METHOD USED

SAMPLING METHOD SPT = STANDARD PENETRATION TEST T = TUBE R = RING

Soil Description

0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5
6
7
8
9
0

Boring Log Summary

FIGURE 4

GROUNDWATER MONITORING FORM

Engineering and Environmental Services

Groundwater Monitoring

Field Report No. ______________

Project Name ____________________ **Job No.** ______________

Date ______________ **Method of Measure** ______________ **Weather** ______________

Monitoring Well No.	Depth to Product (ft)	Depth to Water (ft)	Depth to Bottom (ft)	Comments

Operational Status:

Signature: ______________________________

RZA AGRA, Inc. Field Representative

FIGURE 5

GROUNDWATER SAMPLING FORM

RZA AGRA, Inc.
Engineering and Environmental Services

Groundwater Sampling

Field Report No. ________

Project Name ________________________________ Job No. ________

Date ____________ Method of Collection ____________ Weather ________

Sample No.	Depth to Water (ft)	Depth to Bottom (ft)	Column Height (ft)	1 Well Volume	Volume Purged	Bailed Dry?	Time Purged	Conductivity	Temp. (C) / Ph	Sample Time

Well Volumes: 1" id...0.041 gal/ft 1.5" id...0.092 gal/ft 2" id...0.163 gal/ft 4" id...0.653 gal/ft 6" id...1.469 gal/ft

Remarks: ________________________________

Signature: ________________________________
RZA AGRA, Inc Field Representative

FIGURE 6

SAMPLE LABEL

ENVIRONMENTAL SAMPLING SUPPLY

LOT #

SAMPLE ID

SAMPLED BY	DATE
	TIME
LOCATION	PRESERVATIVE
ANALYSIS	CLIENT

9601 San Leandro Street, Oakland, California 94603
(510) 562-4988 (800) 233-8425

FIGURE 7

CHAIN-OF-CUSTODY FORM

RZA-AGRA
Environmental & Engineering Services
11335 Northeast 122nd Way
Kirkland, Washington 98034-6918
(206) 820-4669/FAX (206) 821-3914

№ 11109

Chain of Custody Record / Analysis Request

Project Name: Job No.:
Project Manager: Phone #:
Sampler:

Analysis Requested: (circle, check box or write preferred method in box)

RZA-AGRA Sample ID	Lab Samp ID	Date Collected	Time Collected	Matrix (S=soil, W=water, A=air)	# Containers/Preservation: 40 ml VOA /	1 L Glass /	8 oz Glass /				CHILL	BTEX by EPA 8020 Soil / EPA 602 Water	WTPH-G	BTEX / WTPH-G	WTPH-HCID	WTPH-D	TPH by EPA 8015 Mod.	WTPH-418.1 Modified	TPH by EPA 418.1	LEAD EPA 6010 7420 7421 Soil; Total / Dissolved EPA 7421 Water	TOTAL METALS	TCLP EPA 1311	P C B s EPA 8080 Soil; EPA 608 Water	V O C s EPA 8010 8020 Soil; EPA 601 602 Water	GC/MS EPA 8240 Volatiles	GC/MS EPA 8270 Semi-volatiles			Hold for Further Analysis	RUSH (see below)

RELINQUISHED BY SAMPLER:	RELINQUISHED BY:	RELINQUISHED BY:
Signature:	Signature:	Signature:
Printed Name:	Printed Name:	Printed Name:
Firm:	Firm:	Firm:
Date/Time:	Date/Time:	Date/Time:
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**
Signature:	Signature:	Signature:
Printed Name:	Printed Name:	Printed Name:
Firm:	Firm:	Firm:
Date/Time:	Date/Time:	Date/Time:

LABORATORY:

Total # Containers:

Condition of Containers?

Condition of Seals?

Special Handling

Turnaround:
- ☐ 8 hour
- ☐ 24 hour
- ☐ 5 business day
- ☐ 10 business day
- ☐ other ______(#)business day

PURPOSE OF SAMPLING / COMMENTS:

Form 100A

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator; GOLDENROD - to lab in advance

HEALTH AND SAFETY PLAN

Project Name: Y-Pay-Mor

Project Location: 2210 S. 320th Street, Federal Way

Project Number: W-7883-6

Project Dates: 10/27/92 - 10/30/92

RZA AGRA, INC. SAFETY PERSONNEL:

Safety Program Director: David G. Cooper

Safety Officer: Wendre R. Vaughan WRV

Project Manager: Dale Kramer

Site Safety Coordinator: Dale Kramer

EMERGENCY CONTACTS:

Hospital/Emergency Room: (St. Francis)	838-9700
(Map showing shortest route to St. Francis is on back of this page)	
Fire:	911
Police:	911
Poison Control Center:	526-2121
Electric Utility (Puget Power):	927-1100
Emergency Telephone (U.S. West):	1-206-872-4121
Department of Ecology Spill Response: 649-7000	
Emergency Natural Gas:	1-206-475-6700 (Tacoma)
Emergency Water Shut-Off: Federal Way Sewer & Water District	941-2121
Washington State Patrol:	911
Site Telephone :	979-6143
:	
RZA AGRA Safety Officer (Wendre R. Vaughan):	820-4669 (w), 670-3603 (h)
Project Manager (Dale Kramer):	820-4669 (w)

Site Safety Coordinator (SSC), Project Manager and Safety Officer are to be notified immediately if worker exposure, accidents or site conditions not anticipated in this document are encountered. In case of hazard exposure during and/or prior to a medical situation, the hospital and any emergency response personnel are shall be notified that patient's clothing may be contaminated.

ACTION LEVELS:

PPE Level to Level C: At ALL TIMES in EXCLUSION ZONE

Stop all work and exit work area: 90 ~~150~~ ppm or greater measured on OVM or, WRV
20% LEL of gasoline in work area

I. General Information

A. Project Description

RZA AGRA personnel will supervise the advancement of 2 soil test borings and the installation of 2 monitoring/pumping wells. Soil test borings and monitoring/pumping wells will be installed by a water well drilling subcontractor (Beck Environmental). As a part of soil test boring advancement, RZA AGRA personnel will collect soil samples from each boring every 5 feet. If wells are installed, RZA AGRA personnel will develop all wells installed. Groundwater samples will be collected from 2 monitoring/pumping wells located on site.

B. Site History

The site is the location where dry cleaning solvents (i.e., tetrachloroethylene and dry cleaning lacquer) have been and/or are being used and/or stored. Previous investigations encountered the following concentrations (parts per million) of petroleum hydrocarbon constituents in soil and water at this site:

PARAMETER	SOIL (ppb)	SOIL VAPOR (ppm)
Tetrachloroethylene (PCE)	160,000	3,000
Trichloroethylene (TCE)	7,500	Not Tested
1,2-Trans-Dichloroethylene (trans-DCE)	5,600	Not Tested
cis-1,2-Dichloroethylene (cis-DCE)	3,900	Not Tested
1,1,2,2 Tetrachloroethane (PCA)	3,100	Not Tested
Vinyl Chloride (VC)	530	Not Tested
Acetone	1,200	Not Tested
2-Butanone	690	Not Tested

Other compounds potentially present at the site include methylene chloride and the numerous daughter products of PCE, which can exist as contaminants. The potential concentrations of these compounds are unknown. Information on the above-listed compounds, with the exception of 2-butanone, are located in Appendix A.

II. Site Safety Personnel

Mr. David G. Cooper is the safety program director for RZA AGRA's Kirkland, Washington operations. The safety program director is responsible for administration of RZA AGRA's health and safety program for the Kirkland office.

Ms. Wendre Vaughan coordinates, under the direction of the safety program director, health and safety planning for projects with potential hazardous material exposure. Primarily the duties of the safety officer entail coordination with project manager and site safety coordinator for preparation of site health and safety plans, assessment of chemical hazards and selection of safety/monitoring equipment necessary for each project.

The project manager has overall responsibility for project operations, and as such is responsible for providing a safe work environment. This involves coordinating preparation of a site health and safety plan with safety officer and providing necessary conditions for implementation of the site health and safety plan.

The site safety coordinator (SSC) has the responsibility of implementing the site health and safety plan while at the site. The SSC will be involved with the safety officer and project manager in preparation of the site health and safety plan. If the plan is not being implemented or if unanticipated situations arise, the SSC may stop all proceedings and see that all personnel depart the site. The SSC will have charge of all instruments and see to their proper use and function.

III. Emergency Procedures

In all emergencies, document action taken and notify safety officer, project manager, SSC and client officials of occurrence of an emergency and actions taken.

A. Hazard Exposures

Skin-remove contaminated clothing immediately;wash with soap and water.

Inhalation-remove to fresh air. Where necessary, call emergency medical help (ambulance, hospital, police) and follow medical emergency help procedures.

Eye Contact-flush with eye wash or water at least 15 minutes. Follow emergency medical help procedures, if indicated. Contaminants may be absorbed through the eyes.

Ingestion-obtain medical help if indicated.

Injuries-administer first aid if necessary. Follow emergency medical procedures below, if necessary. Medical emergencies take precedence over decontamination.

B. Emergency Medical Help Procedures

If necessary, call hospital (St. Francis): 838-9700

Hospital Address: See Map on back of first page

If the injury is life-threatening, follow steps 1 through 8 below. If the injury is not life-threatening, perform necessary first aid and consider the need for decontamination prior to transport.

1. Perform first aid necessary to determine victim(s) medical status;
2. Call emergency transport;
3. Give specific directions to location of emergency;
4. Give phone from which you are calling;
5. Tell emergency services what happened. Inform that victim(s) may be wearing contaminated clothing;
6. Inform emergency services how many persons need help;
7. Inform emergency services what is being done for the victim(s);
8. Stay on telephone until told to hang-up;

Transport to hospital, if possible.

C. Fire/Explosion

Use hand extinguisher if appropriate and safety permits. Call fire department, if appropriate. Evacuate to upwind location if fire cannot be controlled with a fire extinguisher.

D. Accidental Spill/Release

1. Pick up, isolate, or contain spill;

2. Evacuate area, if necessary;
3. Contact emergency agencies, if necessary.

E. Unanticipated Conditions

1. Suspend all non-emergency activities;

2. Notify safety officer and project manager immediately. Do not restart planned operations in the area until authorized by the safety officer and project manager;

3. If the unanticipated condition(s) is the presence of unidentifiable non-hydrocarbon related contaminants, site conditions, required protective equipment level and action levels will have to be reevaluated by the safety officer, project manager and site safety coordinator prior to restarting planned operations.

IV. Hazard Assessment

RZA AGRA anticipates, based upon the past history of the site and upon the types of activities to be performed, to encounter the following types of hazards:

- Chemical
- Physical
- Confined Space
- Construction
- Utilities

Based upon RZA AGRA's preliminary assessment, the proper personal protective equipment (PPE) to be employed at this site was determined to be Level C protection.

A. Chemical

Chemical hazards expected to be encountered include acetone, 2-butanone (methyl ethyl ketone) and chlorinated solvents. See table below for permissible exposure limits (PELs), short term exposure limits (STELs), odor perception thresholds and concentrations representing imminent danger to life and health (IDLH). Odor perception is variable from person to person. Odor should not be used as a gauge of exposure amount or to determine if concentrations are safe/unsafe. Odor perception thresholds are presented here as an additional aid.

Routes of exposure include both inhalation and contact. Symptoms of exposure to chlorinated

Compound	Odor Perception Threshold	PEL (ppm)	STEL (ppm) 15 min.	IDLH (ppm)
Acetone	100	750	1,000	20,000
2-Butanone (Methyl Ethyl Ketone)	Unknown	200	300	3,000
Tetrachloroethylene	27	25	None	500
1,1,2,2-Tetrachloroethane	1.5	1	None	150
Vinyl Chloride	3,000	1	5 (Ceiling)	Carcinogen
Trichloroethylene	28	50	200	1,000
*1,2-trans-dichloroethylene	0.08 (low) 1,975 (high)	200	None	4,000
*cis-1,2-dichloroethylene	Unknown	200	None	4,000

PEL - Permissible Exposure Limit
STEL - Short Term Exposure Limit for 15 minute period
IDLH - Imminent Danger to Life and Health
* - Total 1,2-dichloroethylene concentration should be used to evaluate PEL, STEL and IDLH

solvents include: irritated eyes, nose and throat; intoxication; headache; blurred vision; dizziness; and, nausea.

Absorption through the skin and/or eyes is possible if the compound is contacted. Skin absorption could occur if it is spilled or unintentionally contacted.

Vinyl chloride is a known human carcinogen, classed by EPA as a Class A Carcinogen. Tetrachloroethylene, trichloroethylene and 1,1,2,2-tetrachloroethane are suspected human carcinogens (Class B).

Tetrachloroethylene and 1,1,2,2-tetrachloroethylene are suspected teratogens in humans.

B. Physical

The physical hazards which are expected to be encountered during site activities include noise, manual lifting, heavy equipment operation, weather related hazards (rain, snow, wind), rough terrain and explosion hazards. Hearing protection and steel-toed boots will be required for all personnel working in vicinity of heavy equipment.

These hazards will be mitigated by using safe work practices at all times. The Site Safety Coordinator (SSC) has total responsibility for ensuring that all RZA AGRA personnel on-site perform work tasks in a safe and sensible manner.

As RZA AGRA personnel are not typically experienced heavy equipment operators, the safe operation of heavy equipment will be the responsibility of the subcontractor and the equipment operator. The drilling company subcontractor will be responsible for picking operators and ensuring that they are qualified to operate all drilling equipment. All drilling equipment will be inspected daily by the subcontractor to assure that the equipment is in good working order, including, but not limited to, hydraulic hoses, belts, cables, chain links and hoist hooks. All equipment will be turned off, locked up or otherwise secured at the close of each work period to prevent unauthorized use.

If at any time the SSC determines that safe work practices are not followed, the tasks will be suspended and corrective actions will be taken.

In some instances, subsurface explorations do encounter concentrations of combustible vapors. For those site with the potential for ignition of concentrations of combustible vapors, ignition of the combustible vapors must be guarded against. This will be accomplished by allowing the combustible gas meter to run on a continuous basis with the alarm level set at 20% of the lower explosive limit (LEL) for gasoline of 1.4% by volume in air.

Because of the potential explosion hazard presented during subsurface exploration of sites with a history of petroleum product usage, **SMOKING WILL NOT BE ALLOWED ANYWHERE ON THE SITE PROPERTY.**

C. Construction

Construction hazards will be mitigated as all work will be performed in general accordance with WAC 296-155.

D. Utilities

Prior to initiation of drilling activities, a utility locate was conducted through the Washington State Utility Notification Center (UNC). This has been logged by the UNC with the site specific identification number 92333826 and RZA AGRA user identification #2720. The UNC can be contacted by phone at: 1-800-424-5555. All other hazards not delineated through the UNC utility locate are the responsibility of the client.

Where there are overhead power lines in the vicinity of the site, they must be carefully avoided. A good rule of thumb is for all masts, buckets of backhoes/trackhoes and front-end loaders to remain at least 10 feet away from lines carrying 125,000 volts, 15 feet from lines carrying up to 250,000 volts and 20 from lines carrying over 250,000 volts.

All soil test boring/well locations will be located no closer than five feet to any located underground utilities. Because of error in utility locating hand augering at each location should be done prior to initiating advancement of drilling equipment. In the case of damage to a underground utility, safe exit and closure of the work area and/or site to the public (if necessary) should be completed prior to contacting the appropriate utility agency for repair/closure of utility line.

E. Confined Space Entry

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, limited visibility, limited egress and restricted movement. By definition a confined space is a space or work area not designed or intended for normal human occupancy, having limited means of egress and poor natural ventilation and/or any structure included buildings or rooms which have limited means of egress. The work area will be considered a confined space.

The "buddy system" will be employed during all work conducted in confined spaces. *The "buddy system" consists of a minimum of two people assigned to the confined space at any time.* The confined space observer provides external assistance to those inside the confined space, summons rescue personnel in the event of emergency and assists the rescue team.

1) General provisions for a confined space include:

Only personnel trained and knowledgeable of the requirements of these Confined Space Entry Procedures will be authorized to enter a confined space or be a confined space observer.

Forced ventilation using fans positioned as shown on the site plan shall be provided for the confined space prior to initiating explorations. However, care should be taken to not spread contamination outside the enclosed area.

The contents of any confined space shall, where necessary, be removed prior to entry. All ignition sources must be removed prior to entry.

Hand tools used in confined spaces shall be in good repair, explosion and spark proof, and selected according to intended use. Where possible, pneumatic power tools are to be used.

Hand-held lights and other illumination utilized in confined spaces shall be equipped with guards to prevent contact with bulb and must be explosion proof. For the under dock work, any lighting must also be rated to be used in water environments so that a electrocution hazard is not introduced into the work area.

Only self-contained breathing apparatus or NIOSH-approved airline respirators equipped with a 30-minute emergency air supply (egress bottle) shall be used in untested confined spaces or in any confined space with conditions determined immediately dangerous to life and health.

Where air-moving equipment is used to provide ventilation, chemicals shall be removed from the vicinity to prevent introduction into the confined space.

Vehicles shall not be left running near confined space work or near air-moving equipment being used for confined space ventilation.

Smoking in confined spaces shall be prohibited at all times.

Any deviation from these Confined Space Entry Procedures requires prior permission of the Safety Officer and Site Safety Coordinator.

2) Procedure for Confined Space Entry calls for the Site Safety Coordinator to:

Evaluate the job to be done and identify the potential hazards before a job in a confined space is scheduled.

Ensure that all process piping, mechanical and electrical equipment, etc., have been disconnected, purged, inspected, blanked-off or locked and tagged as necessary.

If possible, ensure removal of any standing fluids that may produce toxic or air-displacing gases, vapors or dust.

Ensure that any hot work (welding, burning, open flames, or spark producing operation) that is to be performed in the confined space has been approved by the Project Manager, Safety Officer.

Ensure that the personnel who enter the confined space and the confined space observer/helper are familiar with the contents and requirements of this instruction.

Ensure remote atmospheric testing of the confined space prior to employee entry to ensure the following:

- Oxygen content between 19.5% and 23.5%
- No concentration of combustible gas in space. Sampling will be done throughout the confined space and specifically at the lowest point in the space.
- The absence of other atmospheric contaminants, if the space has contained toxic, corrosive, or irritant material.

3) Confined Space Observer Duties

While personnel are inside the confined space, a confined space observer will monitor the activities and provide external assistance to those in the space. The observer will have no other duties which may take their attention away from the work or require them to leave the vicinity of the confined space at any time while personnel are in the space.

The confined space observer shall maintain at least voice contact with all personnel in the confined space. Visual contact is preferred, if possible.

The observer shall be instructed by his supervisor in the method for contacting rescue personnel in the event of an emergency.

If irregularities within the space are detected by the observer, personnel within the space will be ordered to exit.

In event of any emergency, the observer must NEVER enter the confined space prior to contacting and receiving assistance from a helper. Prior to this time, he should attempt to remove personnel with a lifeline (if usage does not pose a greater hazard, lifelines are recommended to be used) and to perform all other rescue functions from outside the space.

A helper shall be designated to provide assistance to the confined space observer in case the observer must enter the confined space to retrieve personnel.

VI. Action Plan

ORGANIC VAPORS

PID or FID	0-~~150~~ 90 ppm	Continue investigation in Level C with continuous monitoring with instrument. Change cartridges every hour.
	> ~~150~~ 90 ppm	Stop All Work and Evacuate Site; Re-evaluate PPE and engineering controls ~~which are black or organic vapor/acid gases which are pink and yellow~~

WRW

Readings are sustained over at least a minute during and are taken downwind.

Background readings obtained 50 feet upwind of site activity.

Monitoring will be conducted upwind and downwind in addition to at the borehole/well site.

VI. Personal Protection Level

The RZA AGRA Site Safety Coordinator (SSC) is responsible for ensuring the health, safety, and efficiency of the project team. The level of personal protection necessary for the health and safety of the project team will be determined by the SSC based upon the above action plan and any overt signs of hazards to life and health.

Any team member can seek to upgrade the level of protection established by the SSC. This will be accomplished through consultation with the RZA AGRA SSC, and an agreement will be reached before the team member enters the work area. **UNDER NO CIRCUMSTANCES** will the RZA AGRA team members downgrade the level of personal protection selected by the SSC. The level of protection selected for this site is Level C.

A. Modified Level C consists of steel-toed, chemical resistant rubber boots, double inner glove of PVC or latex, outer gloves of Nitrile or equivalent, hard hat, safety glasses, PVC-Coated Tyvek coveralls and a full-face air purifying respirator equipped with organic vapor and high efficiency particulate cartridges.

B. Air purifying cartridges will be replaced every hour.

VII. Site Control

A. Work areas will be established as follows:
While working inside the building, the exclusion zone will be the entire building. For work conducted outside the building, an exclusion line will be established 15 feet from the drilling/backhoe equipment. This are should be marked with tape where practicable. The area inside this line will be considered the exclusion zone. Exit from the exclusion zone into the contamination reduction zone (CRZ) will be through a corridor established with tap adjacent to the exclusion line.

General access to the exclusion zone and CRZ by the public should be restricted by either fencing or barricades and flagging along the perimeter of the CRZ.

B. Personnel decontamination will take place in the CRZ and will consist of:

1. A wash tub (or equivalent) will be filled with potable water and detergent (TSP). Persons leaving the hot zone will step into the detergent solution and scrub both boots and gloves. Upon completion of scrubbing, personnel will step into a similar tub filled with clean potable water and rinse gloves and boots thoroughly.

NOTE: Step 2 will be done only if Tyvek is worn.

2. Personnel will then remove tape from around wrists and ankles and remove the Tyvek coveralls which will be discarded into a drum located at the end of the CRZ.

VIII. Monitoring Plan

Personal monitoring will be done at the discretion of the SSC. In lieu of personal monitoring, the direct reading instruments listed under the action plan will be used. Regular monitoring upwind and downwind of the active work area will also be conducted.

All readings obtained with the FID or PID would be recorded in a log book maintained by the SSC.

IX. Site Security

A. Flagging will be used to delineate the hot zone from the CRZ and also the CRZ from the support area.

B. No unauthorized persons will be allowed in the CRZ or the hot zone - unauthorized persons are those without appropriate training, without proof of medical surveillance, and those with no business on the site.

X. Training

Certificates of successful completion of a 40-hour training course will be maintained at the offices and will be produced for perusal by regulatory authorities upon request. All personnel should carry 40-hour training cards. At least one of the RZA AGRA team members present on-site will also have a certificate of completion for 8-hour first aid and CPR training.

XI. Medical Surveillance

Evidence of a current physical examination in the form of a letter from an examining physician will be maintained at the offices and will be available to regulatory personnel upon request.

XII. Acknowledgement Form

The content of the plan will be discussed in detail at the start of the project with all site personnel during a safety meeting held at the site. The SSC shall document attendance at this meeting and content of the meeting. All site personnel will be expected to sign an acknowledgement form. If other contractors have a separate safety plan, a copy of that plan must be given to the SSC at this meeting.

ACKNOWLEDGEMENT FORM

I have read; I understand; and I will abide by the rules established in the Health and Safety Plan.

SIGNATURE	DATE
[illegible]	10-24-92
[illegible]	10-27-92
[illegible]	10-27-92
[illegible]	10-27-92
[illegible]	10-27-92
[illegible]	10-27-92
Richard [illegible]	10-27-92
[illegible]	10-27-92
[illegible]	10-27-92
Rodney [illegible] Sr.	10-27-92

SEPARATE SAFETY PLAN(S)

EMPLOYEE EXPOSURE RECORD

Complete the following after completing this phase of work. Return this page to the RZA AGRA Safety Officer.

Project Name:____________________________

Project Number:________________________________

Project Location:_______________________________

Dates This Phase of Work Conducted:______________________

Hazardous Substances Present on-site and highest concentrations present in water and soil, if available:

Employee Name	Total Hours on-site	Hazardous Substances Present in Work Area	Contact with Soil and or water?

INFORMATION SHEETS ON SUSPECTED ON-SITE CHEMICALS

ɔic: ACETONE

RVIEW
ɹterial name:
ACETONE
mmon synonyms:
Dimethyl ketone
Propanone
2-Propanone
aracteristics:
Watery liquid Colorless Sweet odor
Floats and mixes with water. Flammable, irritating vapor is produced.
ergency actions:
Stay upwind and use water spray to ''knock down'' vapor.
Shut off ignition sources and call fire department. Keep people away.
Stop discharge if possible.
Isolate and remove discharged material.
Avoid contact with liquid and vapor.
Notify local health and pollution control agencies.
ire:
FLAMMABLE.
Flashback along vapor trail may occur.
Vapor may explode if ignited in an enclosed area.
Extinguish with dry chemical, alcohol foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.
:posure:
CALL FOR MEDICAL AID.
VAPOR
Irritating to eyes, nose and throat.
If inhaled, may cause difficult breathing or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.
LIQUID
Irritating to eyes.
Not irritating to skin.
IF IN EYES, hold eyelids open and flush with plenty of water.
ɪter pollution:
Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.
Notify local health and pollution control officials.
Notify operators of nearby water intakes.
SPONSE TO DISCHARGE
[ssue warning-high flammability Disperse and flush
3EL

Topic: ACETONE

Category: Flammable liquid
Class: 3

CHEMICAL DESIGNATIONS

CG compatibility class: Ketone
Formula: CH(3)COCH(3)
IMO/UN designation: 3.1/1090
DOT id no.: 1090
CAS registry no.: 67-64-1

OBSERVABLE CHARACTERISTICS

Physical state: Liquid
Color: Colorless
Odor: Sweetish; pleasant, resembling that of mint or fruit; pungent; sharp, penetrating residual; ketonic, pleasant, non-residual

HEALTH HAZARDS

Personal protective equipment: Organic vapor canister or air-supplied mask; synthetic rubber gloves; chemical safety goggles or face splash shield.
Symptoms following exposure: INHALATION: vapor irritating to eyes and mucous membranes; acts as an anesthetic in very high concentrations. INGESTION: low order of toxicity but very irritating to mucous membranes. SKIN: prolonged excessive contact causes defatting of the skin, possibly leading to dermatitis.
Treatment of exposure: INHALATION: if victim is overcome, remove to fresh air and call a physician; administer artificial respiration if breathing is irregular or stopped. INGESTION: if victim has swallowed large amounts and is conscious and not having convulsions, induce vomiting and get medical help promptly; no specific antidote known. SKIN: wash well with water. EYES: flush with water immediately for at least 15 min. Consult a physician.
Threshold limit value: 750 ppm
Short term inhalation limits: 1000 ppm for 30 min.
Toxicity by ingestion: Grade 1; LD(50) = 5 to 15 g/kg (dog)
Late toxicity: Not pertinent
Vapor (gas) irritant characteristics: If present in high concentrations, vapors cause moderate irritation of the eyes or respiratory system. Effect is temporary.
Liquid or solid irritant characteristics: No appreciable hazard. Practically harmless to the skin because it is very volatile and evaporates quickly from the skin.
Odor threshold: 100 ppm
IDLH value: 20000 ppm

FIRE HAZARDS

Flash point: 4 degrees F O.C.; 0 degrees F C.C.
Flammable limits in air: 2.6%-12.8%
Fire extinguishing agents: Alcohol foam, dry chemical,

Topic: ACETONE

carbon dioxide
Fire extinguishing agents NOT to be used: Water in straight hose stream will scatter and spread fire and should not be used.
Special hazards of combustion products: Not pertinent
Behavior in fire: Not pertinent
Ignition temperature: 869 degrees F
Electrical hazard: Class I, Group D
Burning rate: 3.9 mm/min.
Adiabatic flame temperature: Data not available
Stoichiometric air to fuel ratio: Data not available
Flame temperature: Data not available

CHEMICAL REACTIVITY
Reactivity with water: No reaction
Reactivity with common materials: No reaction
Stability during transport: Stable
Neutralizing agents for acids and caustics: Not pertinent
Polymerization: Not pertinent
Inhibitor of polymerization: Not pertinent
Molar ratio (reactant to product): Data not available
Reactivity group: 18

WATER POLLUTION
Aquatic toxicity: 14,250 ppm/24 hr/sunfish/killed/tap water
13,000 ppm/48 hr/mosquito fish/TLm/ turbid water
Waterfowl toxicity: Not pertinent
Biological oxygen demand (BOD): (Theor) 122%, 5 days
Food chain concentration potential: None noted

SHIPPING INFORMATION
Grades of purity: Technical: 99.5% plus 0.5% water Reagent: 99.5% plus 0.5% water
Storage temperature: Ambient
Inert atmosphere: No requirement
Venting: Open (flame arrester) or pressure-vacuum

HAZARD CLASSIFICATIONS
Code of federal regulations: Flammable liquid

NAS HAZARD RATING FOR BULK WATER TRANSPORTATION:

Category	Rating
Fire	3
Health	
Vapor Irritant	1
Liquid or Solid Irritant	0
Poisons	0
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	1
Aesthetic Effect	1
Reactivity	
Other Chemicals	2
Water	0

Topic: ACETONE

Self Reaction.................. 1

NFPA HAZARD CLASSIFICATION:

Category	Classification
Health Hazard (Blue)............	1
Flammability (Red)..............	3
Reactivity (Yellow).............	0

PHYSICAL AND CHEMICAL PROPERTIES

Physical state at 15 degrees C. and 1 ATM: Liquid
Molecular weight: 58.08
Boiling point at 1 ATM: 133 degrees F = 56.1 degrees C = 329.3 degrees K
Freezing point: -138 degrees F = -94.7 degrees C = 178.5 degrees K
Critical temperature: 455 degrees F = 235 degrees C = 508 degrees K
Critical pressure: 682 psia = 46.4 atm = 4.70 MN/m(2)
Specific gravity: 0.791 at 20 degrees C (liquid)
Liquid surface tension: Not pertinent
Liquid water interfacial tension: Not pertinent
Vapor (gas) specific gravity: 2.0
Ratio of specific heats of vapor (gas): 1.127
Latent heat of vaporization: 220 Btu/lb = 122 cal/g = 5.11 X 10(5) J/kg
Heat of combustion: -12,250 Btu/lb = -6808 cal/g = -285.0 X 10(5) J/kg
Heat of decomposition: Not pertinent
Heat of solution: Not pertinent
Heat of polymerization: Not pertinent
Heat of fusion: 23.42 cal/g
Limiting value: Data not available
REID vapor pressure: 7.25 psia

Topic: CIS-1,2-DICHLOROETHYLENE

ADMINISTRATIVE INFORMATION
 Hazardous Substance DataBank Number:
 1. 5656
 Last Revision Date:
 1. 881228
 Review Date:
 1. SRP review on 02/19/88
 Update History:
 1. Field update on 03/06/90, 1 field added/edited/deleted.
 2. Complete Update on 12/28/88, 70 fields added/edited/deleted.
SUBSTANCE IDENTIFICATION
 Name of Substance:
 1. CIS-1,2-DICHLOROETHYLENE
 CAS Registry Number:
 1. 156-59-2
 Related HSDB Records:
 1. (Isomer) 6361 [TRANS-1,2-DICHLOROETHYLENE
 2. 149 [1,2-DICHLOROETHYLENE
 Synonyms:
 1. (Z)-1,2-DICHLOROETHYLENE **PEER REVIEWED**
 2. 1,2-CIS-DICHLOROETHYLENE **PEER REVIEWED**
 3. CIS-1,2-DICHLORETHYLENE **PEER REVIEWED**
 4. CIS-1,2-DICHLOROETHENE **PEER REVIEWED**
 5. CIS-DICHLOROETHYLENE **PEER REVIEWED**
 6. ETHENE, 1,2-DICHLORO-, (Z)- **PEER REVIEWED**
 7. ETHYLENE, 1,2-DICHLORO-, (Z)- **PEER REVIEWED**
 8. Acetalyne dichloride **PEER REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 5th Printing/Revision. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services,NIOSH/Supt. of Documents, GPO, Sept. 1985. 98
 Molecular Formula:
 1. C2-H2-Cl2 **PEER REVIEWED**
 Wiswessar Line Notation:
 1. G1U1G -Z **PEER REVIEWED** [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry ofToxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLARS file.,p. 87/8703
 RTECS Number:
 1. NIOSH/KV9420000
 Shipping Name/Number - DOT/UN/NA/IMCO:
 1. IMO 3.2; Dichloroethylene
 2. UN 1150; Dichloroethylene
 STCC Number:
 1. 49 091 45; Dichloroethylene
MANUFACTURE/USE INFORMATION

Topic: CIS-1,2-DICHLOROETHYLENE

Methods of Manufacturing:

1. SEPARATION OF CIS ... FORM BY FRACTIONAL DISTILLATION: ... TRUCE, BARNEY, J ORG CHEM 27, 128 (1962). **PEER REVIEWED** [The Merck Index. 10th ed. Rahway, New Jersey: Merck Co., Inc., 1983. 14
2. PROBABLY BY PARTIAL CHLORINATION OF ACETYLENE OR REACTION OF 1,1,2,2-TETRACHLOROETHANE WITH STEAM OVER AN IRON CATALYST TO GIVE AN ISOMERIC MIXT, FOLLOWED BY FRACTIONAL DISTILLATION; MAY BE A BYPRODUCT OF ETHYLENE DICHLORIDE MANUFACTURE. **PEER REVIEWED** [SRI

Other Manufacturing Information:

1. Trans isomer is more widely used in industry than either the cis isomer or the commercial mixture. **PEER REVIEWED** [Gosselin, R.E., R.P. Smith, H.C. Hodge. Clinical Toxicology of Commercial Products. 5th ed. Baltimore: Williams and Wilkins, 1984.,p. II-62

Major Uses:

1. SOLVENT & CHEMICAL INTERMEDIATE. **PEER REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3550
2. SOLVENT (AS ISOMERIC MIXT) FOR PERFUMES, DYES, & LACQUERS. **PEER REVIEWED** [SRI
3. SOLVENT (AS MIXT) FOR THERMOPLASTICS, FATS, & PHENOLS. **PEER REVIEWED** [SRI
4. SOLVENT (AS MIXT) FOR CAMPHOR & NATURAL RUBBER. **PEER REVIEWED** [SRI
5. CHEM INT (AS ISOMERIC MIXT) FOR CHLORINATED CMPD. **PEER REVIEWED** [SRI
6. AGENT IN RETARDING FERMENTATION. **PEER REVIEWED** [SRI
7. Used as a solvent for waxes, resins, and acetylcellulose. It is also used in the extraction of rubber, as a refrigerant, in the manufacture of pharmaceuticals and artificial pearls and in the extraction of oils and fats from fish and meat. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
8. CIS- & TRANS-ISOMERS OF 1,2-DICHLOROETHYLENE HAVE HAD USE AS SOLVENTS & CHEM INTERMEDIATES. NEITHER OF ISOMERS HAS DEVELOPED WIDE INDUSTRIAL USAGE IN THE US PARTLY BECAUSE OF THEIR FLAMMABILITY. /CIS AND TRANS ISOMERS/ **PEER REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3550

U.S. Production:

1. (1977) AT LEAST 5.0X10+8 G (CAPTIVE PRODN) **PEER

REVIEWED** [SRI
2. (1981) ND **PEER REVIEWED** [SRI

U.S. Imports:
1. (1979) ND **PEER REVIEWED** [SRI
2. (1981) ND **PEER REVIEWED** [SRI

U.S. Exports:
1. (1979) ND **PEER REVIEWED** [SRI
2. (1981) ND **PEER REVIEWED** [SRI

CHEMICAL & PHYSICAL PROPERTIES

Color/Form:
1. Liquid **PEER REVIEWED** [The Merck Index. 10th ed. Rahway, New Jersey: Merck Co., Inc., 1983. 14
2. Colorless **PEER REVIEWED** [ITII. Toxic and Hazarous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1982. 165

Boiling Point:
1. 60.3 DEG C @ 760 MM HG **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272

Melting Point:
1. -80.5 DEG C **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272

Molecular Weight:
1. 96.94 **PEER REVIEWED** [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry ofToxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLARS file.,p. 87/8703

Corrosivity:
1. 1,2-Dichloroethylene will attack some forms of plastics, rubber, and coatings. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Density/Specific Gravity:
1. 1.2837 @ 20 DEG C/4 DEG C **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272

Heat of Vaporization:
1. 73.0 cal/g at 60.3 deg C at 760 mm Hg **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Octanol/Water Partition Coefficient:
1. log Kow= 1.86 **PEER REVIEWED** [Hansch C, Leo AJ; Medchem Project issue 26 Claremont College Pomona, CA (1986)

Topic: CIS-1,2-DICHLOROETHYLENE

Solubilities:

1. SOL IN ALCOHOL, ACETONE, ETHER, BENZENE, & CHLOROFORM. **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272
2. The solubility of cis-1,2- dichloroethylene in water is 3.5 g/l. **PEER REVIEWED** [Riddick JA et al; Organic Solvents: Physical Properties and Methods of Purification Techniques of Chemistry 4th Ed New York, NY: Wiley-Interscience Vol 2 pp.1325 (1986)

Spectral Properties:

1. INDEX OF REFRACTION: 1.4490 @ 20 DEG C/D; MAX ABSORPTION (VAPOR): GREATER THAN 200 NM. **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272
2. SADTLER REF NUMBER: 3645 (IR, PRISM) **PEER REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-272
3. Refractive index: 1.4519 at 15 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Vapor Density:

1. 3.54 g/l (at bp, 760 mm Hg) **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Vapor Pressure:

1. 273 mm Hg at 30 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Viscosity:

1. 0.48 cp at 20 deg C (liquid) **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Other Chemical/Physical Properties:

1. Colorless /1,2-Dichloroethylene/ **PEER REVIEWED** [ITII. Toxic and Hazarous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1982. 165
2. Sweet pleasant odor /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
3. Heat of combustion: -4,847.2 Btu/lb= -2,692.9 cal/g /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

4. Latent heat of vaporization: 130 Btu/lb= 72 cal/g /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
5. Residue on evaporation: 0.007% by weight (maximum) **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116
6. Evaporation from water at 25 deg C of 1 ppm solution: 50% after 24 min, 90% after 83 min. /1,2-Dichloroethylene/ **PEER REVIEWED** [Verschueren, K. Handbook of Environmental Data of Organic Chemicals. 2nd ed. New York, NY: Van Nostrand Reinhold Co., 1983. 488

SAFETY & HANDLING

Emergency Guidelines

DOT Emergency Guidelines:

1. Health Hazard: If inhaled, may be harmful; Contact may cause burns to skin and eyes. Fire may produce irritating, or poisonous gases. Runoff from fire control or dilution water may cause pollution. **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
2. Small Fires: Dry chemical, CO2, water spray, or foam. Large Fires: Water spray, fog, or foam. Move container from fire area if you can do it without risk. Do not get water inside container. Cool containers that are exposed to flames with water from the side until well after fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
3. Fire or Explosion: Flammable/combustible material; May be ignited by heat, sparks, or flames. Vapors may travel to a source of ignition and flash back. Container may explode in heat of fire. Vapor explosion hazard indoors, outdoors, or in sewers. Runoff to sewer may create fire or explosion hazard. **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
4. Spill or Leak: Shut off ignition sources; No flares, smoking, or flames in hazard area. Do not touch spilled material; Stop leak if you can do it without risk. Use water spray to reduce vapors; Do not get water inside container. Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal. Large Spills: Dike far ahead of spill for later disposal. **PEER REVIEWED**

[Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29

5. First Aid: Move victim to fresh air; Call emergency medical care. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Remove and isolate contaminated clothing and shoes at the site.In case of contact with material, immediately flush skin or eyes with running water for at least 15 minutes. Keep victim quiet and maintain normal body temperature. **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
6. Emergency Action: Keep unnecessary people away; Isolate hazard area and deny entry. Stay upwind; keep out of low areas. Wear self-contained (positive pressure if available) breathing apparatus and full protective clothing. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire. If water pollution occurs, notify appropriate authorities. **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29

Flammable Properties

Fire Potential:

1. FLAMMABLE, DANGEROUS FIRE HAZARD. /sym-Dichloroethylene/ **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 10th ed. New York: Van Nostrand Reinhold Co., 1981. 6361
2. Burning rate: 2.6 mm/min **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

NFPA Hazard Classification:

1. Health: 2. 2= Materials hazardous to health, but areas may be entered freely with self-contained breathing apparatus. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39
2. Flammability: 3. 3= Liquids which can be ignited under almost all normal temp conditions. Water may be ineffective on these liq because of their low flash points. Solids which form coarse dusts, solids in shredded or fibrous form that create flash fires, solids that burn rapidly, usually because they contain their own oxygen, and any material that ignites spontaneously at normal temp in air. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on

Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

3. Reactivity: 2. 2= Materials which in themselves are normally unstable & readily undergo violent chemical change but do not detonate. ... Also ... materials which may react violently with water or ... may form potentially explosive mixtures with water. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Flammable Limits:

1. LOWER 9.7%, UPPER 12.8% /1,2-Dichloroethene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Autoignition Temperature:

1. 460 DEG C **PEER REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3550

Fire Fighting Information

Fire Fighting Procedures:

1. ... Water may be ineffective except when applied gently to the surface to blanket and extinguish the fire. /1,2-Dichloroethene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 325M-34
2. If material is on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog, solid streams of water may spread fire. Cool all affected containers with flooding quantities of water and apply water from as far a distance as possible. Use foam, dry chemical, or carbon dioxide. /Dichloroethylene/ **PEER REVIEWED** [Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, D.C.: Assoc. of American Railroads,Hazardous Materials Systems (BOE), 1987. 244
3. Wear positive pressure self-contained breathing apparatus when fighting fires involving this material. /Dichloroethylene/ **PEER REVIEWED** [Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, D.C.: Assoc. of American Railroads,Hazardous Materials Systems (BOE), 1987. 244

Toxic Combustion Products:

1. Phosgene and hydrogen chloride fumes may form in fires.

PEER REVIEWED [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

2. ... Carbon monoxide may be released in a fire involving 1,2-dichloroethylene. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Other Fire Fighting Hazards:

1. Vapor is heavier than air ... and may travel a considerable distance to a source of ignition and flash back. /1,2-Dichloroethene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Explosive Limits and Potential:

1. Vapors form explosive mixt with air. /1,2-Dichloroethene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39
2. Containers may explode in fire. **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
3. Lower 9.7%; upper 12.8% /1,2-Dichloroethylene/ **PEER REVIEWED** [International Labour Office. Encyclopedia of Occupational Health and Safety. Vols. I&II. Geneva, Switzerland: International Labour Office, 1983. 1079

Hazardous Reactions

Reactivities and Incompatibilities:

1. May release explosive chloroacetylene by the contact with copper or copper alloys. /1,2-Dichloroethylene/ **PEER REVIEWED** [ITII. Toxic and Hazarous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1982. 165
2. Reacts with strong oxidizers. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
3. The reaction of 1,2-dichloroethylene and potassium hydroxide produces chloroacetylene, which is explosive and spontaneously flammable in air. It is highly toxic. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection

Association, 1986.,p. 491M-173

4. The addition of sodium, caustic or caustic solutions to 1,2-dichloroethylene ... may form monochloroacetylene. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 491M-188

Decomposition:

1. Decomposes slowly on exposure to air, light, and moisture. /sym-Dichloroethylene/ **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 10th ed. New York: Van Nostrand Reinhold Co., 1981. 335

Warning Properties

Skin, Eye, and Respiratory Irritations:

1. 1,2-Dichloroethylene is an eye irritant. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Preventive Measures

Protective Equipment and Clothing:

1. RUBBER GLOVES; SAFETY GOGGLES; AIR SUPPLY MASK OR SELF-CONTAINED BREATHING APPARATUS. **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
2. Wear appropriate clothing to prevent repeated or prolonged skin contact. Wear eye protection to prevent any reasonable probability of eye contact. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
3. The following types of respirators should be selected under the prescribed concentrations: 1000 ppm: 1. Any powered air purifying respirator with organic vapor cartridge(s), 2. Any chemical cartridge respirator with a full facepiece and organic vapor cartridges(s); 4000 ppm: 1. Any supplied air respirator operated in a continuous flow mode, 2. Any air purifying full facepiece respirator (gas mask) with a chin style or front or back mounted organic vapor canister, 3. Any self contained breathing apparatus with a full facepiece, 4. Any supplied air respirator with a full facepiece; Emergency or planned entry in unknown concentration or IDLH conditions: 1. Any self contained breathing apparatus with a full facepiece and operated in a pressure demand or other positive

pressure mode, 2. Any supplied air respirator with a full face piece and operated in pressure demand or other positive pressure mode in combination with an auxiliary self contained breathing apparatus operated in pressure demand or other positive pressure mode. Escape: 1. Any air purifying full facepiece respirator (gas mask) with a chin style or front or back mounted organic vapor canister, 2. Any appropriate escape type self contained breathing apparatus. /1,2-Dichloroethylene/ **PEER REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 5th Printing/Revision. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services,NIOSH/Supt. of Documents, GPO, Sept. 1985. 99

4. Employees should be provided with and required to use impervious clothing, gloves, face shields (eight inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with 1,2-dichloroethylene. Employees should be provided with and required to use splash proof goggles where there is any possibility of liquid 1,2-dichloroethylene contacting the eyes. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Other Protective Measures:

1. ... Employees should wash promptly when skin is wet or contaminated. Remove clothing promptly if wet or contaminated to avoid flammability hazard. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
2. If material not on fire and not involved in fire: Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak it without undue personnel hazard. Use water spray to knock-down vapors. /Dichloroethylene/ **PEER REVIEWED** [Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, D.C.: Assoc. of American Railroads,Hazardous Materials Systems (BOE), 1987. 244
3. Personnel Protection: Avoid breathing vapors. Keep upwind. Wear appropriate chemical protective gloves, boots and goggles. Do not handle broken packages unless wearing appropriate personal protective equipment. Wash away any material which may have contacted the body with copious

amounts of water or soap and water. Wear positive pressure self-contained breathing apparatus when fighting fires involving this material. /Dichloroethylene/ **PEER REVIEWED** [Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, D.C.: Assoc. of American Railroads,Hazardous Materials Systems (BOE), 1987. 244

4. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
5. In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
6. Clothing contaminated with liquid 1,2-dichloroethylene should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of 1,2-dichloroethylene from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the 1,2-dichloroethylene, the person performing the operation should be informed of 1,2-dichloroethylene's hazardous properties. Non-impervious clothing which becomes contaminated with liquid 1,2-dichloroethylene should be removed immediately and not reworn until the 1,2-dichloroethylene is removed from the clothing. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
7. Skin that becomes contaminated with liquid 1,2-Dichloroethylene should be immediately washed or showered with soap or mild detergent and water to remove any 1,2-Dichloroethylene. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J.

Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

8. Contact lenses should not be worn when working with this chemical. /1,2-Dichloroethylene/ **PEER REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 2nd Printing. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services, NIOSH/Supt.of Documents, GPO, February 1987. 99
9. Contact lens use in industry is controversial. A survey of 100 corporations resulted in the recommendation that each company establish their own contact lens use policy. One presumed hazard of contact lens use is possible chemical entrapment. Many authors found that contact lens minimized injury or protected the eye. The eye was afforded more protection from liquid irritants. The authors concluded that soft contact lens do not worsen corneal damage from strong chemicals and in some cases could actually protect the eye. Overall, the literature supports the wearing of contact lenses in industrial environments as part of the standard eye protection, eg face shields; however, more data are needed to establish the value of contact lenses. **PEER REVIEWED** [Randolph SA, Zavon MR; J Occup Med 29: 237-42 (1987)
10. Contaminated protective clothing should be segregated in such a manner so that there is no direct personal contact by personnel who handle, dispose, or clean the clothing. Quality assurance to ascertain the completeness of the cleaning procedures should be implemented before the decontaminated protective clothing is returned for reuse by the workers. **PEER REVIEWED** [SRP

Other Safety & Handling

Shipment Methods and Regulations:

1. Whenever hazardous materials are to be transported, Title 49 CFR, Transportation, Parts 100-180, published by the US Dept of Transportation, contain the regulatory requirements and must be consulted. **PEER REVIEWED** [52 FR 16482 (5/5/87)
2. Shipping description: Dichloroethylene, IMO 3.2, UN 1150. Label(s) required: Flammable liquid. Acceptable Modes of transportation: Air, rail, road, and water. /Dichloroethylene/ **PEER REVIEWED** [52 FR 16571 (5/5/87)
3. Int'l Air Shipments: Shipping description: Dichloroethylene, IMO 3.2, UN 1150. Label(s) required: Flammable Liquid. Packaging Instructions: 5.3.305 (passenger); 5.3.307 (cargo). /Dichloroethylene/ **PEER REVIEWED** [IATA. Dangerous Goods Regulations. 28th ed. Montreal, Canada: International Air Transport Association.

Dangerous Goods Board, January 1, 1987. 126

4. Water shipments: Shipping description: Dichloroethylene, IMO 3.2, UN 1150. Label(s) required: Flammable liquid. /Dichloroethylene/ **PEER REVIEWED** [IMDG; International Maritime Dangerous Goods Code; International Maritime Organization (1986)

Storage Conditions:

1. PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERABLE. INSIDE STORAGE SHOULD BE IN STANDARD FLAMMABLE LIQ STORAGE ROOM OR CABINET. SEPARATE FROM OXIDIZING MATERIALS. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Cleanup Methods:

1. 1. REMOVE ALL IGNITION SOURCES. 2. VENTILATE AREA OF SPILL OR LEAK. 3. FOR SMALL QUANTITIES, ABSORB ON PAPER TOWELS. EVAPORATE IN SAFE PLACE (SUCH AS A FUME HOOD). ALLOW SUFFICIENT TIME FOR EVAPORATING VAPORS TO COMPLETELY CLEAR THE HOOD DUCTWORK. BURN PAPER IN SUITABLE LOCATION ... /1,2-DICHLOROETHYLENE/ 3. 1,2-DICHLOROETHYLENE SHOULD NOT BE ALLOWED TO ENTER CONFINED SPACE, SUCH AS SEWER, BECAUSE OF POSSIBILITY OF EXPLOSION. SEWERS DESIGNED TO PRECLUDE FORMATION OF EXPLOSIVE CONCN OF 1,2-DICHLOROETHYLENE VAPORS ARE PERMITTED. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
2. A mixed culture containing methane-utilizing bacteria was obtained. Two chlorinated ethenes, cis- and trans-1,2-dichloroethylene, were shown to degrade to chlorinated products, which appear to degrade further. **PEER REVIEWED** [Fogel MM et al; Appl Environ Microbiol 51 (4): 720-4 (1986)

Disposal Methods:

1. At the time of review, criteria for land treatment or burial (sanitary landfill) disposal practices are subject to significant revision. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices. **PEER REVIEWED** [SRP
2. 1,2-DICHLOROETHYLENE MAY BE DISPOSED OF BY ATOMIZING IN SUITABLE COMBUSTION CHAMBER EQUIPPED WITH AN APPROPRIATE EFFLUENT GAS CLEANING DEVICE. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health

Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

3. Incineration, preferably after mixing with another combustible fuel. Care must be exercised to assure complete combustion to prevent the formation of phosgene. An acid scrubber is necessary to remove the halo acids produced. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 323
4. This compound should be susceptible to removal from wastewater by air stripping. /1,2-Dichloroethylene/ **PEER REVIEWED** [USEPA/ORD; Innovative and Alternative Technology Assessment Manual 3-5, 3-11-3-12 (1980) USEPA 430/9-78-009

TOXICITY/BIOMEDICAL EFFECTS
Summary
Medical Surveillance:

1. The following medical procedures should be made available to each employee who is exposed to 1,2-dichloroethylene at potentially hazardous levels; Initial Medical Screening: Employees should be screened for history of certain medical conditions which might place the employee at an increased risk from 1,2-dichloroethylene. /Such conditions include/: liver and chronic respiratory disease. ... Periodic Medical Examination: Any employee developing the above listed conditions should be referred for further medical conditions. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 1

Toxicity Excerpts
Human Toxicity Excerpts:

1. This liquid can act as a primary irritant producing dermatitis and irritation of mucous membrances. **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
2. TOXIC BY INGESTION, INHALATION & SKIN CONTACT; IRRITANT & ... /PRC: CNS DEPRESSANT/ IN HIGH CONCN. **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 10th ed. New York: Van Nostrand Reinhold Co., 1981. 335
3. INHALATION CAUSES NAUSEA, VOMITING, WEAKNESS, TREMOR, EPIGASTRIC CRAMPS, CENTRAL NERVOUS DEPRESSION. CONTACT WITH LIQ CAUSES IRRITATION OF EYES & (ON PROLONGED CONTACT) SKIN. INGESTION CAUSES SLIGHT DEPRESSION TO DEEP

... /PRC: CNS DEPRESSION/. **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

Non-Human Toxicity Excerpts:

1. AT 16,000 PPM /RATS/ ... WERE ANESTHETIZED IN 8 MIN AND WERE KILLED IN 4 HR. ... TRANS ISOMER /IS/ ... TWICE AS TOXIC & ANESTHETIC AS CIS ISOMER ... EFFECT OF INHALATION IS ... /PRC: CNS DEPRESSION/. ... DISTURBANCE OF EQUILIBRIUM & PROSTRATION OCCUR IN APPROX SAME LENGTH OF TIME FROM SIMILAR CONCN OF CIS & TRANS ISOMERS. **PEER REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3551
2. /REPEATED/ ... EXPOSURE OF CATS & RABBITS TO VAPOR CONCN OF 0.16-0.19% IN AIR ... /DURATION OF EXPOSURE UNSPECIFIED/ SHOWED LOSS OF APPETITE, DECR IN BODY WEIGHT, & PATHOLOGICAL CHANGES IN LUNG, LIVER, & KIDNEYS. ... WHEN CIS ... ISOMER ... INCUBATED IN PRESENCE OF METABOLICALLY ACTIVE MOUSE LIVER ENZYMES ... IT WAS NOT MUTAGENIC TO E COLI K-12 OR SALMONELLA TYPHIMURIUM. **PEER REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3552
3. CIS-1,2-DICHLOROETHYLENE DID NOT INCR THE RECOMBINATION RATE, INDUCED POINT MUTATION OR GENE CONVERSION IN SACCHAROMYCES CEREVISIAE STRAIN WHETHER IN THE PRESENCE OR ABSENCE OF A MAMMALIAN MICROSOMAL ACTIVATION SYSTEM. APPARENTLY, IT IS NOT MUTAGENIC. **PEER REVIEWED** [GALLI A ET AL; BOLL SOC ITAL BIOL SPER 58 (13): 860 (1982)
4. A SINGLE 8 HR EXPOSURE TO CIS-1,2-DICHLOROETHYLENE AT 200 PPM RESULTED IN A INCR IN THE HEXOBARBITAL SLEEPING TIME, ZOXAZOLAMINE PARALYSIS TIME AND THE METABOLIC FORMATION OF 4-AMINOANTIPYRINE FROM AMINOPYRINE IN ADULT FEMALE WISTAR RATS. THE INHIBITION OF HEPATIC DRUG METABOLISM IS CAUSED BY A COMPETITIVE AND REVERSIBLE INTERACTION OF THE 2 DCE ISOMERS WITH THE MIXED-FUNCTION OXIDASE SYSTEM. INHIBITS DRUG METABOLIZING ENZYMES THEREFORE SLEEPING TIME IS PROLONGED, ALSO TIME OF PARALYSIS. **PEER REVIEWED** [FREUNDT KJ; TOXICOLOGY 10 (2): 131 (1978)
5. Some but not all dogs narcotized by inhaling the vapor have been observed to develop delicate superficial corneal turbidity. The first observation of corneal disturbance was made on three dogs repeatedly exposed to dichloroethylene by evaporation of 10-15 cc in a chamber of 0.115 cu m vol. Haziness was observed in both corneas of one dog after the second exposure and slight haziness

of one eye of another dog after fourteen exposures, but no ocular disturbance was found in the third dog. A more detailed study subsequently showed that the corneal haziness occuring in dogs was attributable to many fine gray flecks in the endothelium, and that this usually cleared in twenty-four hours, or forty-eight hours at the most. /1,2-Dichloroethylene/ **PEER REVIEWED** [Grant, W.M. Toxicology of the Eye. 3rd ed. Springfield, IL: Charles C. Thomas Publisher, 1986. 325

6. Cis,trans-1,2-dichloroethylene was found to be negative when tested for mutagenicity using the Salmonella/microsome preincubation assay, using the standard protocol approved by the National Toxicology Program (NTP). Cis-, trans-1,2-dichloroethylene was tested in as many as 5 Salmonella typhimurium strains (TA1535, TA1537, TA97, TA98, and TA100) in the presence and absence of rat and hamster liver S-9, at doses of 0.0333, 0.100, 0.3333, 1.000, and 3.3333 mg/plate. The highest ineffective dose tested in any Salmonella typhimurium strains was 3.3333 mg/plate. Slight clearing of the background bacterial lawn occurred at this dose. **PEER REVIEWED** [Mortelmans K et al; Environ Mutagen 8: 1-119 (1986)
7. Cis- and trans-1,2-dichloroethylene were tested for mutagenic effects in a diploid strain (D7) of yeast Saccharomyces cerevisiae in suspension tests with and without a mammalian microsomal activation system, a S9 mouse liver fraction, and by an in vivo intrasanguineous host-mediated assay. The effects of the same agents on aminopyrine N-demethylase activity and cytochrome p450 level in liver were studied in nonpretreated and in phenolbarbital + beta-naphthoflavone-pretreated mice. In the suspension test, both isomers exhibited dose dependent toxicity, and survival was lower with metabolic activation than without. In the host mediated assay, only the cis-isomer showed evidence of mutagenic activity with significant increases in convertants at the trp locus and reverants at the ilv locus. Such mutagenic activity was found after acute and chronic doses and in the liver, kidney, and lung tissue. ... The cis-isomer tended to inhibit activity or destroy the enzyme. **PEER REVIEWED** [Bronzetti G et al; Teratog, Carinog, Mutagen 4 (4): 365-75 (1984)
8. Vinylidene chloride, cis-1,2-dichloroethylene, and trichloroethylene induced unscheduled DNA synthesis /in isolated hepatocytes/, whereas trans-1,2-dichloroethylene and tetrachloroethylene did not. **PEER REVIEWED** [Costa AK, Ivanetich KM; Carcinogenesis 5 (12): 1629-36 (1984)
9. The mutagenicities of organic chemical contaminants in

city water and related cmpd were examined by the Salmonella/microsome test (Ames test). Out of 21 chemicals tested, 1,2-dichloroethane was mutagenic in Salmonella typhimurium TA100 in the presence of S9 mix ... /cis-1,2-dichloroethylene/ ... was not mutagenic in the present test system. **PEER REVIEWED** [Nohmi T et al; Bull Natl Inst Hyg Sci (103): 60-64 (1985)

10. The clastogenic potential of organic chemical contaminants in city water and related cmpd was examined using Chinese hamster cells in culture. ... /Cis-1,2-Dichloroethylene/ showed no significant increase in the incidence of chromosome aberrations when used with and without S9 mix. **PEER REVIEWED** [Sofuni T et al; Bull Natl Inst Hyg Sci (103): 64-75 (1985)
11. The cytogenic activities of ... cis-1,2-dichloroethylene and trans-1,2-dichloroethylene were studied. Cells form a Chinese hamster lung fibroblast cell line were cultured and treated with a reaction mixture consisting of supernatant-9 mix (S9), a test cmpd, and culture medium. ... Cis-dichloroethylene and trans-dichloroethylene induced no significant chromosomal abberations with or without S9. The frequency of abberations increased in the presence of metyrapone in a dose dependent manner. Reduced glutathione markedly inhibited the induction of aberrations. ... Both cis-dichloroethylene and trans-dichloroethlene and the two dichloroethylene metabolites failed to induce sister chromatid exchange. **PEER REVIEWED** [Sawada M et al; Mut Res 187 (3): 157-63 (1987)

Toxicity Values

Ecotoxicity Values:

1. LC50 Lepomis machrochirus (bluegill) 135,000 ug/l/96 hr in a static unmeasured bioassay. **PEER REVIEWED** [USEPA; In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants (1978) Contract No. 68-01-4646 as cited in USEPA; Ambient Water Quality Criteria Doc: Dichloroethylenes p.B-5 (1980) EPA 440/5-80-041

Pharmacokinetics

Absorption, Distribution and Excretion:

1. INHALATION PHARMACOKINETICS OF CIS-DICHLOROETHYLENE WERE STUDIED. RATS WERE EXPOSED IN A CLOSED INHALATION SYSTEM TO VARIOUS INITIAL ATMOSPHERIC LEVELS OF HALOGENATED ETHYLENES, AND THE DECLINE OF ATMOSPHERIC CONCN WAS FOLLOWED USING GAS CHROMATOGRAPHIC ANALYSIS. **PEER REVIEWED** [FILSER JG, BOLT HM; ARCH TOXICOL 42 (2): 123 (1979)
2. DICHLOROETHYLENE IS LARGELY EXCRETED THROUGH THE LUNG. **PEER REVIEWED** [American Conference of Governmental Industrial Hygienists. Documentation of the Threshold

Limit Values and Biological Exposure Indices. 5th ed. Cincinnati, OH:American Conference of Governmental Industrial Hygienists, 1986. 185

Metabolism/Metabolites:

1. RATS EXPOSED TO CIS-1,2-DICHLOROETHYLENE EXHALED ACETONE AT A RATE OF 1.95 MUMOL/HR/KG. **PEER REVIEWED** [FILSER JG ET AL; TOXICOL LETT 2 (4): 247 (1978)
2. Metabolism of cis-1,2-dichloroethylene in perfused rat liver produced detectable amounts of dichloroethanol adn dichloroacetaldehyde. **PEER REVIEWED** [Bonse GT et al; Biochem Pharmacol 24: 1829-34 (1975) as cited in USEPA/ODW; Suggested No Adverse Response Level for cis-1,2-Dichloroethylene p.4 (1981)
3. The major initial metabolites of the chlorinated ethylenes in hepatocyte suspensions isolated from phenobarbital-treated rats were as follows ... cis-1,2-dichloroethylene, 2,2-dichloroethanol (0.24 nmol/106 cells/min); ... the initial products /cis-1,2-dichloroethene/ ... are rapidly and extensively metabolized in the hepatocyte, where the Phase II enzymes are present. **PEER REVIEWED** [Costa Ak, Ivanetich KM; Carcinogenesis 5 (12): 1629-36 (1984)

Mechanism of Action:

1. CIS-1,2-DICHLOROETHYLENE BOUND TO THE ACTIVE SITE OF HEPATIC MICROSOMAL CYTOCHROME P450 WITH PRODUCTION OF A TYPE-I DIFFERENCE SPECTRUM AND STIMULATED CO-INHIBITABLE HEPATIC MICROSOMAL NADPH OXIDATION. **PEER REVIEWED** [COSTA AK, IVANETICH KM; BIOCHEM PHARMACOL 31 (11): 2093 (1982)

ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Summary

Environmental Fate/Exposure Summary:

1. Cis-1,2-dichloroethylene may be released to the environment in emissions and wastewater during its production and use. Under anaerobic conditions that may exist in landfills or sediment, one is likely to find 1,2-dichloroethylenes that are formed as breakdown products from the reductive dehalogenation of trichloroethylene and tetrachloroethylene. The cis-1,2-dichloroethylene is apparently the more common isomer found although it is mistakenly listed as the trans isomer. The trans isomer, being a priority pollutant is more commonly analyzed for and the analytical procedures generally used do not distinguish the isomers. If cis-1,2-dichloroethylene is released on soil, it should evaporate and/or leach into the groundwater where very slow biodegradation should occur. If released into water, cis-1,2-dichloroethylene will be lost mainly through volatilization (half life 3 hr in a model river).

Biodegradation, adsorption to sediment, and bioconcentration in aquatic organisms should not be significant. In the atmosphere cis-1,2-dichloroethylene will be lost by reaction with photochemically produced hydroxyl radicals (half life 8 days) and scavenged by rain. Because it is relatively long lived in the atmosphere, considerable dispersal from source areas should occur. The general population is exposed to cis-1,2-dichloroethylene in urban air as well as in contaminated drinking water from ground water sources. Occupational exposure will be via dermal contact with the vapor and liquid or via inhalation.(SRC) **PEER REVIEWED**

Pollution Sources

Artificial Sources:

1. Cis-1,2-dichloroethylene may be released to the environment in emissions and wastewater during its production and use as a solvent and extractant, in organic synthesis, and in the manufacture of perfumes, lacquers, and thermoplastics(4). An assessment of the sources of cis-1,2-dichloroethylene is complicated by the fact that the trans isomer is a priority pollutant while the cis isomer is not and the standard EPA methods of analysis do not allow the isomers to be differentiated(1). This has resulted in monitoring reports erroneously listing the trans isomer when the cis isomer is present(1). The Michigan Department of Health ... frequently finds the cis-isomer and, if concentrations are high, occasionally finds traces of the trans- isomer(1). In an anaerobic, high-organic matrix, such as a landfill site, one is likely to find 1,2-dichloroethylene as breakdown products from reductive dehalogenation(1). Degradation products are found in increasing proportions further from a source and where there are high concentrations of other degradable organic compounds(1). Under simulated landfill conditions, cis-1,2-dichloroethylene is formed from trichloroethylene, tetrachloroethylene, and 1,1,2,2-tetrachloroethane and therefore the common industrial solvents may be sources of dichloroethylenes in such environments(1,2). Additionally, in muck and sediment microcosms, tetrachloroethylene is converted into dichloroethylene(3,5). The preponderance of dichloroethylene so formed is the cis-isomer(3,5). **PEER REVIEWED** [(1) Cline PV, Viste DR; Waste Manag Res 3: 351-60 (1985) (2) Hallen RT et al; ACS Div Environ Chem 192nd Natl Mtg 26: 344-6 (1986) (3) Parsons F et al; J Amer Water Works Assoc 76: 56-9 (1984) (4) Hawley GG; Condensed Chemical Dict 10th ed NY: Von Nostrand Reinhold pp.335 (1981) (5) Barrio-Lage GA et al; Environ Toxicol Chem 6: 571-8 (1987)

Environmental Fate

Topic: CIS-1,2-DICHLOROETHYLENE

Environmental Fate:

1. TERRESTIAL FATE: If cis-1,2-dichloroethylene is released on soil, it should evaporate and/or leach into the groundwater where very slow biodegradation should occur.(SRC) **PEER REVIEWED**
2. AQUATIC FATE: If released into water, cis-1,2-dichloroethylene will be lost mainly through volatilization (half life 3 hr in a model river). Biodegradation and adsorption to sediment should not be significant.(SRC) **PEER REVIEWED**
3. ATMOSPHERIC FATE: In the atmosphere cis-1,2-dichloroethylene will be lost by reaction with photochemically produced hydroxyl radicals (half-life 8 days). There is evidence that it will be scavenged by rain which is to be expected of a water soluble chemical.(SRC) **PEER REVIEWED**

Environmental Transformations

Biodegredation:

1. In a biodegradability screening test employing a wastewater inoculum and 5 ppm of cis-1,2-dichloroethylene, 54% of the chemical was lost in 7 days, whereas a 34% loss due to volatilization occurred in 10 days(3). However, literature references to microbial degradation of low molecular weight chlorinated aliphatics generally find that they are not metabolized(4). When cis-1,2-dichloroethylene was incubated with methanogenic aquifer material obtained adjacent to a landfill site in a serum bottle at 17 deg C, the concn of the compound was reduced to < 2% of the controls in 16 wk(1). After 40 wk, only traces of the chemical remained but no vinyl chloride or other transformation product was detected(1). Another investigator found that when cis-1,2-dichloroethylene was incubated anaerobically using an inoculum from a municipal waste digester in order to simulate conditions in a landfill, vinyl chloride appeared within 6 wk(2). Biodegradation of cis-1,2-dichloroethylene was studied in microcosms prepared from uncontaminated organic sediment from the Everglades and allowed to sit to insure oxygen depletion. Under these anoxic coniditions, 50% of the chemical was lost in 6 months(5). The fact that ethyl chloride is produced as well as vinyl chloride indicates that there are different pathways in the sequential dechlorination of cis-1,2-dichloroethylene than for the trans isomer where only vinyl chloride is produced(5). **PEER REVIEWED** [(1) Wilson BH et al; Environ Sci Technol 20: 997-1002 (1986) (2) Hallen RT et al; ACS Div Environ Chem 192nd Natl Mtg 26: 344-6 (1986) (3) Tabak HH et al; J Water Pollut Control Fed 53: 1503-18 (1981) (4) Callahan MA et al; Water-related Environemntal Fate of 129

Topic: CIS-1,2-DICHLOROETHYLENE

Priority Pollutants (1979) USEPA-440/4-79-029b (5)
Barrio-Lage G et al; Environ Sci Technol 20: 96-9 (1986)

Abiotic Degradation:

1. CIS-DICHLOROETHYLENE DECOMPOSED AT MODERATE RATES (ESTIMATED HALF LIFE 5-12 HR UNDER BRIGHT SUNLIGHT) WHICH WERE DETERMINED UNDER SIMULATED ATMOSPHERIC CONDITIONS IN PRESENCE OF NITRIC OXIDE. **PEER REVIEWED** [DILLING WL ET AL; ENVIRON SCI TECHNOL 10 (4): 351 (1976)
2. Cis-1,2-dichloroethylene in the atmosphere reacts with photochemically produced hydroxyl radicals resulting in a half-life of 8 days(1). The only product positively identified in this reaction was formyl chloride (89% yield)(1). Chlorine substitution on alkenes markedly reduces their reactivity towards ozone and the half-life resulting from ozone attack of the double bond is 129 days(2). Cis-1,2-dichloroethylene has a UV absorption band at 190 nm that extends to 240 nm(3,4). However, minute light absorption was observed, up to 380 nm(3) but there is no evidence that this would contribute significantly to photolytic breakdown under environmental conditions. **PEER REVIEWED** [(1) Goodman MA et al; ACS Div Environ Chem 192nd Natl Mtg 26: 169-71 (1986) (2) Tuazon EC et al; Arch Environ Contam Toxicol 13: 691-700 (1984) (3) Ausubel R, Wijnen MHJ; Int J Chem Kinetics 7: 739-51 (1975) (4) Dahlberg JA; Acta Chemica Scandinavica 23: 3081-90 (1969)
3. In this study, anoxic microcosms containing organic sediment and water were spiked to contain 5 mg/l of one of the following cmpd: 1,1-dichloroethane, cis-1,2-dichloroethene, or trans-1,2-dichloroethene. After incubation in the dark at 25 deg C for up to 6 months, contents were analyzed by gas chromatography and verified by gas chromatography/mass spectrometry in an attempt to identify sequential steps in the transformation process. Vinyl chloride was produced after 1-2 weeks of incubation in all spiked microcosms, but none were observed in sterile and unspiked controls. Chloroethane was produced only in microcosms spiked with cis-1,2-dichloroethene, indicating isomer specificity and the occurrence of mechanisms other than reductive dechlorination. **PEER REVIEWED** [Barrio-Lage G et al; Environ Sci Technol 20 (1): 96-99 (1986)

Environmental Transport

Bioconcentration:

1. The recommended log octanol/water partition coefficient for cis-1,2-dichloroethylene is 1.86(1), from which one estimates a BCF of 15 using a recommended regression equation(2). Therefore cis-1,2- dichloroethylene should not bioconcentrate significantly in aquatic organisms. **PEER REVIEWED** [(1) Hansch C, Leo AJ; Medchem Project

issue 26 Claremont College Pomona, CA (1986) (2) Lyman WJ et al; Handbook Of Chem Property Estimation Methods pp. 5-1 to 5-30 McGraw-Hill NY (1982)

Soil Adsorption/Mobility:

1. The solubility of cis-1,2- dichloroethylene in water is 3.5 g/l(1) from which one estimates a KOC of 49 using a recommended regression equation(2). Therefore cis-1,2-dichloroethylene should not adsorb significantly to soil or sediment. **PEER REVIEWED** [(1) Riddick JA et al; Organic Solvents: Physical Properties And Methods Of Purification Techniques Of Chemistry 4th Ed New York, NY: Wiley-Interscience Vol 2 pp. 1325 (1986) (2) Lyman WJ et al; Handbook of Chem Property Estimation Methods pp.4-1 to 4-33 McGraw-Hill NY (1982)

Volatilization from Water/Soil:

1. The Henry's Law constant for cis-1,2-dichloroethylene is 0.00337 atm cu m/mol(1) from which one estimates that the half life for volatilization from a model river 1 m deep with a 1 m/sec current and a 3 m/sec wind is 3.1 hr(2,SRC). Transport through the liquid phase controls volatilization(2). The mean volatilization half life of cis-1,2-dichloroethylene from a slowly stirred beaker 6.5 cm deep was 19.4 minutes which is equivalent to a 5.0 hr half-life in a body of water 1 m deep(4,SRC). 96.8% of the cis-1,2-dichloroethylene was removed from contaminated groundwater in Wausau, WI by air stripping, a value that was within 1.5% of that predicted using the Henry's Law constant(3). **PEER REVIEWED** [(1) Hine J, Mookerjee PK; J Org Chem 40: 292-8 (1975) (2) Lyman WJ et al; Handbook of Chem Property Estimation Methods NY: McGraw-Hill pp.15-1 to 15-34 (1982) (3) Hand DW et al; J Amer Water Works Assoc 78: 87-97 (1986) (4) Dilling WL; Environ Sci Technol 11: 405-9 (1977)

Environmental Concentrations

Water Concentrations:

1. Evaporation from water at 25 deg C of 1 ppm solution: 50% after 24 min, 90% after 83 min. /1,2-Dichloroethylene/ **PEER REVIEWED** [Verschueren, K. Handbook of Environmental Data of Organic Chemicals. 2nd ed. New York, NY: Van Nostrand Reinhold Co., 1983. 488
2. DRINKING WATER: Cis-1,2-dichloroethylene was found in Miami drinking water at 16 ppb and Cincinnatti and Philadelphia drinking water at 0.1 ppb, but was absent from 7 other drinking waters surveyed(1). **PEER REVIEWED** [(1) USEPA; AWQC for Dichloroethylenes (NTIS PB81-117525) (1980)
3. GROUNDWATER: Raw water from a well in Wausau, WI contained 83.3 ppb of cis-1,2-dichloroethylene(1). Studies of the contaminants in shallow groundwater at the Miami Drum

site, an inactive drum recycling facility, reported 839 and 13.3-17.9 ppb of cis-1,2-dichloroethylene (2). The Biscayne aquifer, that supplies drinking water to residents of Dade County contained 0-26 ppb of cis-dichloroethylene in the vicinity of the Miami Drum site(2). **PEER REVIEWED** [(1) Hand DW et al; J Am Water Works Assoc 78: 87-97 (1986) (2) Myers VB; Remedial Activaties at The Miami Drum Site, Florida Natl Conf Manage Uncontrolled Hazard Waste Sites pp. 354-7 (1983)

4. SURFACE WATER: Cis 1,2- dichloroethylene was found along a 30 km stretch of the Glatt River in Switzerland at load levels of 1 g/hr(1). **PEER REVIEWED** [(1) Zuercher F, Giger; Vom Waser 47: 37-55 (1976)

Effluents Concentrations:

1. In a comprehensive survey of wastewater from 4000 industrial and publicly owned treatment works (POTWs) sponsored by the Effluent Guidelines Division of the USEPA, cis-1,2-dichloroethylene was identified in discharges of the following industrial category (frequency of occurrence; median concn in ppb): steam electric (1; 1.6), leather tanning (1; 3.3), iron and steel mfg (2; 1400.8), nonferrous metals (1; 314.6), organics and plastics (2; 121.5), textile mills (1; 8.3), plastics and synthetics (3; 20.1), rubber processing (1; 712.0), explosives (1; 1.5). The highest effluent concn was 2059 ppb in the iron and steel mfg industry(1). **PEER REVIEWED** [(1) Shackelford WM et al; Analyt Chim Acta 146: 15-27 (1983)

Sediment/Soil Concentrations:

1. Cis-1,2-dichloroethylene has been detected, but not quantitated in sediment/soil/water samples at the Love Canal(1). **PEER REVIEWED** [(1) Hauser TR et al; Env Monit Assess 2: 249-72 (1982)

Atmospheric Concentrations:

1. RURAL/REMOTE: Two site/samples in USA contained no cis-1,2-dichloroethylene(1). URBAN/SUBURBAN: USA (669 site/samples) 68 parts per trillion median, 3500 parts per trillion maximum(1). SOURCE AREAS: USA (101 site/samples) 300 parts per trillion median, 6700 parts per trillion maximum(1). **PEER REVIEWED** [(1) Brodzinsky R, Singh HB; Volatile Organic Chemicals in The Atmosphere Menlo Park,CA: SRI International Contract 68-02-3452 198 pp. (1982)

Human Exposure

Probable Routes of Human Exposure:

1. Occupational exposure to cis-1,2-dichloroethylene will be via inhalation and dermal contact with the vapor as well as by dermal contact with the liquid during its use as a solvent. The general population is exposed to

cis-1,2-dichloroethylene in urban air as well as in contaminated drinking water from ground water sources. (SRC) **PEER REVIEWED**

Average Daily Intake:

1. AIR INTAKE: (assume air concn of 68 ppt) - 5.4 ug. WATER INTAKE: (assume water concn from contaminated sources of 0.23-2.7 ppb) 0.5-5.4 ug when drinking water is contaminated. (SRC) **PEER REVIEWED**

EXPOSURE STANDARDS & REGULATIONS

Standards & Regulations

Immediately Dangerous to Life or Death:

1. 4000 ppm /1,2-dichloroethylene/ **QC REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 2nd Printing. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services, NIOSH/Supt.of Documents, GPO, February 1987. 98

Occupational Permissible Levels

OSHA Standards:

1. 8-hr Time-Weighted avg: 790 mg/cu m /1,2-Dichloroethylene/ **PEER REVIEWED** [29 CFR 1910.1000 (7/1/87)

Other Standards and Regulations

Water Standards:

1. Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. **PEER REVIEWED** [40 CFR 401.15 (7/1/87)
2. A satisfactory /ambient water/ criterion to /protect human health/ from the incremental risk of cancer cannot be derived at this time due to the insufficiency in the available data for 1,2-dichloroethylene. **PEER REVIEWED** [USEPA; Ambient Water Quality Criteria Doc: Dichloroethylenes p.V (1980) USEPA 440/5-80-041

MONITORING AND ANALYSIS METHODS

Sampling Procedures:

1. A known volume of air is drawn through a charcoal tube to trap the organic vapors present. /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Department of Health, Education Welfare, Public Health Service. Center for Disease Control, National Institute for Occupational Safety Health. NIOSH Manual ofAnalytical Methods. 2nd ed. Volumes 1-7. Washington, DC: U.S. Government Printing Office, 1977-present.,p. V2 S110-1
2. Calibrate each personal sampling pump with sampler in line. Break ends of sampler (charcoal tube) and attach sampler to personal sampling pump with flexible tubing. Sample at flow rate of 0.01 to 0.2 liters/min for total sample of 3 liters. /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Department of Health and Human Services, Public Health Service. Centers for Disease Control, National Institute for Occupational Safety and Health.

NIOSHManual of Analytical Methods, 3rd ed. Volumes 1 and 2 with 1985 supplement, and revisions. Washington, DC: U.S. Government Printing Office, February 1984.,p. 1003-1

3. Measurements to determine employee exposure are best taken so that the average eight hr exposure is based on a single eight hr sample or two four hr samples. Several short time interval samples (up to 30 min) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Topic: TRANS-1,2-DICHLOROETHYLENE

ADMINISTRATIVE INFORMATION
Hazardous Substance DataBank Number:
1. 6361
Last Revision Date:
1. 900416
Review Date:
1. SRP review on 12/09/87
Update History:
1. Complete Update on 04/16/90, 1 field added/edited/deleted.
2. Complete Update on 09/26/88, 73 fields added/edited/deleted.

Topic: TRANS-1,2-DICHLOROETHYLENE

SUBSTANCE IDENTIFICATION
Name of Substance:
1. TRANS-1,2-DICHLOROETHYLENE
CAS Registry Number:
1. 156-60-5
Related HSDB Records:
1. (Isomer) 5656 [CIS-1,2-DICHLOROETHYLENE
2. 1995 [1,1-DICHLOROETHYLENE
Synonyms:
1. Ethylene, 1,2-dichloro-, **PEER REVIEWED**
2. sym-Dichloroethylene **PEER REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 5th Printing/Revision. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services,NIOSH/Supt. of Documents, GPO, Sept. 1985. 98
Molecular Formula:
1. C2H2Cl2 **PEER REVIEWED**
RTECS Number:
1. NIOSH/KV9400000
Shipping Name/Number - DOT/UN/NA/IMCO:
1. IMO 3.2; 1,2-Dichloroethylene
2. UN 1150; 1,2-Dichloroethylene
EPA Hazardous Waste Number:
1. U079; trans-1,2-Dichloroethylene

Topic: TRANS-1,2-DICHLOROETHYLENE

CHEMICAL & PHYSICAL PROPERTIES

Boiling Point:

1. 48.0- 48.5 deg C at 760 mm Hg **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Melting Point:

1. -50 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Corrosivity:

1. 1,2-Dichloroethylene will attack some forms of plastics, rubber, and coatings. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Density/Specific Gravity:

1. 1.2565 at 20 deg C/4 deg C **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272

Heat of Vaporization:

1. 73.7 cal/g at bp **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Octanol/Water Partition Coefficient:

1. The recommended log octanol/water partition coefficient for trans-1,2- dichloroethylene is 2.06. **PEER REVIEWED** [Hansch C, Leo AJ; Medchem Project issue 26 Claremont College Pomona, CA (1986)

Solubilities:

1. Soluble in alcohol, ether, acetone, benzene, and chloroform. **PEER REVIEWED** [Weast, R.C. (ed.) Handbook of Chemistry and Physics. 67th ed. Boca Raton, FL: CRC Press, Inc., 1986-87.,p. C-272
2. water: 0.63 g/100 g at 25 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Spectral Properties:

1. Refractive index: 1.4490 at 15 deg C/D **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116
2. IR: 3646 (Sadtler Research Laboratories Prism Collection) **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 623
3. NMR: 6742 (Sadtler Research Laboratories Spectral Collection) **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and

II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 623

4. MASS: 203 (Atlas of Mass Spectral Data, John Wiley & Sons, New York) **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 623

Vapor Density:

1. Vapor density: 3.67 g/l at bp at 760 mm Hg **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Vapor Pressure:

1. 395 mm Hg at 30 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Viscosity:

1. 0.41 cp at 20 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116

Other Chemical/Physical Properties:

1. Sweet pleasant odor /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
2. Heat of combustion: -4,847.2 Btu/lb= -2,692.9 cal/g /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
3. Latent heat of vaporization: 130 Btu/lb= 72 cal/g /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
4. Specific heat: 0.270 cal/g at 20 deg C **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116
5. Residue on evaporation: 0.0007% by weight maximum **PEER REVIEWED** [Flick, E.W. Industrial Solvents Handbook. 3rd ed. Park Ridge, NJ: Noyes Publications, 1985. 116
6. Evaporation from water at 25 deg C of 1 ppm solution: 50% after 24 min, 90% after 83 min. /1,2-Dichloroethylene/ **PEER REVIEWED** [Verschueren, K. Handbook of Environmental Data of Organic Chemicals. 2nd ed. New York, NY: Van Nostrand Reinhold Co., 1983. 488

Topic: TRANS-1,2-DICHLOROETHYLENE

SAFETY & HANDLING

Emergency Guidelines

DOT Emergency Guidelines:

1. Health Hazard: If inhaled, may be harmful; Contact may cause burns to skin and eyes. Fire may produce irritating, or poisonous gases. Runoff from fire control or dilution water may cause pollution. /Dichloroethylene/ **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
2. Fire: Some of these materials may react violently with water. Small Fires: Dry chemical, CO2, water spray, or foam. Large Fires: Water spray, fog, or foam. Move container from fire area if you can do it without risk. Do not get water inside container. Cool containers that are exposed to flames with water from the side until well after fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. /Dichloroethylene/ **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
3. Fire or Explosion: Flammable/combustible material; May be ignited by heat, sparks or flames. Vapors may travel to a source of ignition and flash back. Container may explode in heat of fire. Vapor explosion hazard indoors, outdoors, or in sewers. Runoff to sewer may create fire or explosion hazard. /Dichloroethylene/ **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
4. Spill or Leak: Shut off ignition sources; No flares, smoking, or flames in hazard area. Do not touch spilled material; Stop leak if you can do it without risk. Use water spray to reduce vapors; Do not get water inside container. Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal. Large Spills: Dike far ahead of spill for later disposal. /Dichloroethylene/ **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29
5. First Aid: Move victim to fresh air; Call emergency medical care. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Remove and isolate contaminated clothing and shoes at the site.In case of contact with material, immediately flush skin or eyes with running water for at least 15 minutes. Keep victim quiet and maintain normal body temperature.

/Dichloroethylene/ **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29

6. Emergency Action: Keep unnecessary people away; Isolate hazard area and deny entry. Stay upwind; keep out of low areas. Wear self-contained (positive pressure if available) breathing apparatus and full protective clothing. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire. If water pollution occurs, notify appropriate authorities. FOR EMERGENCY ASSISTANCE CALL CHEMTREC (800) 424-9300. /Dichloroethylene/ **PEER REVIEWED** [Department of Transportation. Emergency Response Guidebook 1984 DOT P 5800.3 Washington, DC: U.S. Government Printing Office, 1984.,p. G-29

Flammable Properties

Fire Potential:

1. Burning rate: 2.6 mm/min /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
2. FLAMMABLE, DANGEROUS FIRE HAZARD. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 10th ed. New York: Van Nostrand Reinhold Co., 1981.

NFPA Hazard Classification:

1. Health: 2. 2= Materials hazardous to health, but areas may be entered freely with self-contained breathing apparatus. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39
2. Flammability: 3. 3= Liquids which can be ignited under almost all normal temp conditions. Water may be ineffective on these liq because of their low flash points. Solids which form coarse dusts, solids in shredded or fibrous form that create flash fires, solids that burn rapidly, usually because they contain their own oxygen, and any material that ignites spontaneously at normal temp in air. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39
3. Reactivity: 2. 2= Materials which in themselves are normally unstable & readily undergo violent chemical change but do not detonate. ... Also ... materials which may react violently with water or ... may form potentially

explosive mixtures with water. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Flammable Limits:

1. Lower 9.7%, Upper 12.8% /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Flash Point:

1. 36 deg F (2 deg C) /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Autoignition Temperature:

1. 860 deg F (460 deg C) /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Fire Fighting Information

Fire Fighting Procedures:

1. ... Water may be ineffective except when applied gently to the surface to blanket and extinguish the fire. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 325M-34
2. /Use/ dry chemical, foam or carbon dioxide /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
3. If material is on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog, solid streams may be ineffective. Cool all affected containers with flooding quantities of water and apply water from as far a distance as possible. Use alcohol foam, carbon dioxide, or dry chemical. **PEER REVIEWED** [Bureau of Explosives; Emergency Handling of Haz Matl in Surface Trans p.186 (1981)
4. Wear self-contained breathing apparatus when fighting fires involving this material. **PEER REVIEWED** [Bureau of Explosives; Emergency Handling of Haz Matl in Surface Trans p.186 (1981)

Toxic Combustion Products:

Topic: TRANS-1,2-DICHLOROETHYLENE

1. Phosgene and hydrogen chloride fumes may form in fires. /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
2. ... Carbon monoxide may be released in a fire involving 1,2-dichloroethylene. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Other Fire Fighting Hazards:

1. Vapor is heavier than air ... and may travel a considerable distance to a source of ignition and flash back. **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Explosive Limits and Potential:

1. Vapor forms explosive mixt with air. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39
2. Lower 9.7%; upper 12.8% /1,2-Dichloroethylene/ **PEER REVIEWED** [International Labour Office. Encyclopedia of Occupational Health and Safety. Vols. I&II. Geneva, Switzerland: International Labour Office, 1983. 1079
3. Containers may explode in fire. **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

Hazardous Reactions

Reactivities and Incompatibilities:

1. May release explosive chloroacetylene by the contact with copper or copper alloys. /1,2-Dichloroethylene/ **PEER REVIEWED** [ITII. Toxic and Hazarous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1982. 165
2. Reacts with strong oxidizers. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
3. The reaction of 1,2-dichloroethylene and potassium hydroxide produces chloroacetylene, which is explosive and spontaneously flammable in air. It is highly toxic. /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous

Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 491M-173

4. The addition of sodium, caustic or caustic solutions to 1,2-dichloroethylene ... may form monochloroacetylene. ... /1,2-Dichloroethylene/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 491M-188
5. Addition of a hot liquid to the cold solvent caused sudden emission of sufficient vapor to cause a flame to flash back 12 m from a fire. Although the bulk of the solvent did not ignite, various items of paper and wood in the room were ignited by the transient flame. /1,2-Dichloroethylene/ **PEER REVIEWED** [Bretherick, L. Handbook of Reactive Chemical Hazards. 3rd ed. Boston, MA: Butterworths, 1985. 232
6. Incompatible with alkalies, difluoromethylene dihypofluorite and nitrogen tetraoxide. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984. 946

Decomposition:

1. Decomposes slowly on exposure to air, light and moisture. /1,2-Dichloroethylene/ **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 10th ed. New York: Van Nostrand Reinhold Co., 1981. 335

Warning Properties

Odor Threshold:

1. Odor low: 0.3357 mg/cu m; Odor high 1975.00 ppm **PEER REVIEWED** [Ruth JH; Am Ind Hyg Assoc J 47: A-142-51 (1986)

Skin, Eye, and Respiratory Irritations:

1. This liquid can act as a primary irritant producing dermatitis and irritation of mucous membranes. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
2. 1,2-Dichloroethylene is an eye irritant. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Preventive Measures

Protective Equipment and Clothing:

1. Wear appropriate clothing to prevent repeated or prolonged skin contact. Wear eye protection to prevent any

reasonable probability of eye contact. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322

2. RUBBER GLOVES; SAFETY GOGGLES; AIR SUPPLY MASK OR SELF-CONTAINED BREATHING APPARATUS. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
3. The following types of respirators should be selected under the prescribed concentrations: 1000 ppm: 1. Any powered air-purifying respirator with organic vapor cartridge(s), 2. Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s); 4000 ppm: 1. Any supplied-air respirator operated in a continuous flow mode, 2. Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister, 3. Any self-contained breathing apparatus with a full facepiece, 4. Any supplied-air respirator with a full facepiece; Emergency or planned entry in unknown concentration or IDLH conditions: 1. Any self-contained breathing apparatus with a full facepiece and operated in a pressure-demand or other positive pressure mode, 2. Any supplied-air respirator with a full face piece and operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode. Escape: 1. Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister, 2. Any appropriate escape-type self-contained breathing apparatus. /1,2-dichloroethylene/ **PEER REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 5th Printing/Revision. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services,NIOSH/Supt. of Documents, GPO, Sept. 1985. 99
4. Employees should be provided with and required to use impervious clothing, gloves, face-shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with 1,2-dichloroethylene. Employees should be provided with and required to use splash-proof goggles where there is any possibility of liquid 1,2-dichloroethylene contacting the eyes. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3

VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Other Protective Measures:

1. If this chemical gets into the eyes, irrigate immediately. If this chemical contacts the skin, wash with soap promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once and perform artificial respiration. ... Employees should wash promptly when skin is wet or contaminated. Remove clothing promptly if wet or contaminated to avoid flammability hazard. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 322
2. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
3. In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
4. Clothing contaminated with liquid 1,2-dichloroethylene should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of 1,2-dichloroethylene from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the 1,2-dichloroethylene, the person performing the operation should be informed of 1,2-dichloroethylene's hazardous properties. Non-impervious clothing which becomes contaminated with liquid 1,2-dichloroethylene should be removed immediately and not reworn until the 1,2-dichloroethylene is removed from the clothing. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS).

Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

5. Skin that becomes contaminated with liquid 1,2-dichloroethylene should be immediately washed or showered with soap or mild detergent and water to remove any 1,2-dichloroethylene. /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
6. If material not on fire and not involved in fire: Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Use water spray to knock-down vapors. /1,2-Dichloroethylene/ **PEER REVIEWED** [Bureau of Explosives; Emergency Handling of Haz Matl in Surface Trans p.186 (1981)
7. Personnel Protection: Avoid breathing vapors. Keep upwind. Do not handle broken packages without protective equipment. Wash away any material which may have contacted the body with copious amounts of water or soap and water. /1,2-Dichloroethylene/ **PEER REVIEWED** [Bureau of Explosives; Emergency Handling of Haz Matl in Surface Trans p.186 (1981)
8. Contact lenses should not be worn when working with this chemical. /1,2-Dichloroethylene/ **PEER REVIEWED** [NIOSH. Pocket Guide to Chemical Hazards. 5th Printing/Revision. DHHS (NIOSH) Publ. No. 85-114. Washington, D.C.: U.S. Dept. of Health and Human Services,NIOSH/Supt. of Documents, GPO, Sept. 1985. 99

Other Safety & Handling

Stability/Shelf Life:

1. GRADUALLY DECOMPOSED BY AIR, LIGHT AND MOISTURE, FORMING HCl; /SRP: POTENTIAL PHOSGENE FORMATION/ /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [The Merck Index. 10th ed. Rahway, New Jersey: Merck Co., Inc., 1983. 14

Shipment Methods and Regulations:

1. Whenever hazardous materials are to be transported, Title 49 CFR, Transportation, Parts 100-180, published by the US Dept of Transportation, contain the regulatory requirements and must be consulted. **PEER REVIEWED** [52 FR 16482 (5/5/87)
2. Shipping description: Dichloroethylene, 3, UN1150. Label(s) required: Flammable liquid. Acceptable Modes of transportation: Air, rail, road, and water. **PEER REVIEWED** [52 FR 16571 (5/5/87)
3. Int'l Air Shipments: Shipping description: Dichloroethylene, 3, UN1150. Label(s) required: Flammable

Liquid. Packaging Instructions: 5.3.305 (passenger); 5.3.307 (cargo). **PEER REVIEWED** [IATA. Dangerous Goods Regulations. 28th ed. Montreal, Canada: International Air Transport Association. Dangerous Goods Board, January 1, 1987. 126

4. Water shipments: Shipping description: Dichloroethylene, 3, UN1150. Label(s) required: Flammable liquid. **PEER REVIEWED** [IMDG; International Maritime Dangerous Goods Code; International Maritime Organization (1986)

Storage Conditions:

1. PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERABLE. INSIDE STORAGE SHOULD BE IN STANDARD FLAMMABLE LIQ STORAGE ROOM OR CABINET. SEPARATE FROM OXIDIZING MATERIALS. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th ed. Boston, MA: National Fire Protection Association, 1986.,p. 49-39

Cleanup Methods:

1. 1. REMOVE ALL IGNITION SOURCES. 2. VENTILATE AREA OF SPILL OR LEAK. 3. FOR SMALL QUANTITIES, ABSORB ON PAPER TOWELS. EVAPORATE IN SAFE PLACE (SUCH AS A FUME HOOD). ALLOW SUFFICIENT TIME FOR EVAPORATING VAPORS TO COMPLETELY CLEAR THE HOOD DUCTWORK. BURN PAPER IN SUITABLE LOCATION ... 3. 1,2-DICHLOROETHYLENE SHOULD NOT BE ALLOWED TO ENTER CONFINED SPACE, SUCH AS SEWER, BECAUSE OF POSSIBILITY OF EXPLOSION. SEWERS DESIGNED TO PRECLUDE FORMATION OF EXPLOSIVE CONCN OF 1,2-DICHLOROETHYLENE VAPORS ARE PERMITTED. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2

Disposal Methods:

1. At the time of review, criteria for land treatment or burial (sanitary landfill) disposal practices are subject to significant revision. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices. **PEER REVIEWED** [SRP
2. Incineration, preferably after mixing with another combustible fuel. Care must be exercised to assure complete combustion to prevent the formation of phosgene. An acid scrubber is necessary to remove the halo acids produced. /1,2-Dichloroethylene/ **PEER REVIEWED** [Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens, 1985. 2nd ed. Park Ridge, NJ: Noyes Data Corporation, 1985. 323

3. 1,2-DICHLOROETHYLENE MAY BE DISPOSED OF BY ATOMIZING IN SUITABLE COMBUSTION CHAMBER EQUIPPED WITH AN APPROPRIATE EFFLUENT GAS CLEANING DEVICE. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
4. A potential candidate for rotary kiln incineration at a temperature range of 820 to 1,600 deg C and residence times of seconds for liquids and gases, and hours for solids; Also, a potential candidate for fluidized bed incineration at a temperature range of 450 to 980 deg C and residence times of seconds for liquids and gases, and longer for solids; Also a potential candidate for liquid injection incineration at a temperature range of 650 to 1,600 deg C and a residence time of 0.1 to 2 seconds. **PEER REVIEWED** [USEPA; Engineering Handbook for Hazardous Waste Incineration p.3-12 (1981) EPA 68-03-3025
5. This compound should be susceptible to removal from wastewater by air stripping. /1,2-Dichloroethylene/ **PEER REVIEWED** [USEPA/ORD; Innovative and Alternative Technology Assessment Manual 3-5, 3-11-3-12 (1980) EPA 430/9-78-009

Topic: TRANS-1,2-DICHLOROETHYLENE

Summary

Medical Surveillance:

1. Employees should be screened for history of certain medical conditions which might place the employee at increased risk from 1,2-dichloroethylene exposure. Liver disease: The importance of /the liver/ in the biotransformation and detoxification of foreign substances should be considered before exposing persons with impaired liver function. Chronic respiratory disease: In persons with impaired pulmonary function, expecially those with obstructive airway disease, the breathing of 1,2-dichloroethylene might cause exacerbation of symptoms due to its irritant properties. Any employee developing the above listed conditions should be referred for further medical examination. /1,2-dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 1

Toxicity Excerpts

Human Toxicity Excerpts:

1. INHALATION CAUSES NAUSEA, VOMITING, WEAKNESS, TREMOR, EPIGASTRIC CRAMPS, CENTRAL NERVOUS DEPRESSION. CONTACT WITH LIQ CAUSES IRRITATION OF EYES & (ON PROLONGED CONTACT) SKIN. INGESTION CAUSES SLIGHT DEPRESSION TO DEEP ... /PRC: CNS DEPRESSION/. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.
2. TOXIC BY INGESTION, INHALATION & SKIN CONTACT; IRRITANT & ... /PRC: CNS DEPRESSANT/ IN HIGH CONCN. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 10th ed. New York: Van Nostrand Reinhold Co., 1981. 335
3. The trans-isomer is twice as toxic as the cis-isomer. **PEER REVIEWED** [Verschueren, K. Handbook of Environmental Data of Organic Chemicals. 2nd ed. New York, NY: Van Nostrand Reinhold Co., 1983. 489

Non-Human Toxicity Excerpts:

1. Some but not all dogs narcotized by inhaling the vapor have been observed to develop delicate superficial corneal turbidity. The first observation of corneal disturbance was made on three dogs repeatedly exposed to dichloroethylene by evaporation of 10-15 cc in a chamber of 0.115 cu m volume. Haziness was observed in both corneas of one dog after the second exposure and slight haziness of one eye of another dog after fourteen

exposures, but no ocular disturbance was found in the third dog. A more detailed study subsequently showed that the corneal haziness occuring in dogs was attributable to many fine gray flecks in the endothelium, and that this usually cleared in twenty-four hours, or forty-eight hours at the most. /1,2-Dichloroethylene/ **PEER REVIEWED** [Grant, W.M. Toxicology of the Eye. 3rd ed. Springfield, IL: Charles C. Thomas Publisher, 1986. 325

2. ... /CATS & RABBITS REPEATEDLY EXPOSED TO TRANS-ISOMER @ CONCN OF 0.16-0.19% IN AIR/ SHOWED LOSS OF APPETITE & SOME RESP IRRITATION BUT NO HISTOPATHOLOGICAL CHANGES IN ORGANS. **PEER REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3552
3. THE MUTAGENICITY OF SEVERAL CHLORINATED ETHYLENES WAS TESTED ON ESCHERICHIA COLI STRAIN K-12 IN CULTURE MEDIUM CONTAINING MOUSE LIVER MICROSOMES METABOLIC ACTIVATION SYSTEM. 1,2-TRANS-DICHLOROETHYLENE WAS NOT MUTAGENIC. **PEER REVIEWED** [GREIM H ET AL; LEBERSCHAEDEN VINYLCHLORID: VINYLCHLORID-KR, (WISS TAG), 2ND: 1-36 (1977)
4. TRANS-1,2-DICHLOROETHYLENE WAS NOT MUTAGENIC IN TESTS USING SALMONELLA TYPHIMURIUM STRAINS IN VITRO WITHOUT METABOLIC ACTIVATION AND IN VIVO WITH METABOLIC ACTIVATION (HOST-MEDIATED ASSAY), OR IN A CYTOGENETIC ANALYSIS OF BONE MARROW CELLS FROM FEMALE ICR MICE AFTER SINGLE AND REPEATED IP APPLICATIONS (5/DAY) 6, 24 AND 48 HR FOLLOWING THE LAST APPLICATION. **PEER REVIEWED** [CERNA M, KYPENOVA H; MUTAT RES 46 (3): 214-5 (1977)
5. Cis,trans-1,2-dichloroethylene was found to be negative when tested for mutagenicity using the Salmonella/microsome preincubation assay, using the standard protocol approved by the National Toxicology Program (NTP). Cis,trans-1,2-dichloroethylene was tested in 5 Salmonella typhimurium strains (TA1535, TA1537, TA97, TA98, and TA100) in the presence and absence of rat or hamster liver S-9, at doses of 0.0333, 0.100, 0.3333, 1.000, and 3.3333 mg/plate. The highest ineffective dose tested in any S typhimurium strain was 3.3333 mg/plate. Slight clearing of the background bacterial lawn occurred at this dose. **PEER REVIEWED** [Mortelmans K et al; Environ Mutagen 8: 1-119 (1986)
6. AT 16,000 PPM /RATS/ ... WERE ANESTHETIZED IN 8 MIN AND WERE KILLED IN 4 HR. ... TRANS ISOMER /IS/ ... TWICE AS TOXIC & ANESTHETIC AS CIS ISOMER ... EFFECT OF INHALATION IS ... /PRC: CNS DEPRESSION/. ... DISTURBANCE OF EQUILIBRIUM & PROSTRATION OCCUR IN APPROX SAME LENGTH OF TIME FROM SIMILAR CONCN OF CIS & TRANS ISOMERS. **PEER

REVIEWED** [Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3551

7. A SINGLE 8 HR EXPOSURE TO CIS-1,2-DICHLOROETHYLENE AT 200 PPM RESULTED IN A INCR IN THE HEXOBARBITAL SLEEPING TIME, ZOXAZOLAMINE PARALYSIS TIME AND THE METABOLIC FORMATION OF 4-AMINOANTIPYRINE FROM AMINOPYRINE IN ADULT FEMALE WISTAR RATS. THE INHIBITION OF HEPATIC DRUG METABOLISM IS CAUSED BY A COMPETITIVE AND REVERSIBLE INTERACTION OF THE 2 DCE ISOMERS WITH THE MIXED-FUNCTION OXIDASE SYSTEM. INHIBITS DRUG METABOLIZING ENZYMES THEREFORE SLEEPING TIME IS PROLONGED, ALSO TIME OF PARALYSIS. **PEER REVIEWED** [FREUNDT KJ; TOXICOLOGY 10 (2): 131 (1978)
8. Cis- and trans-1,2-dichloroethylene were tested for mutagenic effects in a diploid strain (D7) of the yeast Saccharomyces cerevisiae in suspension tests with and without a mammalian microsomal activation system, a S9 mouse liver fraction, and by an in vivo intrasanguineous host-mediated assay. ... Both isomers exhibited dose-dependent toxicity, and survival was lower with metabolic activation than without. In the host-mediated assay, only the cis-isomer showed evidence of mutagenic activity with significant increases in convertants at the tip locus and revertants at the ilv locus. Such mutagenic activity was found after acute and chronic doses and in liver, kidney, and lung tissue. **PEER REVIEWED** [Bronzetti G et al; Teratog, Carcinog Mutagen 4 (4): 365-75 (1984)
9. Trans-1,2-dichloroethylene (DCE) was administered to male and female CD-1 mice. Following an acute LD50 determination (2122 mg/kg in males and 2391 mg/kg in females) and a 14-day range-finding study, a 90-day drinking water study was performed using levels of DCE calculated to deliver approximately 1/100, 1/10, and 1/5 the LD50. Various toxicological assessments were made, including body and organ weights, hematology, serum ch hepatic microsomal activities. Few alterations were observed in either sex following 90 days of exposure. The most noteworthy changes occurred in the males exposed to the highest level of DCE. where there was a significant decrease in glutathione levels, and in the females exposed to all three DCE levels, where there was a significant decrease in aniline hydroxylase activity. **PEER REVIEWED** [Barnes DW et al; Drug Chem Toxicol 8 (5): 373-92 (1985)

Toxicity Values

Ecotoxicity Values:

1. LC50 Lepomis machrochirus (bluegill) 135,000 ug/l/96 hr in

a static unmeasured bioassay. **PEER REVIEWED** [USEPA; In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants (1978) Contract No. 68-01-4646 as cited in USEPA; Ambient Water Quality Criteria Doc: Dichloroethylenes p.B-5 (1980) EPA 440/5-80-041

Pharmacokinetics

Absorption, Distribution and Excretion:

1. DICHLOROETHYLENE IS LARGELY EXCRETED THROUGH THE LUNGS. /1,2-DICHLOROETHYLENE/ **PEER REVIEWED** [American Conference of Governmental Industrial Hygienists. Documentation of the Threshold Limit Values and Biological Exposure Indices. 5th ed. Cincinnati, OH:American Conference of Governmental Industrial Hygienists, 1986. 185

Metabolism/Metabolites:

1. Metabolism of trans-1,2-dichloroethylene in perfused rat liver produced detectable amounts of dichloroethanol and dichloroacetic acid. **PEER REVIEWED** [Bonse GT et al; Biochem Pharmacol 24: 1829-34 (1975) as cited in USEPA/ODW; Suggested No Adverse Response Level for Trans-1,2-Dichloroethylene p.4 (1981)
2. The major initial metabolites of chlorinated ethylenes in hepatocyte suspensions isolated from phenobarbital-treated rats were studied. The initial products of trans-1,2-dichloroethylene from cytochrome p450 in hepatic microsomes are rapidly and extensively metabolized in the hepatocyte, where the Phase II enzymes are present. Trichloroethylene and tetrachloroethylene in the X systems are identical. The abilities of chlorinated ethylenes to induce unscheduled DNA synthesis was assessed in isolated hepatocytes using a method which does not require the blocking of semi-conservative DNA synthesis. Trans-1,2-dichloroethylene did not induce unscheduled DNA synthesis. **PEER REVIEWED** [Costa AK, Ivanetich KM; Carcinogenisis (London) 5 (12): 1629-36 (1984)

ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Summary

Environmental Fate/Exposure Summary:

1. Trans-1,2-dichloroethylene may be released to the environment in air emissions and wastewater during its production and use. Under anaerobic conditions that may exist in landfills, aquifiers, or sediment one is likely to find 1,2-dichloroethylenes that are formed as breakdown products from the reductive dehalogenation of common industrial solvents trichloroethylene, tetrachloroethylene, and 1,1,2,2-tetrachloroethane. The cis-1,2-dichloroethylene is apparently the more common isomer found although it is mistakenly reported as the trans isomer. The trans-isomer, being a priority

pollutant, is more commonly analyzed for and the analytical procedures generally used do not distinguish between isomers. If trans-1,2-dichloroethylene is released on soil, it should evaporate and leach into the groundwater where very slow biodegradation should occur. If released into water, trans-1,2-dichloroethylene will be lost mainly through volatilization (half-life 3 hr in a model river). Biodegradation, adsorption to sediment, and bioconcentration in aquatic organisms should not be significant. In the atmosphere, trans-1,2-dichloroethylene will be lost by reaction with photochemically produced hydroxyl radicals (half-life 3.6 days) and scavenged by rain. Because it is relatively long-lived in the atmosphere, considerable dispersal from source areas should occur. The general population is exposed to trans-1,2-dichloroethylene in urban air as well as in contaminated drinking water from ground water sources. Occupational exposure will be via dermal contact with the vapor and liquid or via inhalation. (SRC) **PEER REVIEWED**

Pollution Sources

Artificial Sources:

1. Trans-1,2-dichloroethylene may be released to the environment in air emissions and wastewater during its production and use as a solvent and extractant, in organic synthesis, and in the manufacture of perfumes, lacquers, and thermoplastics(2). An assessment of the sources of trans-1,2-dichloroethylene is complicated by the fact that it is a priority pollutant while the cis isomer is not and the standard EPA methods of analysis do not allow the isomers to differentiated(1). This has resulted in monitoring reports erroneously listing the trans isomer when the cis isomer is present(1). The Michigan Department of Health has the capability of distinguishing these isomers and claims that it frequently finds the cis isomer and, if concns are high, they occasionally find traces of the trans isomer(1). **PEER REVIEWED** [(1) Cline PV, Viste DR; Waste Manage Res 3: 351-60 (1985) (2) Hawley GG; Condensed Chem Dictionary 10th ed pp. 335 Von Nostrand Reinhold NY (1981)
2. In an anaerobic, high-organic matrix, such as landfill site, one is likely to find 1,2-dichloroethylene as a breakdown product due to reductive dehalogenation(1). Degradation products are found in increasing proportions further from a source and where there are high concns of other degradable organic compounds(1). Under simulated landfill conditions, it has been found that trans-1,2-dichlorothylene is formed from trichloroethylene, tetrachloroethylene, and

1,1,2,2-tetrachloroethane and therefore common industrial solvents may be sources of dichloroethylenes in such environments(1,2). Additionally, in muck microcosms tetrachloroethylene is converted into dichloroethylene, although the relative amount of the trans isomer produced is much less that the cis(3). **PEER REVIEWED** [(1) Cline PV, Viste DR; Waste Menage Res 3: 351-60 (1985) (2) Hallen RT et al; in ACS Div Environ Chem 192nd Natl Mtg 26: 344-6 (1986) (3) Parsons F et al; J Am Water Works Assoc 76: 56-9 (1984)

Environmental Fate

Environmental Fate:

1. Aquatic and Atmospheric Fate: ... Photodissociation is /not/ a significant fate for trans-1,2-dichloroethylene in the aquatic or atmospheric environment. ... Oxidation and hydrolysis in the aquatic environment is not significant for this compound. **PEER REVIEWED** [Callahan, M.A., M.W. Slimak, N.W. Gabel, et al. Water-Related Environmental Fate of 129 Priority Pollutants. Volume I. EPA-440/4 79-029a. Washington, DC: U.S.Environmental Protection Agency, December 1979.,p. 51-1
2. Aquatic Fate: Volatilization ... is a major transport process for removal of trans-1,2-dichloroethylene from aquatic systems. **PEER REVIEWED** [Callahan, M.A., M.W. Slimak, N.W. Gabel, et al. Water-Related Environmental Fate of 129 Priority Pollutants. Volume I. EPA-440/4 79-029a. Washington, DC: U.S.Environmental Protection Agency, December 1979.,p. 51-1
3. TERRESTRIAL FATE: If trans-1,2-dichloroethylene is released to soil, it should evaporate and leach into the groundwater where it may very slowly biodegrade. (SRC) **PEER REVIEWED**
4. AQUATIC FATE: If released into water, trans-1,2-dichloroethylene will be lost mainly through volatilization (half-life 3 hr in model river). Biodegradation and adsorption to sediment should not be significant. (SRC) **PEER REVIEWED**
5. ATMOSPHERIC FATE: In the atmosphere trans-1,2-dichloroethylene will be lost by reaction with photochemically produced hydroxyl radicals (half-life 3.6 days.) There is evidence that it will be scavenged by rain which is to be expected of a water soluble chemical. (SRC) **PEER REVIEWED**

Environmental Transformations

Biodegredation:

1. Trans-1,2-dichloroethylene was recalcitrant in shake flask tests modified to accommodate volatile chemicals(1,2). The concns examined in this studies ranged from 0.80 to 25 ppm. A 21 day acclimation period and the addition of a

lactose cometabolite did not alter the bidegradability. Similarly no biodegradation occurred in a river die-away test(1). Contradictory results were obtained in a biodegradability screen test using a wastewater inoculum and 5 ppm, of trans-1,2-dichloroethylene(3). 67% of chemical lost in 7 days, whereas 33% loss due to volatilization occcured in 10 days(3). **PEER REVIEWED** [(1) Mudder TI, Musterman JL; Development of Empirical Structure Biodegrability Relationships and Biodegradability Testing Protocol for Volatile and Slightly Soluble Priority Pollutants presented before the Div Environ Chem Amer Chem Soc Kanasas City, MO pp. 52-3 (1982) (2) Mudder TI; Diss Abstra Int B 42: 1804 (1981) (3) Tabak HH et al: J Water Pollut Contr Fed 53: 1503-18 (1981)

2. Literature references to microbial degradation of low molecular weight chlorinated aliphatics generally find that they are not metabolized(3). When trans-1,2-dichloroethylene was incubated with aquifer material obtained adjacent to a landfill site in a serum bottle at 17 degC, at least 16 wk of incubation were required before disappearance began relative to autoclaved controls(1). After 40 wk, the average concn was reduced to 18% of controls and vinyl chloride was identified as a degradation product(1). Another investigator found that when trans-1,2-dichloroethylene was incubated anaerobically using an inoculum from a municipal waste digestor in order to simulate conditions in a landfill, vinyl chloride appeared within 6 weeks(2). Biodegradation of trans-1,2-dichloroethylene was studied in microcosms prepared from uncontaminated organic sediment from the Everglades and allowed to sit to insure oxygen depletion. Under these anoxic conditions, 73% of the chemical was lost in 6 months with the accompanying formation of vinyl chloride(4). **PEER REVIEWED** [(1) Wilson BH et al; Environ Sci Technol 20: 997-1002 (1986) (2) Hallen RT et al; in ACS Div Environ Chem 192nd Natl Mtg 26: 344-6 (1986) (3) Callahan MA et al; Water-related Environmental Fate of 129 Priority Pollutants (1979) USEPA-440/4-79-929b (4) Barrio-Lage G et al; Environ Sci Technol 20: 96-9 (1986)

Abiotic Degradation:

1. Trans-1,2-dichloroethylene in the atmosphere reacts with photochemically produced hydroxyl radicals resulting in a half-life of 3.6 days(1). The only product positively identified in this reaction was formyl chloride (56% yield)(1). Chlorine substitution on alkenes markedly reduces their reactivity towards ozone and the half-life resulting from ozone attack of the double bond is 44

days(2). Trans-1,2-dichloroethylene has a UV absorption band that extends to about 240 nm(3), therefore direct photolysis would not be a significant degradative process. **PEER REVIEWED** [(1) Goodman MA et al; IN: ACS Div Environ Chem 192nd Natl Mtg 26:169-71 (1986) (2) Tuazon EC et al; Arch Environ Contam Toxicol 13: 691-700 (1984) (3) Dahlberg JA; Acta Chemica Scandinavica 23: 3081-90 (1969)

Environmental Transport

Bioconcentration:

1. The recommended log octanol/water partition coefficient for trans-1,2- dichloroethylene is 2.06(1), from which one estimates a BCF of 22 using a recommended regression equation(2). Therefore trans-1,2-dichloroethylene should not bioconcentrate significantly in aquatic organisms. **PEER REVIEWED** [(1) Hansch C, Leo AJ; Medchem Project issue 26 Claremont College Pomona, CA (1986) (2) Lyman WJ et al; Handbook of Chem Property Estimation Methods. Environ Behavior of Organic Compounds pp.5-1 to 5-30 McGraw-Hill NY (1982)

Soil Adsorption/Mobility:

1. The solubility of trans-1,2-dichloroethylene in water is 6.3 g/l(1) at 25 deg C from which one can estimate a KOC of 36 using a recommended regression equation(2). Therefore trans-1,2-dichloroethylene should not adsorb significantly to soil or sediment. **PEER REVIEWED** [(1) Riddick JA et al; Organic Solvents: Physical Properties And Methods Of Purification Techniques Of Chemistry 4th Ed New York, NY: Wiley-Interscience 2: pp.1325 (1986) (2) Lyman WJ et al; Handbook of Chem Property Estimation Methods. Environ Behavior of Organic Compounds pp.4-1 to 4-33 McGraw-Hill NY (1982)

Volatilization from Water/Soil:

1. The experimental half-life of volatilization of 1 mg/liter trans-1, 2-dichloroethylene from water to be 22 minutes when stirred at 200 rpm at approximately 25 degrees C in an open container. Removal of 90% of the /cmpd/ required 89 minutes. **PEER REVIEWED** [Callahan, M.A., M.W. Slimak, N.W. Gabel, et al. Water-Related Environmental Fate of 129 Priority Pollutants. Volume I. EPA-440/4 79-029a. Washington, DC: U.S.Environmental Protection Agency, December 1979.,p. 51-5
2. The Henry's Law constant for trans-1,2- dichloroethylene is 0.00672 atm cu m/mole(1). Using this value one can estimate that the half-life for volatilization from a model river 1 m deep with a 1 m/sec current and a 3 m/sec wind is 3.0 hr(2,SRC). Transport through the liquid phase controls volatilization(2). The mean volatilization half-life of trans-1,2- dichloroethylene from a slowly stirred beaker 6.5 cm deep was 24.0 minutes which is

equivalent to a 6.2 hr half-life in a body of water 1 m deep(3,SRC). **PEER REVIEWED** [(1) Hine J, Mookerjee PK; J Org Chem 40: 292-8 (1975) (2) Lyman WJ et al; Handbook of Chem Property Estimation Methods. Environ Behavior of Organic Compounds pp.15-1 to 15-34 McGraw-Hill NY (1982) (3) Dilling WL; Environ Sci Technol 11: 405-9 (1977)

Environmental Concentrations

Water Concentrations:

1. DRINKING WATER: Trans-1,2-dichloroethylene was found in Miami drinking water at 1 ppb(1). The concn of trans-1,2-dichloroethylene in private wells in 5 homes in northern Winnebago County, IL ranged from ND to 64 ppb, 8 ppb median(2). The chemical was found in a groundwater plume of predominantly trichloroethylene believed to originate from an old industrial source(2). Two production wells belonging to the Lakewood Utility district near Tacoma, WA contained 200 ppb of trans-1,2-dichloroethylene from a nearby commercial facility(4). In a survey of purgeable organics in 12 parts of the world outside of Europe and North America, only northern Egypts' contained trans-1,2-dichloroethylene(3); measured conc 0.5 ppb(3). **PEER REVIEWED** [(1) USEPA; AWQC for Dichloroethylenes (NTIS PB81-117525) (1980) (2) Wehrmann HA; Investigation Of A Volatile Organic Chemical Plume In Northern Winnebago County, Illinois Ilenr/re-84/09 (NTIS PB85-114452/gar) Springfield, IL: IL Dept Energy Nat Res pp.95 (1985) (3) Trussell AR et al; pp.39-53 in Water Chlorination vol 4 Jolley RL ed Ann Arbor Sci Publ Ann Arbor, MI (1980) (4) Boateng K et al; A Case History Ground Water Monit Rev 4:24-31 (1984)
2. GROUNDWATER: 4.6% of the 315 wells sampled from the outcrop area of the Potomac-Raritan-Mogothy aquifer system adjacent to the Delaware River contained trans-1,2-dichloroethylene(1). The chemical was absent from wells downdip of the outcrop area(1). A site study of a western Connecticut manufacturing plant that used large quantities of high quality trichloroethylene for degreasing found that 7 of 9 monitoring wells around the plant contained 1.2 - 320.9 ppb of trans-1,2-dichloroethylene(2). **PEER REVIEWED** [(1) Fusillo TV et al; Ground Water 23:354-60 (1985) (2) Stuart JD; Organics Transported Thru Selected Geological Media NTIS PB83-224246 Comm Univ Storrs Inst of Water Resources pp.37 (1983)

Effluents Concentrations:

1. In a comprehensive survey of wastewater from 4000 industrial and publicly owned treatment works (POTWs) sponsored by the Effluent Guidelines Division of the U.S. EPA, trans-1,2-dichloroethylene was identified in

discharges of the following industrial category (frequency of occurrence; median concn in ppb): iron and steel mfg (2; 2265.9), organics and plastics (3; 14.6), inorganic chemicals (2; 3.9), rubber processing (2; 19.0), auto and other laundries (1; 60.6), explosives (1; 3.9), electronics (7; 140.7), mechanical products (2; 13.7), transportation equipment (1; 29.3), publicly owned treatment works (63; 16.3)(1). The highest effluent concn was 3013 ppb in the iron and steel mfg industry(1). **PEER REVIEWED** [(1) Shackelford WM et al; Analyt Chim Acta 146: 15-27 (1983)

2. In another survey of the industrial occurrences of trans-1,2-dichloroethylene, 4 industries had wastewater discharges of >0.1 kg/day. These (industry (mean conc (ppb); Max conc (ppb))) were: metal finishing (260;1700), photographic equipment/supplies (-;2200), nonferrous metal mfg (75;260), rubber processing (150;290)(3). The concn of trans-1,2-dichloroethylene in 3 sewage treatment effluents ranged from 31 to 43 ppb(2). While effluent from the Los Angeles City, Orange County and San Diego County contained <10 ppb of trans-1,2-dichloroethylene, sludge from two of the plants contained 145 and 44 ppb of the chemical(6). At the Valley of the Drums waste site near Louisville, KY, water samples contained trace amounts to 75 ppb of trans-1,2-dichloroethylene, while some sediment samples contained trace amounts of the chemical(4). In the National Urban Runoff Program in which samples of runoff were collected from 19 cities (51 catchments) in the U.S., trans-1,2-dichloroethylene was detected in Eugene, OR and Little Rock, AK (5% of the samples) at levels of 1-3 ppb(5). In a four city study (Cincinnati, St. Louis, Atlanta, and Hartford) to determine the major source type of priority pollutants in tap water and publicly owned treatment work (POTW) influents, it was found that 43%, 38%, and 28% of commercial sources, industrial sources, and POTW influents contained trans-1,2-dichloroethylene(1). The average level of the industrial sources was between 10 and 100 ppb while the others were <10 ppb(1). **PEER REVIEWED** [(1) Levins P et al; Sources of Toxic Pollutants in Influents to Sewage Treatment Plants p.118 (1981) USEPA-440/4-81-008 NTIS PB81-219685 (2) Lao RC et al; pp.107-18 in Analytical Techniques in Environmental Chemistry II Albaiges J ed NY: Pergamon Press (1982) (3) USEPA; Treatability Manual - Vol I (1980) USEPA-600/8-80-042 (4) Stonebraker RD, Smith AJ Jr; pp.1-10 in Control Hazard Mater Spills, Proc Natl Conf Nashville, TN (1980) (5) Cole RH et al; J Water Pollut Control Fed 56: 898-908 (1984) (6) Young DR; Ann Rep South Calif Coastal Water Res Proj p.103-12 (1978)

Topic: TRANS-1,2-DICHLOROETHYLENE

Sediment/Soil Concentrations:

1. Trans-1,2-dichloroethylene has been detected, but not quantitated in sediment/soil/water samples at the Love Canal(1). **PEER REVIEWED** [(1) Hauser TR et al; EPA's Monitoring Program AT Love Canal 1980 Env Monit Assess 2:249-72 (1982)

Atmospheric Concentrations:

1. SOURCE AREAS: Edison NJ - 930 parts/trillion trans-1,2-dichloroethylene(1). **PEER REVIEWED** [(1) Brodzinsky R, Singh HB; Volatile Organic Chemicals In The Atmosphere Menlo Park, CA: SRI International 198 pp. (1982)

Other Environmental Concentrations:

1. Primary sludges from three publicly owned treatment works treating municipal and industrial wastes contained 22, 1540, and 1317 ppb of trans-1,2-dichloroethylene (1). **PEER REVIEWED** [(1) Feiler HD et al; pp.53-7 in Natl Conf Munic Ind Sludge Util Disposal, Silver Spring, MD (1980)

Human Exposure

Probable Routes of Human Exposure:

1. Occupational exposure to trans-1,2-dichloroethylene will be via inhalation and dermal contact with the vapor as well as by dermal contact with the liquid during its use as a solvent. The general population is exposed to trans-1,2- dichloroethylene in urban air as well as in contaminated drinking water.(SRC) **PEER REVIEWED**

EXPOSURE STANDARDS & REGULATIONS

Occupational Permissible Levels

OSHA Standards:

1. Meets criteria for proposed OSHA Medical Records Rule. **PEER REVIEWED** [47 FR 30420 (7/13/82)
2. 8-hr Time-Weighted avg: 790 mg/cu m /1,2-Dichloroethylene/ **PEER REVIEWED** [29 CFR 1910.1000 (7/1/85)

Other Standards and Regulations

Water Standards:

1. Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. /1,2-Dichloroethylene/ **PEER REVIEWED** [40 CFR 401.15 (7/1/86)
2. A satisfactory /ambient water/criterion to /protect human health/ from the incremental risk of cancer cannot be derived at this time due to the insufficiency in the available data for 1,2-dichloroethylene. /1,2-Dichloroethylene/ **PEER REVIEWED** [USEPA; Ambient Water Quality Criteria Doc: Dichloroethylenes p.v (1980) EPA 440/5-80-041

RCRA Requirements:

1. As stipulated in 40 CFR 261.33, when

trans-1,2-dichloroethylene, as a commercial chemical product or manufacturing chemical intermediate or as an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed as a hazardous waste according to Federal and/or State regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill into water or on dry land of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5). **PEER REVIEWED** [51 FR 28296 (8/6/86)

MONITORING AND ANALYSIS METHODS

Sampling Procedures:

1. Calibrate each personal sampling pump with sampler in line. Break ends of sampler (solid sorbent tube) and attach sampler to personal sampling pump with flexible tubing. Sample at flow rate of 0.01 to 0.2 liter/min for total sample of 3 liter. /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Department of Health and Human Services, Public Health Service. Centers for Disease Control, National Institute for Occupational Safety and Health. NIOSHManual of Analytical Methods, 3rd ed. Volumes 1 and 2 with 1985 supplement, and revisions. Washington, DC: U.S. Government Printing Office, February 1984.,p. 1003-1
2. A known volume of air is drawn through a charcoal tube to trap the organic vapors present. The analyte is desorbed with carbon disulfide. /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Department of Health, Education Welfare, Public Health Service. Center for Disease Control, National Institute for Occupational Safety Health. NIOSH Manual ofAnalytical Methods. 2nd ed. Volumes 1-7. Washington, DC: U.S. Government Printing Office, 1977-present.,p. V2 S110-1
3. Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or two four-hour samples. Several short time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). /1,2-Dichloroethylene/ **PEER REVIEWED** [Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981. 2
4. Analyte: 1,2-Dichloroethylene; Matrix: air; Procedure: Adsorption on charcoal, desorption with carbon disulfide,

Gas Chromatography; Range 475-1915 mg/cu m; Precision: 0.052. /1,2-Dichloroethylene/ **PEER REVIEWED** [U.S. Department of Health, Education Welfare, Public Health Service. Center for Disease Control, National Institute for Occupational Safety Health. NIOSH Manual ofAnalytical Methods. 2nd ed. Volumes 1-7. Washington, DC: U.S. Government Printing Office, 1977-present.,p. V2 S110-1

1 -PRODUCT IDENTIFICATION

PRODUCT NAME: METHYLENE CHLORIDE
COMMON SYNONYMS: DICHLOROMETHANE; METHYLENE DICHLORIDE; METHANE DICHLORIDE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: CH2CL2
FORMULA WT.: 84.93
CAS NO.: 75-09-2
NIOSH/RTECS NO.: PA8050000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9313,5378,9264,9128,9330,9341,Q480,9315,5531,9324,9329

CHEMTREC # (800) 424-9300
NATIONAL RESPONSE CENTER # (800) 424-8802
J.T.BAKER INC.
222 RED SCHOOL LANE
PHILLIPSBURG, NJ 08865
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

EFFECTIVE: 05/01/89 ISSUED: 06/22/89
REVISION #05

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

WARNING

MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION. MAY BE HARMFUL ABSORBED THROUGH SKIN. NOTE: REPORTED AS CAUSING CANCER IN LABORATORY EXERCISE DUE CARE. EXCEPTIONAL CONTACT HAZARD: READ MATERIAL SAFETY DATA SHEET.
KEEP AWAY FROM HEAT, MOISTURE, AND DIRECT SUNLIGHT. AVOID CONTACT WITH EYES, SKIN, CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SOAK UP WITH SAND OR EARTH.

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

1 -PRODUCT IDENTIFICATION (continued)

HARMFUL BY INHALATION. POSSIBLE RISKS OF IRREVERSIBLE EFFECTS.
AVOID CONTACT WITH SKIN.

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

2 -COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
METHYLENE CHLORIDE	75-09-2	98-100	500 PPM	50 PPM

3 -PHYSICAL DATA

BOILING POINT: 40 C (104 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): 35
(20 C)

MELTING POINT: -95 C (-139 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): 2.

SPECIFIC GRAVITY: 1.32
(H2O=1)

EVAPORATION RATE: 27.5
(BUTYL ACETATE = 1)

SOLUBILITY(H2O): MODERATE (1-10%)

% VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. ETHER-LIKE ODOR.

4 -FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 2-1-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - 19 % LOWER - 12 %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

4 -FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTA BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSU MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
CONCENTRATED VAPOR CAN BE IGNITED BY A HIGH INTENSITY IGNITION SOUR VAPOR MAY FORM FLAMMABLE MIXTURE IN ATMOSPHERE THAT CONTAINS A HIGH PERCENTAGE OF OXYGEN. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

5 -HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 350 MG/M3 (100 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1740 MG/M3 (500 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): (500 PPM)

PEL (CEILING) = 1000 PPM.

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR METHYLENE CHLORIDE	2136 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR METHYLENE CHLORIDE	437
SUBCUTANEOUS MOUSE LD50 FOR METHYLENE CHLORIDE	6460
INHALATION-30MIN RAT LC50 FOR METHYLENE CHLORIDE	88

CARCINOGENICITY: NTP: NO IARC: YES Z LIST: NO OSHA REG: NO

CARCINOGENICITY
THIS SUBSTANCE IS LISTED AS AN IARC PROBABLE HUMAN CARCINOGEN (GROU AND 2B).

REPRODUCTIVE EFFECTS
TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE MUTAGENIC.

5 -HEALTH HAZARD DATA (continued)

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, WEAKNESS, FATIGUE, IRRITATION OF UPPER RESPIRATORY TRACT, CENTRAL NERVOUS SYSTEM DEPRESSION, CAUSES METHEMOGLOBULIN FORMATION IN THE BLOOD, PULMONARY EDEMA, UNCONSCIOUSNESS, AND MAY BE FATAL

SKIN CONTACT: IRRITATION, MAY BE HARMFUL, PROLONGED CONTACT MAY DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, WEAKNESS, FATIGUE, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION, CAUSES METHEMOGLOBULIN FORMATION IN THE BLOOD, UNCONSCIOUSNESS, AND MAY BE FATAL

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, LUNGS, BLOOD, CENTRAL NERVOUS SYSTEM

TARGET ORGANS
RESPIRATORY SYSTEM, LUNGS, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS S
LIVER, KIDNEYS, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
CARDIOVASCULAR DISORDERS, HEART DISORDERS, LIVER OR KIDNEY DISORDE
CENTRAL NERVOUS SYSTEM DISORDERS, HEAVY DRINKERS, HEAVY SMOKERS

PRIMARY ROUTES OF ENTRY
INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT, ABSORPTION

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLEN WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENT WATER FOR AT LEAST 15 MINUTES.

5 -HEALTH HAZARD DATA (continued)

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS 2-BUTANONE (RQ = 5000 LBS)
TOXIC CHEMICALS: YES CONTAINS DICHLOROMETHANE (METHYLENE CHLORIDE)
GENERIC CLASS: C02
TSCA INVENTORY: YES
STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES
THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WA
THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE C

6 -REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, MOISTURE, LIGHT

INCOMPATIBLES: ALKALI METALS, STRONG OXIDIZING AGENTS, STRONG BASES, OXIDES OF NITROGEN, ZINC, ALUMINUM, WATER, MAGNESIUM, AMINES, PLASTICS, RUBBER, SODIUM, POTASSIUM

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE

7 -SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHI
LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAP
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE
INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U080 (TOXIC WASTE)

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8 -INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 100 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

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9 -STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA. KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.

SPECIAL PRECAUTIONS
MATERIAL IS HYGROSCOPIC.

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10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: DICHLOROMETHANE (AIR ONLY)
HAZARD CLASS: ORM-A
UN/NA: UN1593 REPORTABLE QUANTITY: 1000 LBS.
LABELS: NONE
REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: DICHLOROMETHANE
HAZARD CLASS: 6.1 I.M.O. PAGE: 6118
UN: UN1593 MARINE POLLUTANTS: NO PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: DICHLOROMETHANE
HAZARD CLASS: 6.1

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION (continued)

UN: UN1593 PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29031200000

EPA/TSCA EXPORT NOTIFICATION
YES

N/A = NOT APPLICABLE OR NOT AVAILABLE
N/E = NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS O THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATION PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLAC HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSO TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USE IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICA FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHIN INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTAC WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

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APPROVED BY QUALITY ASSURANCE DEPARTMENT.

Topic: 1,1,2,2-TETRACHLOROETHANE

1.0 IDENTIFIERS

CAS Number: 79-34-5
DOT Number: UN 1702

RTK Substance number: 1809
Date: August 1987

2.0 HAZARD SUMMARY

* 1,1,2,2-Tetrachloroethane can affect you when breathed in and by passing through your skin.
* 1,1,2,2-Tetrachloroethane should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
* Overexposure can cause unconsciousness, liver and kidney damage and death.
* Lower exposures can cause dizziness and drowsiness.
* Long-term exposures can cause chronic damage of the liver, kidneys, blood forming organs and nerves.
* Liquid or vapor can cause eye damage.
* Never use near combustion sources; highly toxic gases are formed.

IDENTIFICATION

1,1,2,2-Tetrachloroethane is a colorless or pale yellow liquid with a sickly sweet odor. It is used in making other chemicals, insecticides, paints, rust removers and varnishes.

REASON FOR CITATION

* 1,1,2,2-Tetrachloroethane is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, CAG, NIOSH and DOT.
* This chemical is on the Special Health Hazard Substance List because it is a CARCINOGEN.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting air samples. Under OSHA 1910.20, you have a legal right to obtain copies of sampling results from your employer. If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
* ODOR THRESHOLD = 1.5 ppm.
* The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is

[illegible] ppm averaged over an 8-hour workshift.
NIOSH: Recommends reducing exposures to the lowest detectable limit.
ACGIH: The recommended airborne exposure limit is 1 ppm averaged over an 8-hour workshift.
* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.
* 1,1,2,2-Tetrachloroethane may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE
* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to 1,1,2,2-Tetrachloroethane and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of 1,1,2,2-Tetrachloroethane to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

3.0 HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to 1,1,2,2-Tetrachloroethane:
* 1,1,2,2-Tetrachloroethane can cause unconciousness and death. Lower exposures can cause dizziness and drowsiness. Poor appetite, nausea, or weakness may occur.
* Short-term exposure can damage the liver and kidneys enough to cause death.
* The liquid or vapor can cause severe damage to the eyes and irritate the skin, nose, mouth and throat.
* Nerve effects like tremors, "pins and needles," headaches, irritability, nervousness, or insomnia may occur.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to 1,1,2,2-Tetrachloroethane and can last for months or years:

Cancer Hazard
* 1,1,2,2-Tetrachloroethane may be a CARCINOGEN in humans since it has been shown to cause liver cancer in animals.
* Many scientists believe there is no safe level of exposure to a cancer-causing agent. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard
* There is limited evidence that 1,1,2,2-Tetrachloroethane is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Long-Term Effects
* Long-term exposure may damage the liver, kidneys, blood forming organs and nerves.

MEDICAL

Medical Testing
Before beginning employment and at regular times after that, the following are recommended:
* Exam of the nervous system.
* Liver and kidney function tests with a complete blood count.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.
Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures
Because more than light alcohol consumption can cause liver damage, drinking alcohol may increase the liver damage caused by 1,1,2,2-Tetrachloroethane.

WORKPLACE CONTROLS AND PRACTICES
Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls

solvent-resistant gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day and put on before work.

Eye Protection
* Eye protection is included in the recommended respiratory protection. Respiratory Protection IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.
* At any exposure level, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

5.0 QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers,

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/m3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that can cause an explosion under certain conditions or on contact with other specific substances.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

6.0 EMERGENCY INFORMATION

Common Name: 1,1,2,2-TETRACHLOROETHANE
DOT Number: UN 1702
DOT Emergency Guide code: 55
CAS Number: 79-34-5

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	Not Found	Not Rated
REACTIVITY	Not Found	Not Rated
POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Extinguish fire using an agent suitable for type of surrounding fire. 1,1,2,2-Tetrachloroethane itself does not burn.
* POISONOUS GASES ARE PRODUCED IN FIRE, including Phosgene and Hydrogen Chloride.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If 1,1,2,2-Tetrachloroethane is spilled or leaked, take the following steps:

* Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Ventilate the area of spill or leak.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* It may be necessary to contain and dispose of 1,1,2,2-Tetrachloroethane as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172 Other:

Topic: 1,1,2,2-TETRACHLOROETHANE

HANDLING AND STORAGE

* Prior to working with 1,1,2,2-Tetrachloroethane you should be trained on its proper handling and storage.
* 1,1,2,2-Tetrachloroethane must be stored to avoid contact with CHEMICALLY ACTIVE METALS (such as POTASSIUM, POWDERED ALUMINUM, SODIUM, MAGNESIUM and ZINC) or STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) since violent reactions occur.

FIRST AID

In NJ, POISON INFORMATION 1-800-962-1253 Other:

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of water. Seek medical attention.

Breathing

* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 8 mm Hg at 68 degrees F (20 degrees C) Water Solubility: Soluble

OTHER COMMONLY USED NAMES

Chemical Name:
Ethane, 1,1,2,2-Tetrachloro-

Other Names and Formulations:
Acetylene tetrachloride; Dichloro-2,2-dichloroethane; Tetrachloroethane

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damage, it can increase the liver damage caused by Tetrachloroethylene.
* Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:
* Where possible, automatically pump liquid Tetrachloroethylene from drums or other storage containers to process containers.
* Specific engineering controls are recommended for this chemical by NIOSH. Refer to the NIOSH criteria document on Tetrachloroethylene #76-185.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:
* Workers whose clothing has been contaminated by Tetrachloroethylene should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Tetrachloroethylene.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with Tetrachloroethylene, immediately wash or shower to remove the chemical.
* At the end of the workshift, wash areas of the body that may have had contact with this chemical, whether or not

known contact has occurred.
* Do not eat, smoke, or drink where Tetrachloroethylene is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.

4.0 PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.
The following recommendations are only guidelines and may not appl y to every situation.

Clothing

* Avoid skin contact with Tetrachloroethylene. Wear solvent-resistant gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
* ACGIH recommends Nitrile Rubber, Polyvinyl Alcohol, or Viton as good to excellent protective materials.

Eye Protection

* Eye protection is included in the recommended respiratory protection.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.
* Engineering controls must be effective to ensure that exposure to Tetrachloroethylene does not occur.
* At any exposure level, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

5.0 QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from

repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

Q: Don't all chemicals cause cancer?
A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Should I be concerned if a chemical causes cancer in animals?
A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone do not cause cancer

unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

Q: Aren't pregnant women at the greatest risk from reproductive hazards?
A: Not necessarily. Pregnant women are at greatest risk from chemicals which harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

6.0 EMERGENCY INFORMATION

Common Name: TETRACHLOROETHYLENE
DOT Number: UN 1897
DOT Emergency Guide code: 74
CAS Number: 127-18-4

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	-	0
REACTIVITY	-	0
CARCINOGEN LIVER AND KIDNEY DAMAGE POISONOUS GASES PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS
* Tetrachloroethylene is a non-combustible liquid.
* Extinguish fire using an agent suitable for type of surrounding fire. Tetrachloroethylene itself does not burn.
* POISONOUS GASES ARE PRODUCED IN FIRE, including Hydrogen Chloride and Phosgene.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES
If Tetrachloroethylene is spilled or leaked, take the following steps:
* Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Ventilate the area of spill or leak.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.

* It may be necessary to contain and dispose of Tetrachloroethylene as a HAZARDOUS WASTE. Contact the NJ Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

DEP HOTLINE: (609) 292-7172
CHEMTREC: (800) 424-9300 Other:

HANDLING AND STORAGE

* Prior to working with Tetrachloroethylene you should be trained on its proper handling and storage.
* Tetrachloroethylene must be stored to avoid contact with STRONG OXIDIZERS, such as CHLORINE, BROMINE, and CHLORINE DIOXIDE; CHEMICALLY ACTIVE METALS, such as BARIUM, LITHIUM, and BERYLLIUM; and NITRIC ACID, since violent reactions occur.
* Store in tightly closed containers in a cool, well-ventilated area away from HEAT.

FIRST AID

NJ POISON INFORMATION 1-800-962-1253

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention.

Breathing

* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.
* Medical observation is recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.

PHYSICAL DATA

Vapor Pressure: 14 mm Hg at 68 degrees F (20 degrees C)

Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
Ethene, Tetrachloro-

Other Names and Formulations:
Perchloroethylene; PERC; Ethylene Tetrachloride

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Topic: TRICHLOROETHYLENE

1.0 IDENTIFIERS

CAS Number: 79-01-6
DOT Number: UN 1710

RTK Substance number: 1890
Date: October 1986

2.0 HAZARD SUMMARY

* Trichloroethylene can affect you when breathed in.
* It should be handled as a carcinogen --with extreme caution.
* Exposure can cause you to feel dizzy and to pass out.
* Exposure can cause an irregular heartbeat leading to sudden death.
* High levels may cause brain damage and death. Repeated exposure can cause fatigue, memory loss, headache, irritability, mental confusion, and depression.
* It can damage the liver and kidneys. High exposures can irritate the lungs.
* Prolonged contact can burn the skin.

IDENTIFICATION

Trichloroethylene is a colorless liquid with a sweet odor. It is used as a solvent for degreasing and dry cleaning, and in printing inks, paints, lacquers, varnishes, and adhesives.

REASON FOR CITATION

* Trichloroethylene is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, NIOSH, DOT, IARC, CAG and NFPA.
* This chemical is on the Special Health Hazard Substance List because it is a CANCER-CAUSING AGENT and a MUTAGEN.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting air samples. Under OSHA 1910.20, you have a legal right to obtain copies of sampling results from your employer. If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
* ODOR THRESHOLD = 28 ppm.
* The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

WORKPLACE EXPOSURE LIMITS

Osha: The legal airborne permissible exposure limit (PEL) is 100 ppm averaged over an 8-hour workshift, 200 ppm as a

ceiling limit, and 300 ppm as an acceptable maximum peak above the ceiling limit for 5 minutes duration in any 2 hours.
NIOSH: The recommended airborne exposure limit is 25 ppm averaged over a 10-hour workshift.
ACGIH: The recommended airborne exposure limit is 50 ppm averaged over an 8-hour workshift and 200 ppm as a STEL (short term exposure limit).
* Trichloroethylene may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE
* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to Trichloroethylene and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Trichloroethylene to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

3.0 HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Trichloroethylene:
* Trichloroethylene may irritate the skin, causing a rash or a burning feeling. Prolonged contact can burn and blister the skin.
* The liquid may damage and irritate the eyes.
* Exposure to the vapor can irritate the eyes, nose, throat, and lungs. Higher levels can cause a build-up of fluid (pulmonary edema). This can cause death.
* Exposure can cause lightheadedness, dizziness, visual disturbances, an excited feeling, nausea and vomiting. Very high levels can cause irregular heartbeat, unconsciousness, and death.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Trichloroethylene and can last for months or years:

Cancer Hazard
* Trichloroethylene may be a CARCINOGEN in humans since it has been shown to cause liver cancer in animals.
* Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard
* There appears to be an association between exposure to various solvents (including Trichloroethylene and Toluene) and birth defects among women in the shoe-making industry. Trichloroethylene's role in this association is unclear.
* There is limited evidence that Trichloroethylene is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Long-Term Effects
* Trichloroethylene may cause a skin allergy. If an allergy develops, very low future exposures can cause itching and a skin rash.
* It can damage the liver and kidneys.
* Repeated exposure can cause memory loss, headache, intolerance of alcohol, depression, and weakness in the arms and legs.
* Prolonged or repeated contact can cause irritation, blistering, roughening, and cracking of the exposed skin. Repeated immersion of the hands in Trichloroethylene may cause paralysis of the fingers.
* Exposure can damage the facial nerves even causing paralysis.

MEDICAL

Medical Testing
For those with frequent or potentially high exposure (half the TLV or greater, or significant skin contact), the following are recommended before beginning work and at regular times after that:
* Liver function tests.
If symptoms develop or overexposure is suspected, the following may be useful:
* Exam of the nervous system. Consider nerve conduction tests.
* Urinary Trichloracetic Acid level (for repeated exposures)

or blood Trichlorethylene levels (for acute exposure).
* Consider chest x-ray after acute overexposure.
* Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.
* Kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.
Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures
* Drinking alcohol (beer, wine, liquor) may cause a flush on the back and neck in people exposed to Trichloroethylene.
* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by Trichloroethylene.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.
In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.
In addition, the following controls are recommended:
* Where possible, automatically pump liquid Trichloroethylene from drums or other storage containers to process containers.
* Specific engineering controls are recommended for this chemical by NIOSH. Refer to the NIOSH criteria document: Occupational Exposure to Trichloroethylene # 73-11025.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:
* Workers whose clothing has been contaminated by Trichloroethylene should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members

could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Trichloroethylene.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* Do not eat, smoke, or drink where Trichloroethylene is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
* Do not smoke in the work area. Even a little vapor inhaled through a burning cigarette, cigar, or pipe will be converted into more highly toxic substances.

4.0 PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.
The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with Trichloroethylene. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
* ACGIH recommends VITON for providing excellent protection.

Eye Protection

* Eye protection is included in the recommended respiratory protection.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.
* At any exposure level use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
* Exposure to 1,000 ppm is immediately dangerous to life and health. If the possibility of exposures above 1,000 ppm

exists use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in continuous flow or other positive pressure mode.

5.0 QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

Q: Don't all chemicals cause cancer?
A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Should I be concerned if a chemical causes cancer in animals?

A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?

A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

Q: Who is at the greatest risk from reproductive hazards?

A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

Q: Should I be concerned if a chemical is a teratogen in animals?

A: Yes. Although some chemicals may affect humans differently than they affect animals, damage to animals suggests that similar damage can occur in humans.

The following information is available from:

New Jersey Department of Health
Occupational Health Service Trenton, NJ 08625-0360 (609) 984-1863

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health physician who can help you find the services you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-5627.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

CAG is the Carcinogens Assessment Group of the federal EPA.

A carcinogen is a substance that causes cancer.

The CAS number is assigned by the Chemical Abstracts Service to identify a specific chemical.

A combustible substance is a solid, liquid or gas that will burn.

A corrosive substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A fetus is an unborn human or animal.

A flammable substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The flash point is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/m3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that can cause an explosion under certain conditions or on contact with other specific substances.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

6.0 EMERGENCY INFORMATION

Common Name: TRICHLOROETHYLENE
DOT Number: UN 1710
DOT Emergency Guide code: 74
CAS Number: 79-01-6

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	-	1
REACTIVITY	-	0

POISONOUS GASES ARE PRODUCED IN A FIRE
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* POISONOUS GASES ARE PRODUCED IN FIRE, including Phosgene and Hydrogen Chloride.
* CONTAINERS MAY EXPLODE IN FIRE.
* Use dry chemical or CO2 extinguishers.
* Water can be used to keep fire-exposed containers cool. Water spray can also be used to flush spills away from exposure sources.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Trichloroethylene is spilled or leaked, take the following steps:

* Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Ventilate the area of spill or leak.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* It may be necessary to contain and dispose of Trichloroethylene as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172 Other:

HANDLING AND STORAGE

* Prior to working with Trichloroethylene you should be trained on its proper handling and storage.
* Trichloroethylene must be handled and stored away from operations which generate HIGH TEMPERATURES, such as ARC WELDING or CUTTING; UNSHIELDED RESISTANCE HEATING; OPEN FLAMES; and HIGH INTENSITY ULTRAVIOLET LIGHT.
* It must also be handled to avoid contact with HOT METALS. Poisonous gases such as PHOSGENE, and HYDROGEN CHLORIDE are formed.
* Prevent contact of Trichloroethylene with STRONG ALKALIS, such as SODIUM HYDROXIDE or POTASSIUM HYDROXIDE, because a highly flammable, toxic liquid is produced. Also prevent contact with ALUMINUM in the presence of DILUTE HYDROCHLORIC ACID, because a violent reaction will occur.
* Prevent contact with CHEMICALLY ACTIVE METALS, POWDERS, or SHAVINGS, such as BARIUM, LITHIUM, SODIUM, or MAGNESIUM; and TITANIUM POWDERS or SHAVINGS, since an explosion can occur.

FIRST AID

In NJ, POISON INFORMATION 1-800-962-1253 Other:

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

Breathing

* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.
* Medical observation is recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.

PHYSICAL DATA

Vapor Pressure: 58 mm Hg at 68 degrees F (20 degrees C)
Water Solubility: Slightly soluble

OTHER COMMONLY USED NAMES

Chemical Name:
Trichloroethene

Other Names and Formulations:
1,1,2-Trichloroethylene; Triclene; Tri; TCE

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program CN 368, Trenton, NJ 08625-0368 (609) 984-2202

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pic: VINYL CHLORIDE

0 IDENTIFIERS

CAS Number: 75-01-4
DOT Number: UN 1086

RTK Substance number: 2001
Date: August 1987

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0 HAZARD SUMMARY
* Vinyl Chloride can affect you when breathed and by passing through skin.
* Vinyl Chloride is a CARCINOGEN--HANDLE WITH EXTREME CAUTION. It also may cause damage to the developing fetus.
* Exposure can cause you to feel dizzy, lightheaded and sleepy. Higher levels can cause you to pass out and even die.
* Repeated exposure can damage the liver, the bones and blood vessels of the hands, and cause skin changes.
* Vinyl Chloride may cause stomach problems, kidney damage, skin allergy and damage the nervous system and blood.
* It is a HIGHLY FLAMMABLE LIQUID or GAS and a DANGEROUS FIRE HAZARD.

IDENTIFICATION
Vinyl Chloride is a colorless gas usually handled as liquid with a faintly sweet odor. It is used in the plastics industry and to make other chemicals.

REASON FOR CITATION
* Vinyl Chloride is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, IARC, DEP and NFPA.
* This chemical is on the Special Health Hazard Substance List because it is a CARCINOGEN, MUTAGEN and is FLAMMABLE.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED
* Exposure to hazardous substances should be routinely evaluated. This may include collecting air samples. Under OSHA 1910.20, you have a legal right to obtain copies of sampling results from your employer. If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
* ODOR THRESHOLD = 3,000 ppm.
* The odor threshold only serves as a warning of exposure. Not smelling it does not mean you are not being exposed.

WORKPLACE EXPOSURE LIMITS

pic: VINYL CHLORIDE

OSHA: The legal airborne permissible exposure limit (PEL) is 1.0 ppm averaged over an 8-hour workshift and 5.0 ppm, not to be exceeded during any 15 minute work period.
NIOSH: Lowest reliably detectable level.
ACGIH: The recommended airborne exposure limit is 5.0 ppm averaged over an 8-hour workshift.

* Vinyl Chloride is a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* A regulated, marked area should be established where Vinyl Chloride is handled, used, or stored.
* Wash thoroughly immediately after exposure to Vinyl Chloride and at the end of the workshift.
* Wear protective work clothing.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Vinyl Chloride to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

.0 HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Vinyl Chloride:

* High exposure can cause you to feel dizzy, lightheaded, "high" and sleepy. Even higher levels can cause headaches, nausea, weakness, and can cause you to pass out and die.
* Contact can irritate the skin and eyes. The liquid can cause frostbite.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Vinyl Chloride and can last for months or years:

Cancer Hazard

is usually less than 2 mg/liter).
* Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:
* Where possible, automatically pump liquid Vinyl Chloride from drums or other storage containers to process containers.
* Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA standard: 1910.1017 Vinyl Chloride.
* Specific engineering controls are recommended for this chemical by NIOSH. Refer to the NIOSH Current Intelligence Bulletin: #79-146 Vinyl Halides Carci-nogenicity # 28.
* Before entering a confined space where Vinyl Chloride may be present, check to make sure that an explosive concentration does not exist.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:
* Workers whose clothing has been contaminated by Vinyl Chloride should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Vinyl Chloride.

health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

Q: Don't all chemicals cause cancer?
A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

Q: Who is at the greatest risk from reproductive hazards?
A: Pregnant women are at greatest risk from chemicals that

harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

Q: Should I be concerned if a chemical is a teratogen in animals?

A: Yes. Although some chemicals may affect humans differently than they affect animals, damage to animals suggests that similar damage can occur in humans.

Appendix E

APPENDIX E

Quality Assurance Project Plan

1.0 Introduction

Quality assurance (QA) objectives are the qualitative or quantitative statements of the accuracy, precision, bias, representativeness, completeness, and comparability identified to assure data quality for the Y-Pay-Mor remedial investigation. The following sections describe the procedures established to assure adherence to each of the QA objectives for this project.

1.1 Accuracy

Accuracy is the degree of agreement between the true value and the measured value of a given parameter. Accuracy will be determined for the Y-Pay-Mor project through the use of matrix sample spikes and surrogate compounds. A sample spike is prepared by adding a known quantity of a pure compound to the environmental sample. Surrogate and spiking compounds should be prepared from samples representative of the compounds being investigated. The compounds used for the Y-Pay-Mor project are those recommended in EPA Method 8240. Matrix spike compounds used will be 1,1-dichloroethene, trichloroethane, chlorobenzene, toluene, and benzene. The surrogate compounds used will be toluene d_8, 4-bromofluorobenzene, and 1,2-dichloroethene-d_4. The calculated percent recovery of the spike or surrogate compound is taken as a measure of the accuracy of the analysis. When there is no change in the volume due to the spike, percent recovery is calculated as follows;

$$\%R=\frac{100(0-X)}{T}$$

Equation 1

%R = Percent Recovery

0 = Measured value of the analyte after spike addition

X = Measured value of analyte before spike addition

T = Value of spike

Tolerance limits for acceptable percent recovery are presented below.

<u>Compound Spike Added (ug/L) or (ug/Kg)QC Limits Water(ug/L)Soil(ug/Kg)</u>

1,1-Dichloroethene5061-14559-172

Trichloroethene5071-12062-137

Benzene5076-12766-142

Toluene5076-12559-139

Chlorobenzene5075-13060-133

1.2 Precision

Precision is defined as the degree of agreement between replicate measurements of the same quantity, or the repeatability of the result. Precision can be calculated as the standard deviation. An estimate of the standard deviation, *s* from *n* replicate results is given by Equation 2.

$$s=\sqrt{\sum\frac{x_i^2-\frac{(\Sigma x_i)^2}{n}}{n-1}}$$

Equation 2

Where x_i is the ith result in the set of n results.

For duplicate results, Equation 2 reduces to:

$$s=\frac{d}{\sqrt{2}}$$

Equation 3

Where d is the absolute value of the difference between two results. This value can also be reported as the Relative Percent Difference (RPD) calculated using Equation 4

$$RPD=2\frac{(S-D)}{(S+D)}X100$$

Equation 4

S = Sample value

D = Duplicate value

RPD = Relative Percent Difference

For every matrix spike analyzed, a matrix spike duplicate will also be analyzed. The RPD QC limits established for this project are shown below.

Compound QC Limits RPD (Water)RPD (Soil)

1,1-Dichloroethene1422

Trichloroethene1424

Benzene1121

Toluene1321

Chlorobenzene1321

These QC limit values will used as a measure of analytical precision.

Laboratory sample duplicates will also be analyzed, as well field sample duplicates and method blank duplicates. Quality control limits are not required for these parameters, however they provide a measure of the overall precision of the data. These values will be evaluated and the data reviewer will determine the extent to which the results affect the associated data.

1.3 Bias

Bias is a measure of the difference between the result parameter and the true value, due to systematic errors. Potential sources of systematic errors include:

- human error or variability during sample collection;
- physical or chemical instability of the samples;
- interference effects caused by chemical or physical sample characteristics;
- errors or variability in calibration of the measurement system; and,
- contamination of samples, sampling equipment, or laboratory equipment.

Sections 2.1 through 2.6 establish procedures for the collection, preservation, transportation and storage of samples, which are designed to eliminate most sources of bias.

1.4 Representativeness

Representativeness of samples for the Y-Pay-Mor project will be achieved through the careful selection of sampling locations and methods. These parameters will be selected so that the data properly represent the existing site conditions and provide the necessary information for thorough site characterization.

In addition, flame ionization detector (FID) readings will be taken from each sample to assist in determining the need for additional sampling in areas which yield high FID readings and to avoid unnecessary analysis of uncontaminated samples.

1.5 Completeness

Completeness refers to the amount of useable data produced in the project. The procedures established in this QAPP and sampling plan are designed to assure that all data will be valid and reportable.

To assure valid results are obtained from analysis all necessary samples, sample cooler temperatures will be monitored every two hours during operating conditions, when temperatures are over 75°F. This especially important due to the high volatility of the contaminants of concern at this site. Care will be taken to provide duplicate samples from areas of particular concern at the site.

1.6 Comparability

Comparability refers to the ability to compare the results obtained from this project to other results. Comparability will be ensured by analyzing all samples obtained in accordance with Standard EPA Method 8240, SW-486.

2.0 Sampling Procedures

This section describes the routine sampling procedures to be followed by field personnel. The procedures are designed to ensure that all samples collected are consistent with the following project objectives:

- samples are identified, preserved, and transported so that data are representative of site conditions;
- information is not lost in sample transfer; and
- laboratory data can be used for site assessment and corrective action.

2.1 Sampling

The results of preliminary analyses indicate that the contaminants of concern at the Y-Pay-Mor site are Volatile Organic Compounds (VOCs). The analysis selected for the determination of VOCs is EPA Method 8240 SW-486. Both soil and water samples will be analyzed in accordance with EPA Method 8240. Specification of non-standard requirements is not necessary to meet the objectives of the Y-Pay-Mor project.

2.2 Sampling Plan

The site map shown in Figure 1 (See report text) indicates the locations of borings and monitoring wells to be used for sample acquisition at the site. Table 1, below provides the minimum general information that will accompany the analytical test result of soil samples submitted for analytical testing.

TABLE 1

Sample ID	Head Space M-TIP H-✓ (ppm)	Depth (feet)	Date Time collected

2.3 Field Decontamination Procedures

Prior to sampling, field personnel will establish a sample staging area near the sampling locations. Portable equipment necessary to perform decontamination operations will be provided. Field personnel will decontaminate sampling equipment before use and between each sample. Sampling equipment will be washed with Alconox, or a similar wash solution; rinsed with tap water, and rinsed with deionized water. Latex gloves will be worn throughout sampling and will be replaced between each sample.

2.4 Sample Handling, Preservation and Shipment

Sample containers will be filled, handled, preserved, and shipped in accordance with the analysis method requirements as specified in EPA Methods described in SW-846.

Hydrochloric acid (HCl) will be added to the containers as required by the field sampler, or by personnel at the analytical laboratory. Samples will be placed in one of two coolers: one cooler will be provided for ground water samples and one cooler for soil samples. Coolers will be chilled to 4°C using "blue ice". Table 2 summarizes the requirements for sample handling, and preservation for both water and soil samples to be analyzed in accordance with EPA Method 8240.

TABLE 2. Sample Preservation and Container Requirements

Matrix	Analyte	Container	Containers per Sample	Preservation Method	Holding Time
Soil	Volatile Organic Compounds	8 oz. wide mouth jar with Teflon lid liner	1	Cool to 4° C Protect from light Minimize headspace	14 days
Water	Volatile Organic Compounds	40 ml glass vials with Teflon lined septum caps	2	Cool to 4° C 2 drops 1:1 HCl Protect from light Eliminate headspace	14 days

2.5 Field Log books

Field personnel will maintain a field logbook or RZA AGRA field logs to provide documentation of activities and significant events. The logbook will contain pertinent information regarding personnel present, site conditions, sampling procedures and anomalies, measurement procedures, calibration records, sample container temperature, etc. All entries in the field logbook must be signed and dated. The logbook will be kept as a permanent record.

2.6 Custody Procedures and Documentation

This section describes the standard operating procedures for the sample handling and preparation of chain-of-custody records. The purpose of these procedures is to maintain the integrity of all samples during collection, transportation, analysis, and reporting. These procedures are necessary to validate the history of sample data from collection through reporting by providing accurate documentation. The procedures described are in accordance with standard EPA sample handling and documentation protocols.

The documents/information needed to control and validate sample custody include sample identification numbers, chain-of-custody records, and custody seals. The following sections describe the procedures established for the use of these documents in the Y-Pay-Mor project.

2.6.1 Chain-of-Custody

To establish the documentation to trace sample possession from the time of collection, a chain-of-custody (COC) record will be completed for each sample shipment. The COC will accompany each sample shipment to the laboratory. Copies of each chain-of-custody form completed for the Y-Pay-Mor site will be held by the sampler and the laboratory.

2.6.2 Field Custody Procedures

In preserving sample custody, field personnel will collect only enough sample to provide an accurate representation of the media being sampled. To the greatest extent possible, sample locations, quantity, and type will be determined prior to actual field work. Samples will be handled as little as possible.

2.6.3 Transfer of Custody

When transferring samples, the individuals relinquishing and receiving will sign, date and record the time on the coc record. This record documents sample custody transfer.

Samples are packaged properly for shipment and dispatched to the laboratory for analysis. A separate coc record accompanies each shipment. Shipping containers are sealed with custody seals, if shipment to the laboratory is by any means other than direct transport by project personnel. The method of shipment, courier name, and related information are entered on the COC in the comments section.

2.6.4 Laboratory Custody Procedures

Upon receipt of sample shipments a PNELI employee shall:

- examine the samples for damage and checks for proper preservation,
- complete the COC,
- place samples in an appropriate storage environment,
- determine acceptable holding times.

PNELI assigns a unique number corresponding to each RZA AGRA sample number. Sample numbers are logged into the computerized laboratory control system.

2.7 Sample Identification Numbers

A sequential numbering system will be used so that data can be entered into a data base. Because different matrices will be sampled, samples will be identified by type, as well as by number. The following exemplifies the numbering system:

SB1001 (matrix, source, sequence)

This number represents a soil (S) sample taken from boring 1 (B1), and the first sample collected at the Y-Pay-mor site. Matrix designations are "S" for soil and "W" for water samples.

Sample labels will be supplied by the laboratory and affixed to sample containers prior to mobilization to the site. Sample labels will be completed, to the greatest extent possible, prior to mobilization. Indelible markers will be used to record sample identification. Each sample label will include the following information:

- Sample Number;
- Date and Time of Collection;
- Sampler's Initials;
- Analytical Requirements; and,
- Preservation Method (Water samples only).

3.0 Analytical Procedures

As stated in Section 1.6, all samples associated with the Y-Pay-Mor site will be analyzed in accordance with EPA Method 8240 SW-486. Table 3, below provides reporting levels and Method Detection Levels (MDL) for the volatile organic compounds routinely reported in this analysis.

TABLE 3. PNELI Method 8240 Reporting and Method Detection Levels

Analytical Method	Reporting Level		Laboratory MDL
	Soil/Sediment (ug/kg)	Water (ug/L)	Water (ug/L)
VOCs Method 8240	100	100	2
Acetone	10	10	2
Bromomethane	5	5	1
Bromodichloromethane	100	100	1
Carbon disulfide	5	5	1
Carbon tetrachloride	10	10	2
Chloroethane	10	10	2
Chloroform	5	5	1
Chloromethane	10	10	1
Methylene chloride	5	5	1
trans-1,2-Dichloroethene	5	5	1
trans-1,3-Dichloropropene	5	5	1
Vinyl acetate	10	10	1
Vinyl chloride	2	2	2
1,1-Dichloroethene	2	2	1
1,1,1-Trichloroethane	5	5	1
1,1-Dichloroethane	5	5	1
2-Butanone	10	10	2
1,2-Dichloroethane	2	2	1
1,1,2,2-Tetrachloroethane	2	2	1
1,2-Dichlorpropane	5	5	1
Trichloroethene	5	5	1
Dibromochloromethane	5	5	1
1,1,2-Trichloroethane	5	5	1
Benzene	5	5	1
cis-1,3-Dichloropropene	5	5	1
2-Chloroethyl vinyl ether	10	10	1
Bromoform	5	5	1
2-Hexanone	10	10	2
4-methyl-2-pentanone	10	10	2
Tetrachloroethene	5	5	1
Toluene	5	5	1
Chlorobenzene	5	5	1
Ethylbenzene	5	5	1
Styrene	5	5	1
Xylenes(Total)	5	5	1

PNELI ensures the quality and reliability of the data generated by adhering to an effective, comprehensive quality assurance program. Integral components of this program include both intra- and inter-laboratory quality control. The program is documented in the Quality Assurance Manual for the laboratory and supported by the Analytical Test Procedures (ATPs), and Standard Operating Procedures (SOPs). Such controls are used to ensure that the sample data results meet or exceed quality standards required for this project.

Quality control procedures used by PNELI for the Y-Pay-Mor project will be dictated by those parameters delineated in Table 4.

TABLE 4. Laboratory QC Requirements and Frequency of Application

QC Parameter	Frequency
Matrix Spikes	One per analytical batch per matrix OR 1/10 samples per matrix, whichever is greater
Matrix spike duplicates	One per analytical batch per matrix OR 1/10 samples, whichever is greater
Method Blanks	One per analytical batch per matrix OR 1/10 samples, whichever is greater
Check Standards	One per analytical batch per matrix OR daily
GC/MS Instrument Tuning Performance Checks	Initial 5-point calibration to be verified with a single point continuing calibration check every 12 hours of instrument operation OR if sensitivity and linearity criteria are not met, a new five point calibration must be generated.

In the event that there is insufficient sample to perform a rerun, the laboratory will call the project manager and a decision will be made on how to proceed.

4.0 Field QC Samples

This section describes the routine procedures to conduct field measurements and to collect samples. The methods presented in this section are intended to ensure that field measurements and sample collection are conducted in a similar and consistent manner by all individuals involved.

4.1 Trip/travel blank

Trip blanks measure potential sample contamination due to the presence of contaminants in the reagent water, preservative chemicals, or sample containers. Trip blanks prepared by the laboratory, will accompany the sample containers to the field and will remain unopened until receipt by the laboratory for analysis. Trip blanks will be collected at a minimum frequency of one per shipment, or 1 per 20 samples, whichever is greater. They will be shipped to the laboratory for analysis with the other samples.

4.2 Field duplicates

Field duplicates are samples collected at the same time and location, and are preserved, stored and analyzed under identical conditions. Field duplicates are used as a measure of the precision of the data. A good estimate of the precision cannot be made if sample results are significantly below the method detection limits (MDL). Samples chosen for field duplicates will, therefore, be chosen to assure that their analysis renders positive results.

5.0 Field Screening

Samples will be screened in the field using an Organic Vapor Meter (OVM) with a photoionization detector (PID). This Quality Assurance Project Plan (QAPP) identifies procedures to maintain consistent quality of project data. Consistency will be maintained by standardizing and documenting field and laboratory procedures.

6.0 Data Reduction, Validation and Reporting

When the results of the project measurements have been assembled, the project manger will determine whether the data quality objectives have been achieved. This section describes the procedures that will be used to make this determination.

Upon receipt of the data deliverables, the quality assurance coordinator will evaluate the data according to the specifications outlined in the EPA document "Laboratory data Validation Functional Guidelines for Evaluating Organic Analyses", February 1988 and in EPA Method 8240. The usefulness of the data will be determined based on these documents. Upon consideration of this information, data that does not meet the necessary criteria will be flagged with the data qualifiers presented below. These data qualifiers will modify the usefulness of the individual values.

<u>Data Qualifiers</u>

U - The material was analyzed for but was not detected above the associated value. The associated numerical value is either the sample quantitation limit or the sample detection limit.

J - The associated numerical value is an estimated quantity because the quality control criteria were not met or the sample concentration sin below the sample quantitation limit.

UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

NJ - Presumptive evidence of the material at an estimated concentration.

R - The data are unusable.

6.1 Reporting

An overall evaluation of the data will be made and the results will be presented in the final report.

Appendix F

APPENDIX F

VAPOR EXTRACTION FEASIBILITY TEST

APPENDIX F

VAPOR EXTRACTION FEASIBILITY TEST
Y-PAY-MORE DRY CLEANERS
2210 S. 320th ST.
FEDERAL WAY, WASHINGTON

1.0 INTRODUCTION

The following report documents a Vapor Extraction Feasibility Study conducted at Y-Pay-More dry cleaners located at 2210 S. 320th street in Federal Way, Washington. The purpose of this test was to evaluate the potential effectiveness of soil vapor extraction as a remedial technology for soil which contains dry cleaning solvents. In addition, the study provided supplemental data regarding subsurface conditions at the site with respect to contaminant distribution. Test procedures are outlined and resulting data presented. Conclusions are drawn from the data set, leading to recommendations regarding the feasibility of vapor extraction as a remedial alternative at the site.

2.0 ABSTRACT

Vapor extraction, or soil venting has been shown to be an effective remediation technology in both environmental literature and in RZA AGRA, Inc.'s own experience. Vapor extraction is the process by which reduced pressure is induced in soils using a high volume regenerative blower manifolded to well points or perforated pipe installed within the vadose zone. The pressure differential induces air circulation through the soil toward the area of lowest pressure. Volatile organic compound (VOC) molecules are mobilized in the induced circulation pattern, removed from the subsurface, and expelled to the open air or to a vapor treatment system through the blower. Because there is a tendency for the geological formation to return to a state of equilibrium, VOC molecules in the aqueous phase tend to vaporize, allowing the removal of a greater percentage of the contamination. In practice, the effectiveness of vapor extraction may be influenced by many variables including fluctuations in the groundwater table, heterogeneities in the site soils, and barometric pressure.

3.0 PROCEDURE

A soil vapor extraction test generally involves manifolding a high vacuum regenerative blower to an extraction point and monitoring the vacuum induced in the subsurface at other nearby observation points. Concentrations of contaminants in the blower exhaust vacuum are carefully monitored and flow rates are generated. All data is collected with respect to time and recorded in consistent units. Initially, the blower is set to apply low suction to the extraction point. The suction is applied until induced vacuum readings stabilize. The blower's suction is then increased. This process continues until the maximum vacuum provided by the blower is reached. During the test, more than one point may be used as an extraction point. Combining multiple staging with multiple extraction points augments the number of data points as well as the distribution of high vapor extraction zones.

A ROTRON DR-454 regenerative blower system was used for this extraction study. This system is capable of drawing 100 standard cubic feet per minute (scfm) when no load is placed on the blower. The system is equipped with a fresh air bleeder valve used in regulating applied vacuum. The blower system also utilizes moisture condensate tanks to keep moisture from putting an unnecessary loading on the blower. Magnehelic vacuum/pressure gauges were used at the monitoring wellheads to measure influence.

Six vapor points located inside the building near the western wall were used for the vapor extraction test (Figure 2 located in the Figure section of the main report) These previously placed vapor points consisted of two inch outside diameter, 0.010-inch slotted stainless steel well screens installed approximately to a depth of 7.5 feet. This is the depth of the structural fill which is supported by relatively dense and less permeable glacial till and weathered glacial till type soils. To minimize the effects of surface air infiltration, a seal of bentonite surrounds each well at floor level to prevent migration of ambient room air into the extraction and monitoring wells during applied vacuum.

4.0 RESULTS

Three of the vapor points, VP-2, VP-5, and VP-4, were used as extraction points during our survey (Figure 2; main report). These wells were chosen as those which would most completely characterize subsurface conditions with respect to permeability and contaminant concentrations. At least three distinct vacuum levels were applied to each extraction point, with VP-2 receiving four. The remaining wells were monitored using the Magnehelic gauges with readings recorded periodically. Blower exhaust concentrations were monitored using two PIDs (an OVM and a Microtip). Both of these instruments determine VOC concentrations in the blower exhaust air stream. One air sample of the blower exhaust was collected from each extraction point during testing procedures and submitted for laboratory analysis. Because the blower assembly was situated outside the building, exhaust contaminants were vented to the atmosphere. The individual measuring the exhaust contaminant levels wore a protective respirator at all times.

The Magnehelic gauges showed an immediate and sustained response at all monitoring points when applied vacuum was 20-inches of water or greater. Applied vacuum values ranged from a minimum of 5-inches of

Equation 1

$$k = \{(Q*n)/(h*pi*Pw)\} * \ln(Rw/Rm)/\{1-(Px/Pw)^2\} \text{(eq.1)}$$

where, k = soil intrinsic permeability (cm^2)

Q = air flow rate (cm^3/sec)

n = viscosity of air 1.8×10^{-3} (g/cm*sec)

h = screened interval in extraction well (cm)

pi = 3.1416

Rw = extraction well radius (cm)

Rm = estimated ROI (cm)

Pw = absolute wellhead pressure (g/cm*sec^2)

Px = absolute observation well pressure (g/cm*sec^2)

Soil permeability was calculated to be approximately 49 darcys (1 darcy=10^{-8} cm^2). This value should be considered approximate and interpreted in a range of values from 20 to 100 darcys this is typical of fill soils poorly sorted, medium silts with sand and gravel heterogeneities.

Based upon the data obtained during the vapor extraction feasibility study, we have determined that soil venting is an applicable remedial alternative at the subject site. Moreover, we are of the opinion that a soil venting system installed on site would sufficiently remediate dense vapor phase impacted soils beneath grade.

CONCENTRATION VERSUS TIME

VP-2,5"VAC

TIME (MIN)	C(PPM)
0.5	19.7
1	19
1.5	17.8
2	17
2.5	15.9
3	15.9
3.5	15.3
4	15.2
4.5	15.3
5	15.3
5.5	15.1
6	15.4
6.5	14.9
7	15.1
7.5	15.5
8	15.3
8.5	15.3
9	15
9.5	15.2

VP-2,20"VAC

TIME (MIN)	C(PPM)
0.5	39.5
1	41.3
1.5	40.8
2	40.3
2.5	39.4
3	39.2
3.5	39
4	38.1
4.5	36.6
5	36
5.5	35.1
6	34.8
6.5	34.2
7	34
7.5	33.5
8	33.1
8.5	32.9
9	37.2
9.5	32.1
10	31.9
11	30.8
12	30.5
13	29.6
14	28.4

VP-2,30"VAC

TIME (MIN)	C(PPM)
0.5	41.5
1	41.9
1.5	40.7
2	40.2
2.5	39.9
3	39.7
3.5	39.3
4	38.8
4.5	38.6
5	38.2
5.5	38.2
6	38
6.5	38.1

VP-2,38"VAC

TIME (MIN)	C(PPM)
0.5	50
1	50.1
1.5	50.3
2	49.5
2.5	49
3	48.5
3.5	46.4
4	46.3
4.5	46.1
5	46
5.5	46.1
6	45.3

VP-5,20"VAC

TIME(MIN)	C(PPM)
0.5	10.5
1	8.6
2	6.2
3	6.2
5	6.2
6	6
7	5.9
8	5.6
9	5.6

VP-5,30"VAC

TIME(MIN)	C(PPM)
0.5	5.6
1	7.6
2	7.5
3	7.4
4	7.9

VP-5,35"VAC

TIME (MIN)	C(PPM)
0.5	
1	8.3
2	8.3
3	8.3

CONCENTRATION VERSUS TIME

VP-4,20"VAC

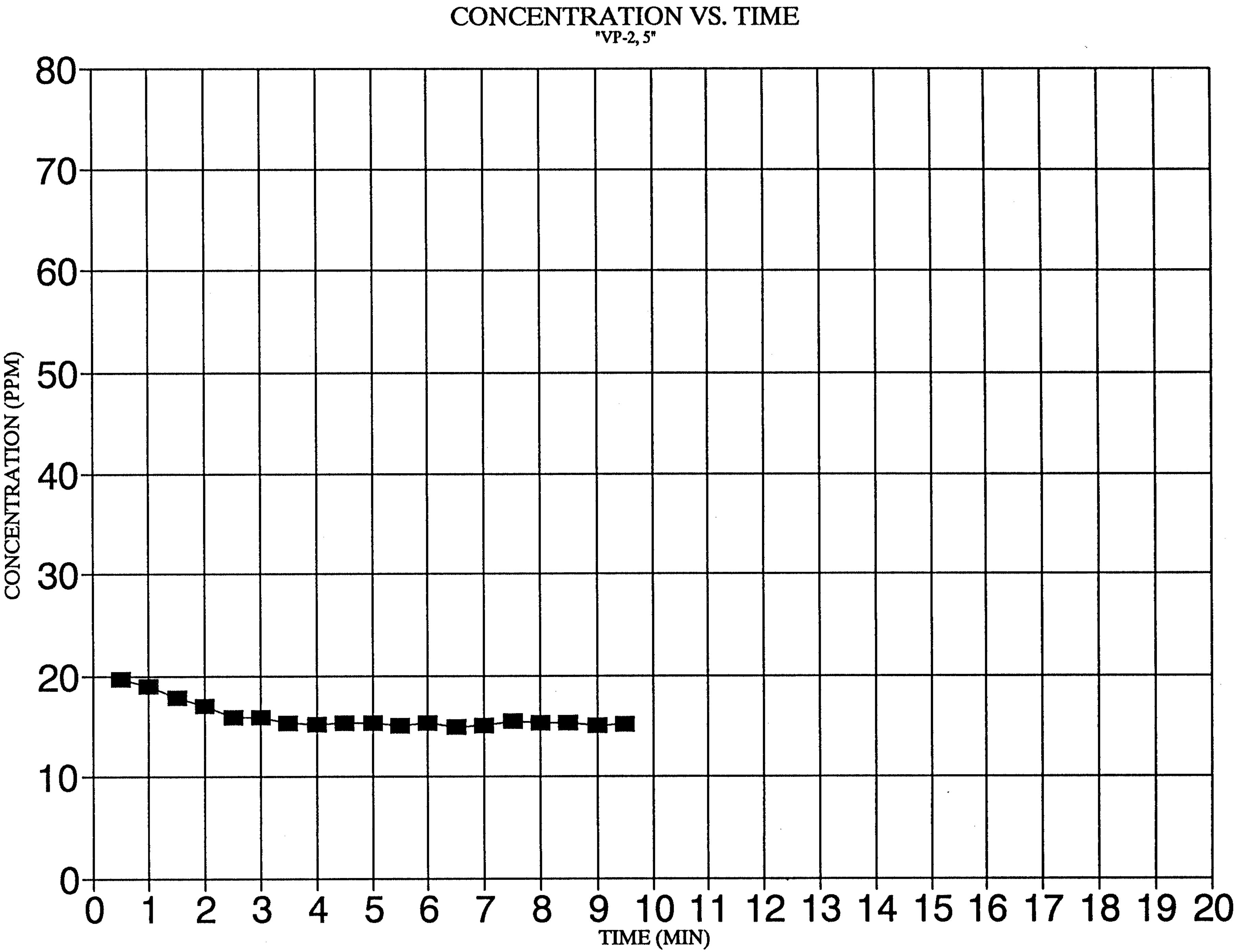
TIME (MIN)	C(PPM)
1	30
1.5	33.3
2	35.1
2.5	35.7
3	35.3
3.5	35.8
4	35.7
4.5	35.7
5	35.7
5.5	35.8
6	35.8
6.5	36
7	36.1
7.5	36.4
8	36.9

VP-4,30"VAC

TIME (MIN)	C(PPM)
0.5	49.9
1	51.9
1.5	52.7
2	53.1
2.5	53.6
3	54
4	54.6
5	55.3
6	55.6
7	56.4

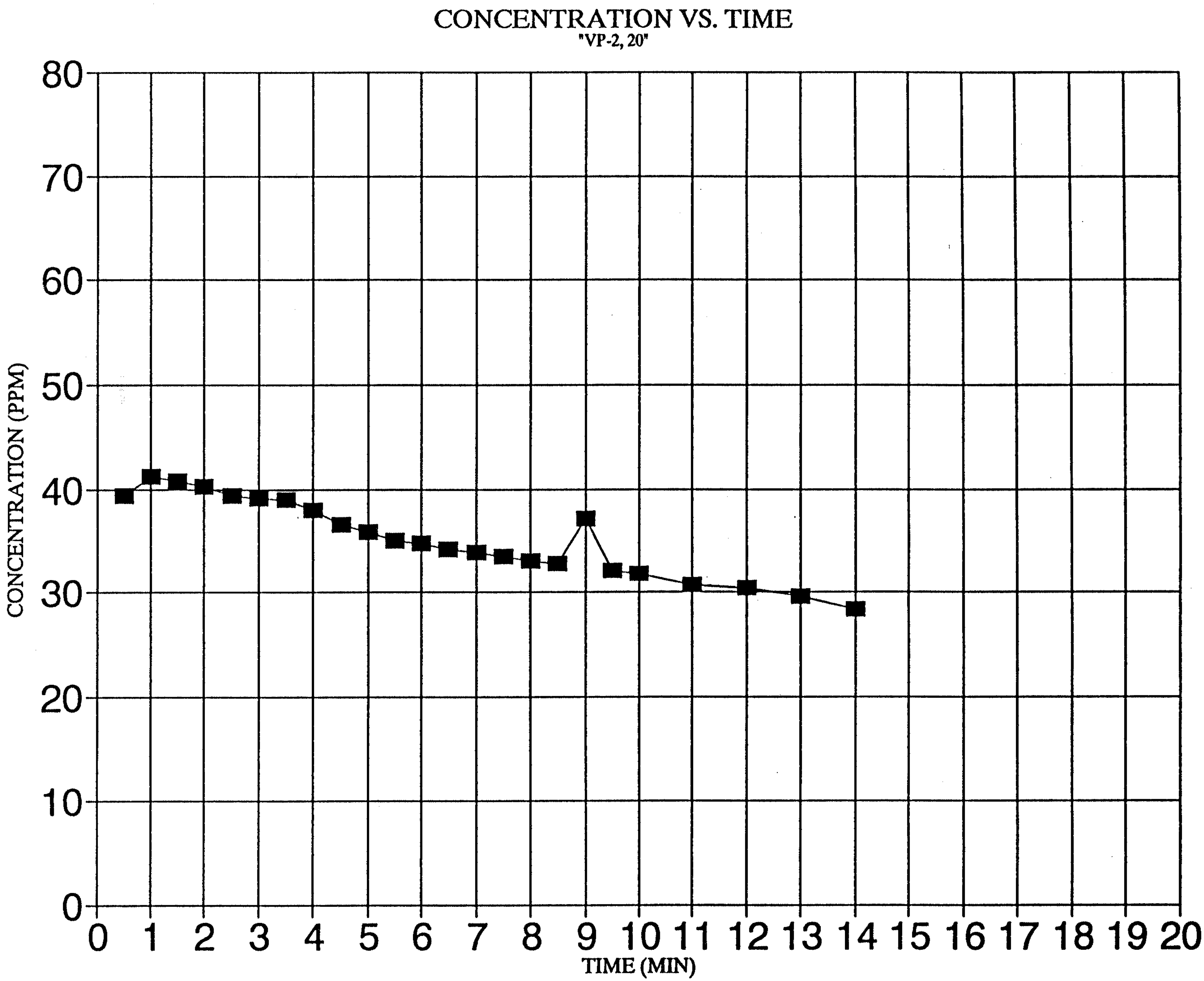
VP-4,34"VAC

TIME (MIN)	C(PPM)
1	64.9
2	65.6
3	68.1
4	68.9
5	69.7
6	70.2
7	70.8
8	71.6
9	72
10	72.4
11	73
12	74.6
13	76.5
14	78.1


CONCENTRATION VS. TIME
"VP-2, 5"
CONCENTRATION (PPM)
0
10
20
30
40
50
60
70
80
TIME (MIN)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

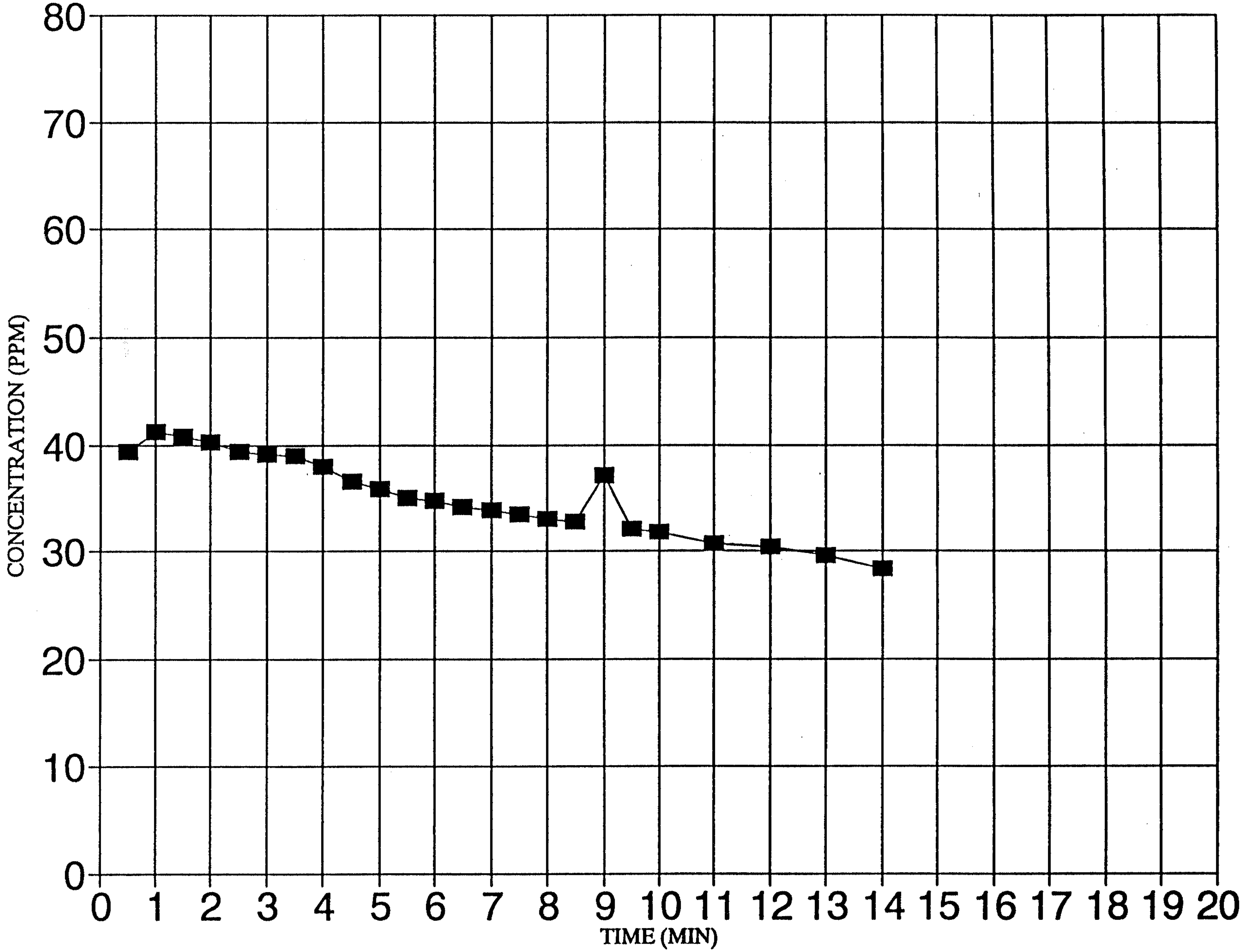
CONCENTRATION VERSUS TIME

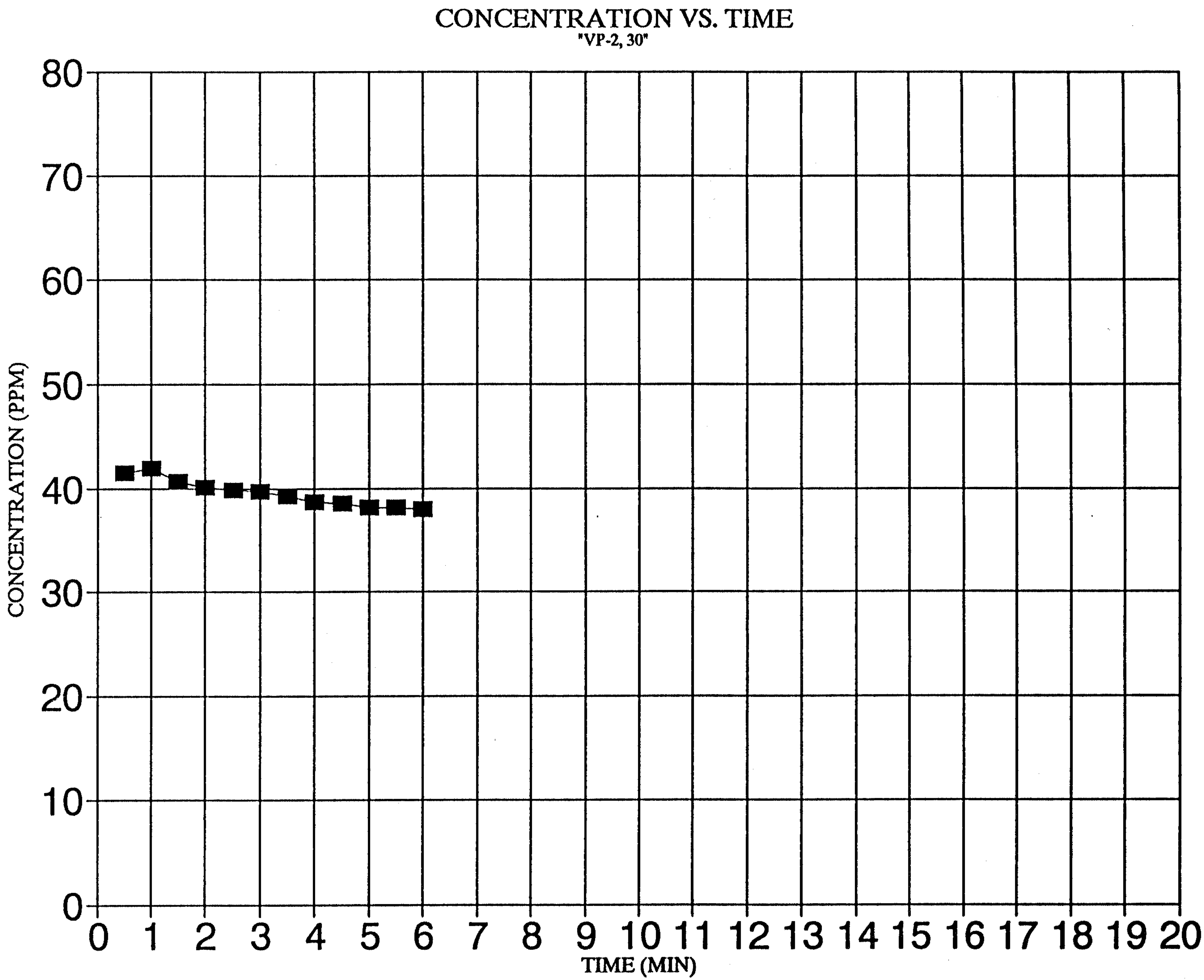
VP-4,20"VAC		VP-4,30"VAC		VP-4,34"VAC	
TIME (MIN)	C(PPM)	TIME (MIN)	C(PPM)	TIME (MIN)	C(PPM)
1	30	0.5	49.9	1	64.9
1.5	33.3	1	51.9	2	65.6
2	35.1	1.5	52.7	3	68.1
2.5	35.7	2	53.1	4	68.9
3	35.3	2.5	53.6	5	69.7
3.5	35.8	3	54	6	70.2
4	35.7	4	54.6	7	70.8
4.5	35.7	5	55.3	8	71.6
5	35.7	6	55.6	9	72
5.5	35.8	7	56.4	10	72.4
6	35.8			11	73
6.5	36			12	74.6
7	36.1			13	76.5
7.5	36.4			14	78.1
8	36.9				


CONCENTRATION VS. TIME
"VP-2, 20"
CONCENTRATION (PPM)
0
10
20
30
40
50
60
70
80
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)

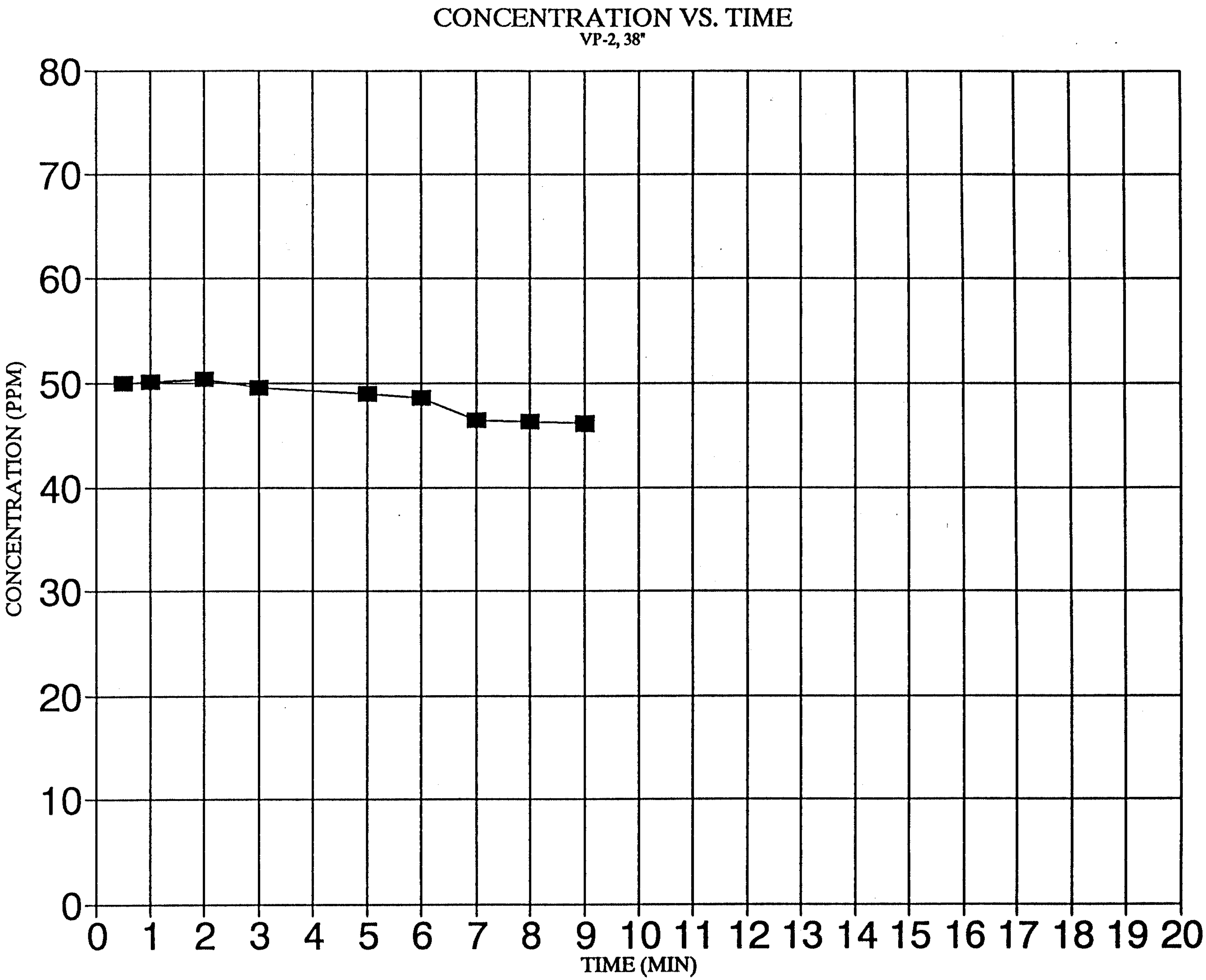
CONCENTRATION VS. TIME

"VP-2, 20"

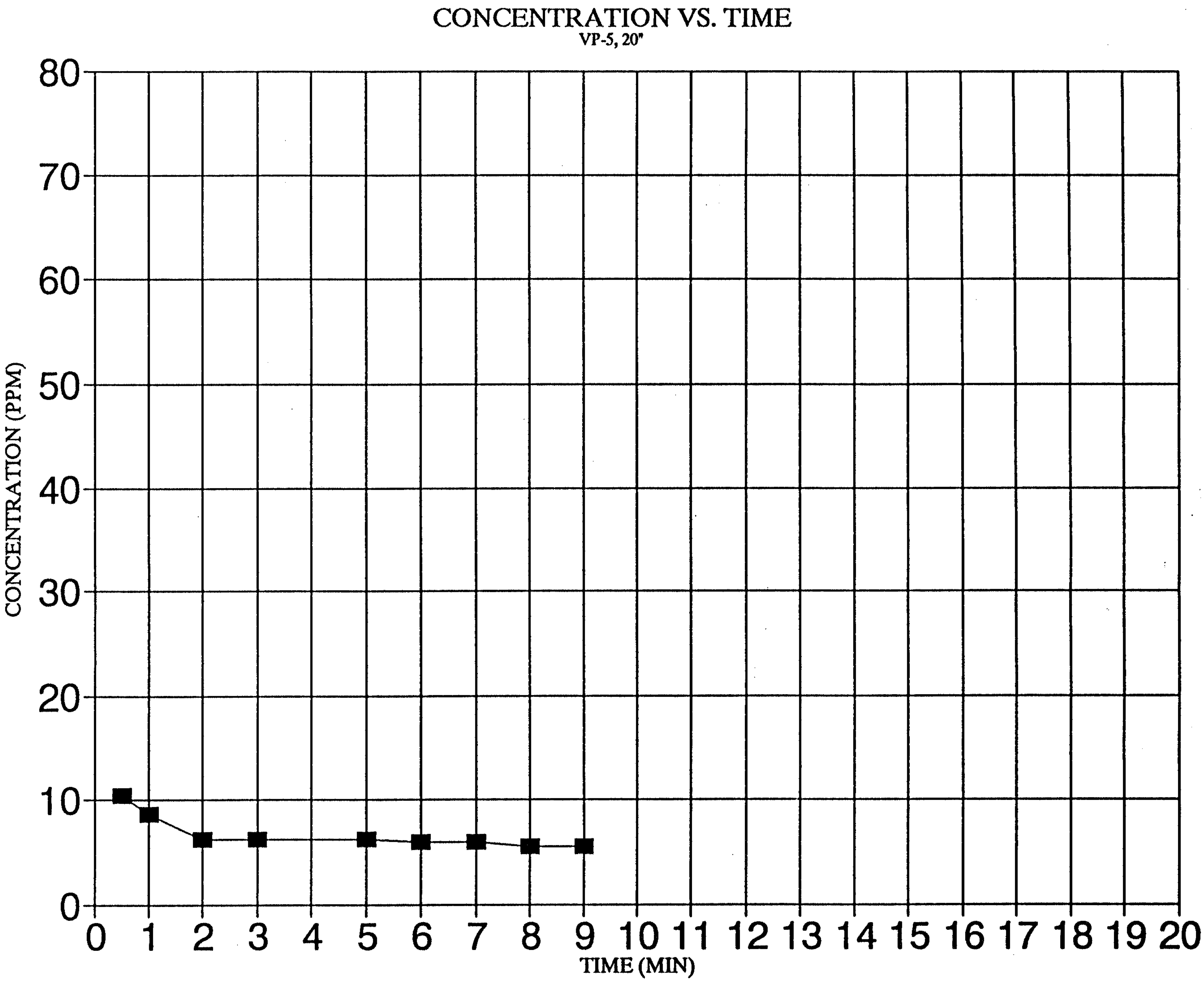




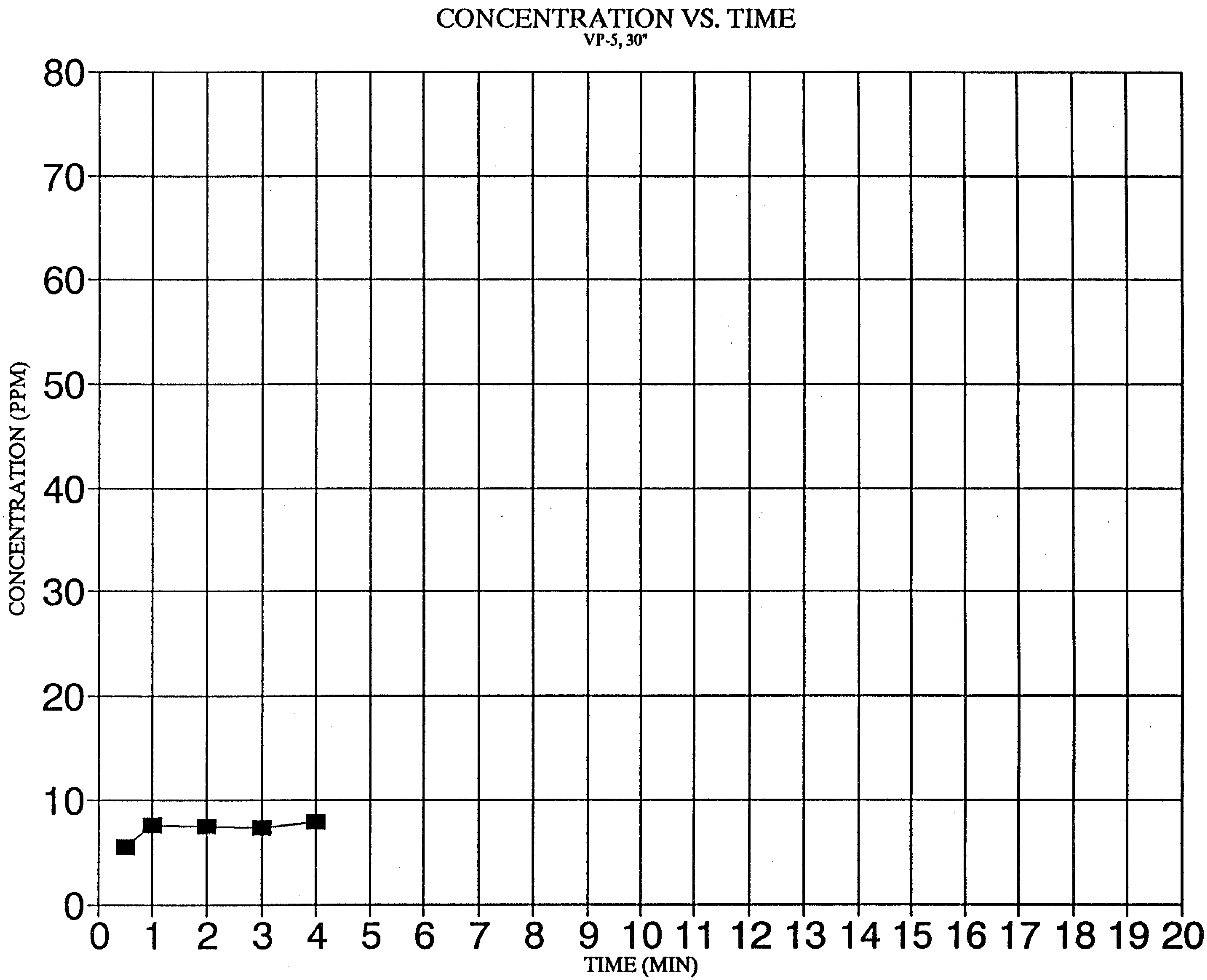
CONCENTRATION VS. TIME
"VP-2, 30"
CONCENTRATION (PPM)
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)

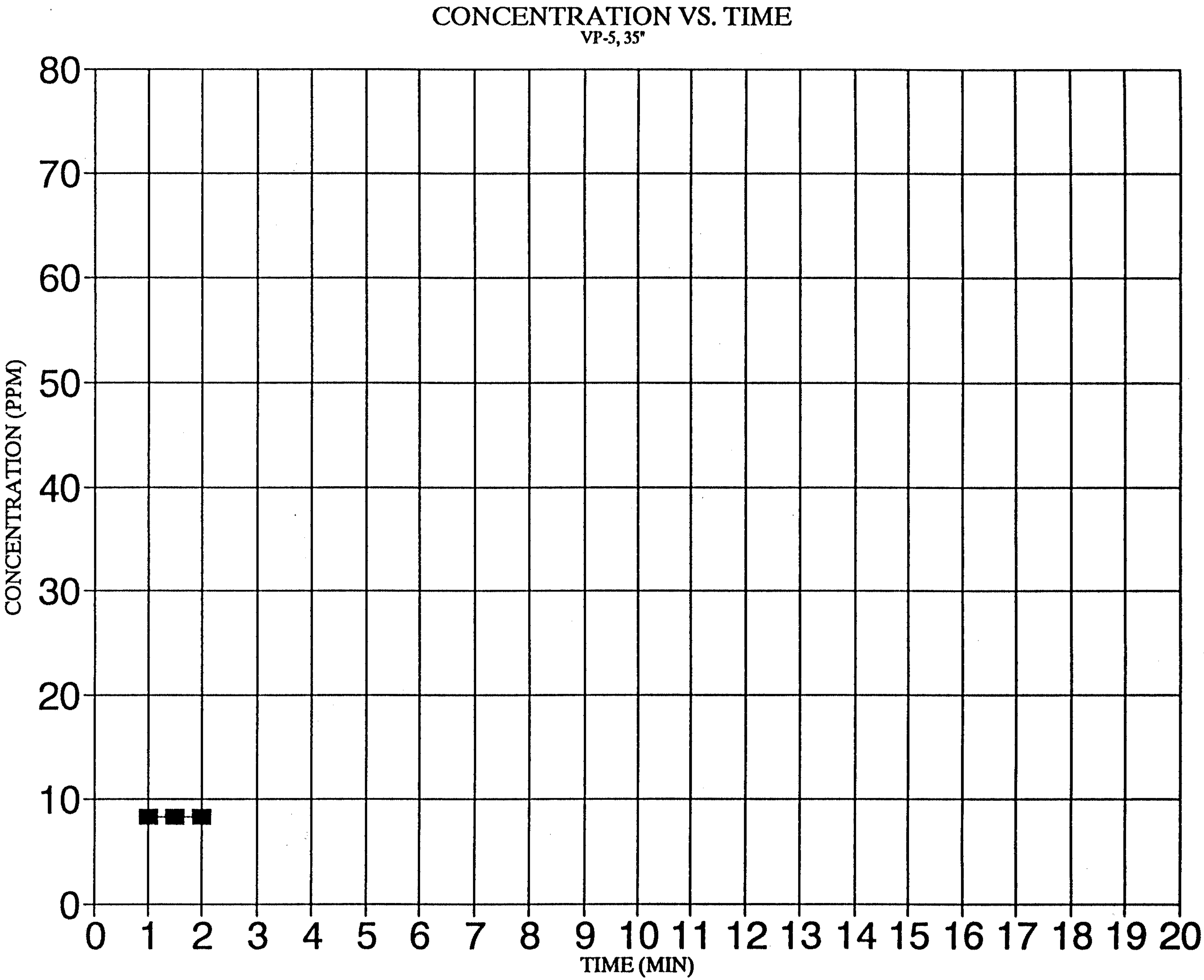


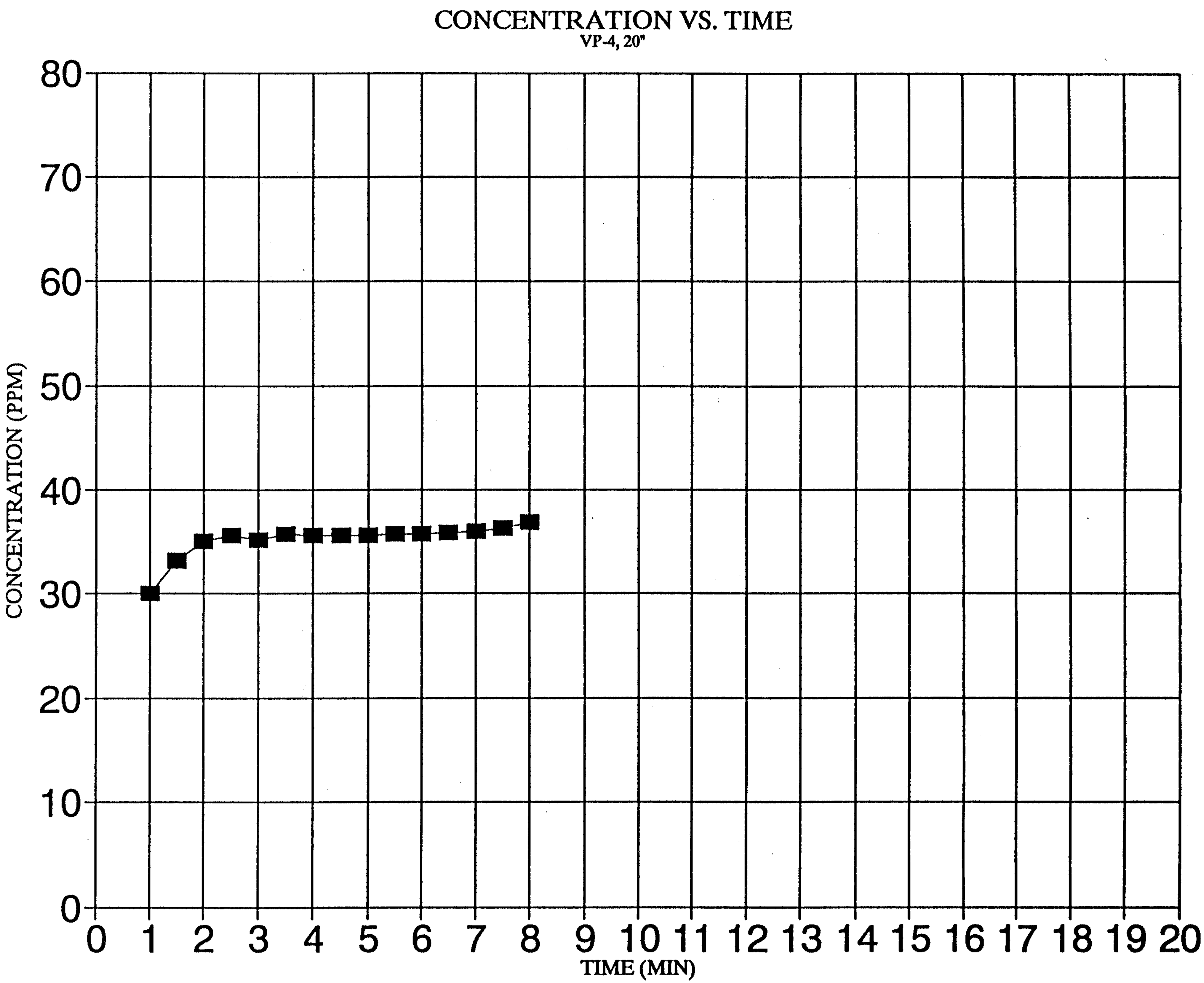
CONCENTRATION VS. TIME
VP-2, 38"
CONCENTRATION (PPM)
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)

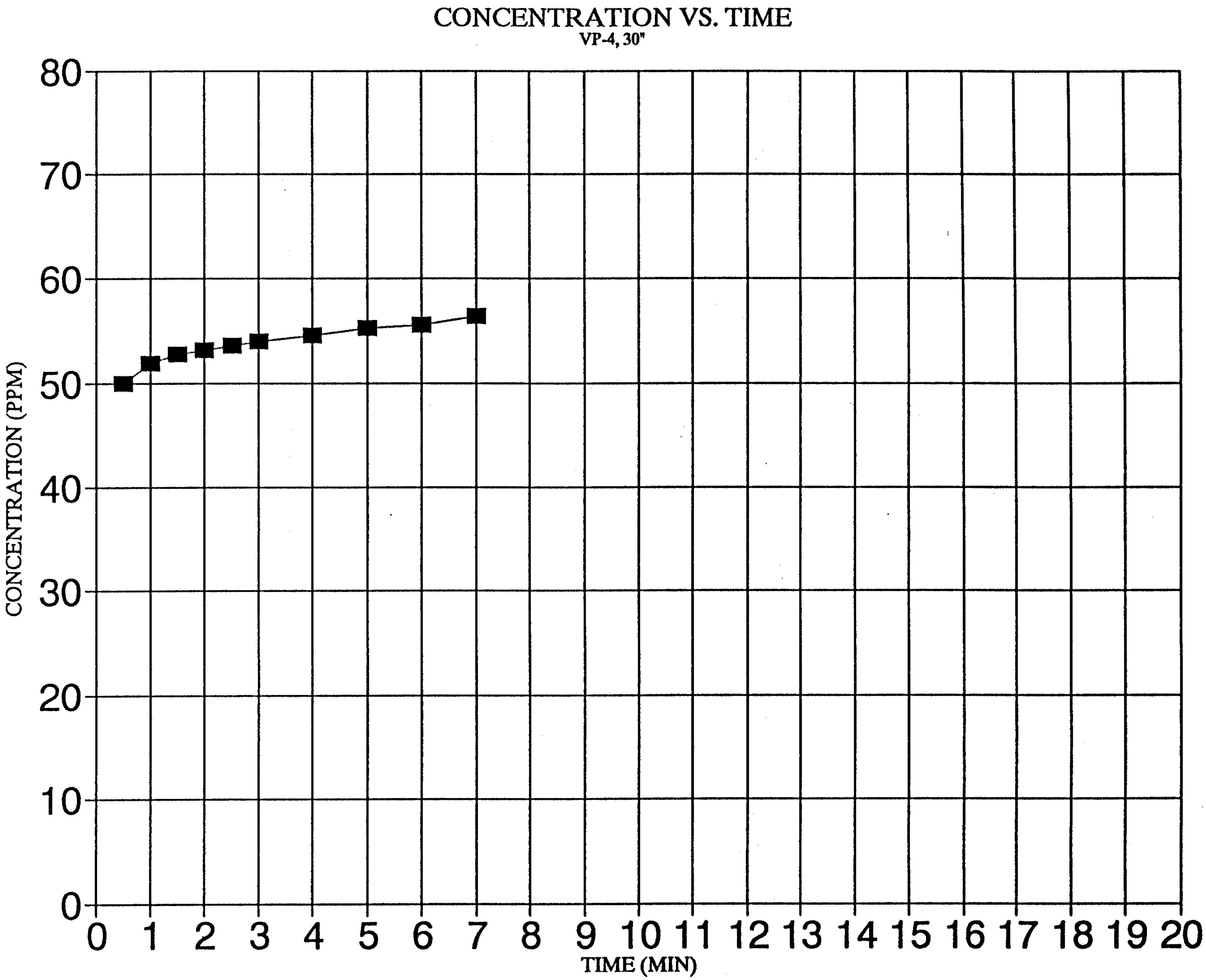


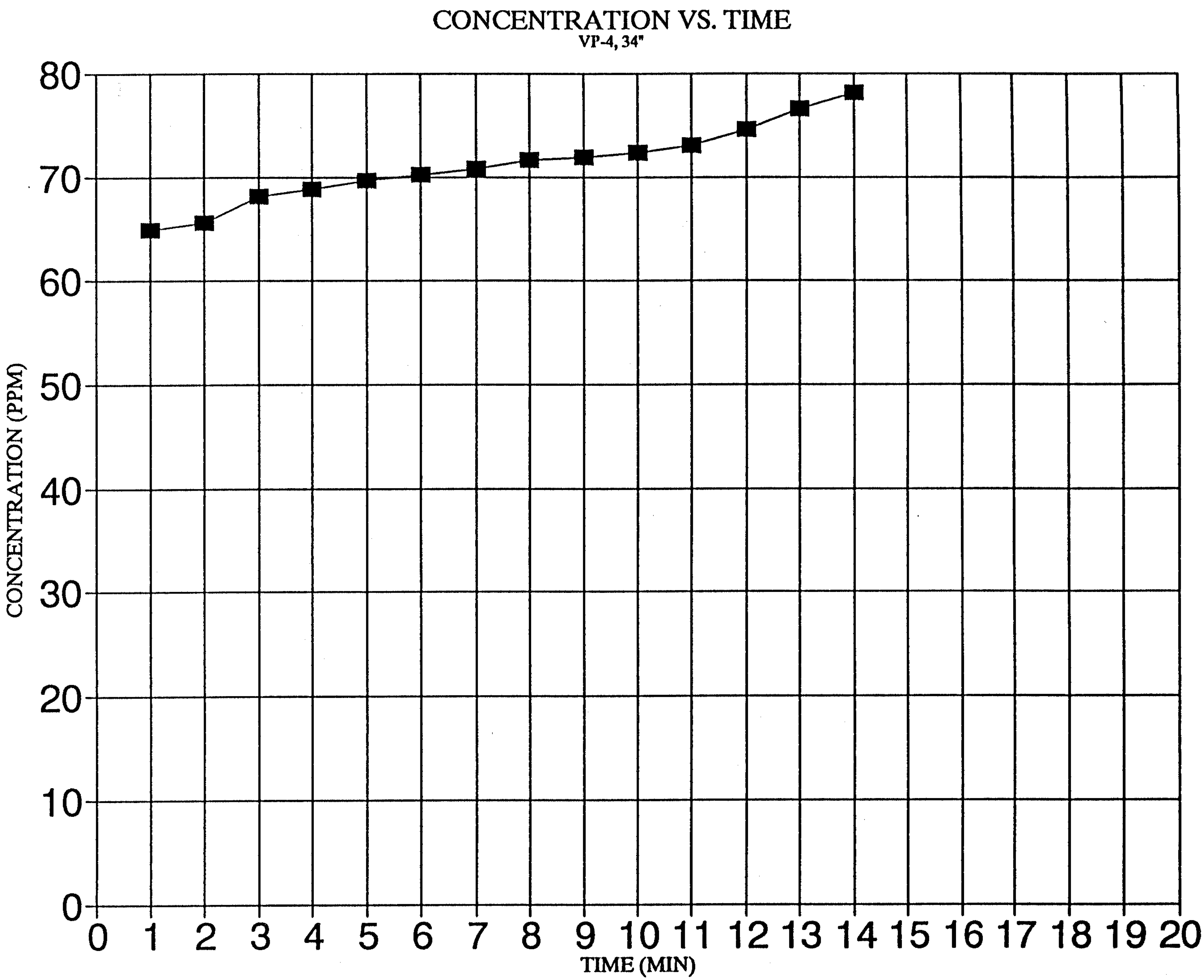
CONCENTRATION VS. TIME
VP-5, 20"
CONCENTRATION (PPM)
0
10
20
30
40
50
60
70
80
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)


CONCENTRATION VS. TIME
VP-5, 30"
CONCENTRATION (PPM)
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)


CONCENTRATION VS. TIME
VP-5, 35"
CONCENTRATION (PPM)
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)


CONCENTRATION VS. TIME
VP-4, 20"
CONCENTRATION (PPM)
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
TIME (MIN)


CONCENTRATION VS. TIME
VP-4, 30"
CONCENTRATION (PPM)
TIME (MIN)
0
10
20
30
40
50
60
70
80
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

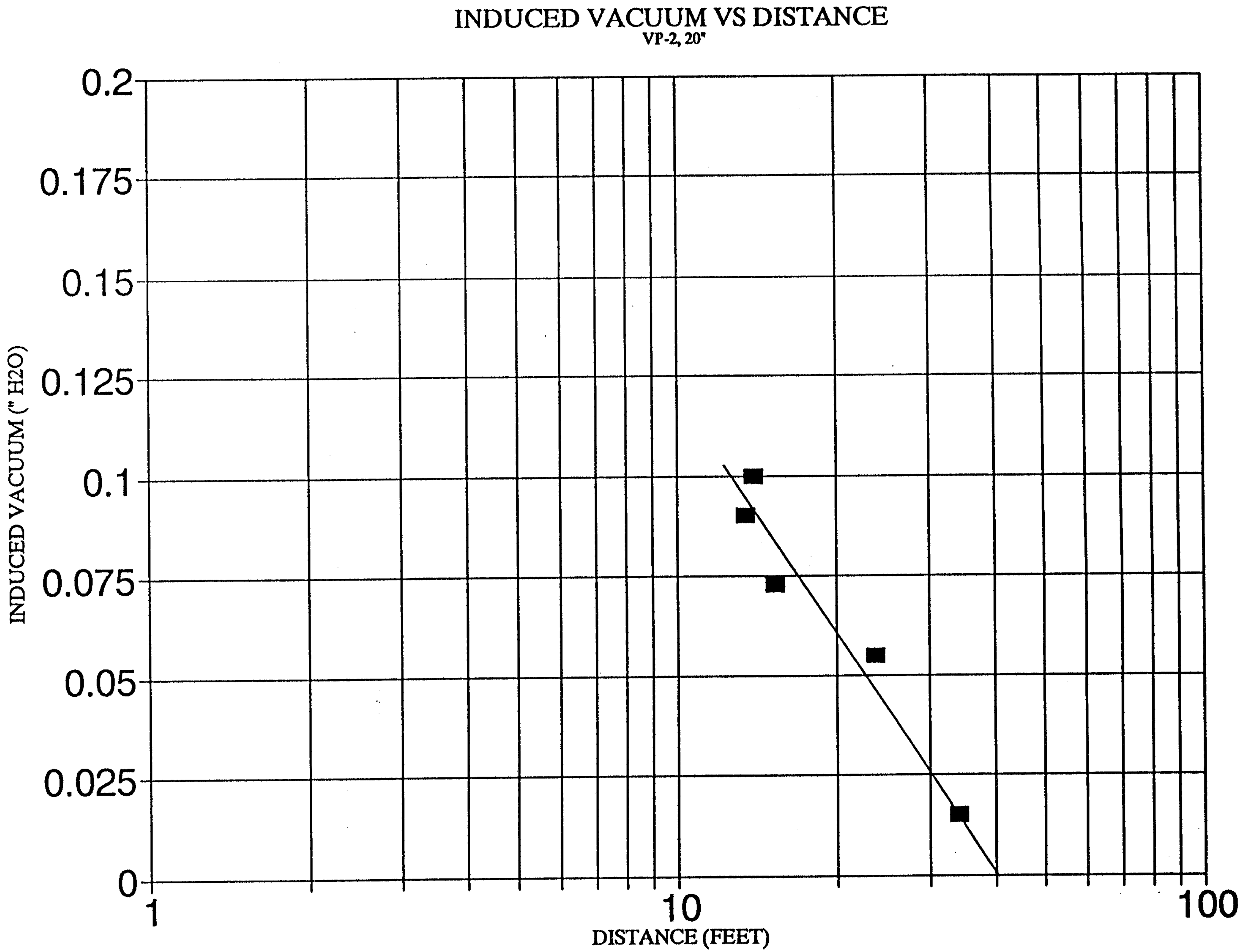

CONCENTRATION VS. TIME
VP-4, 34"
CONCENTRATION (PPM)
TIME (MIN)
0
10
20
30
40
50
60
70
80
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

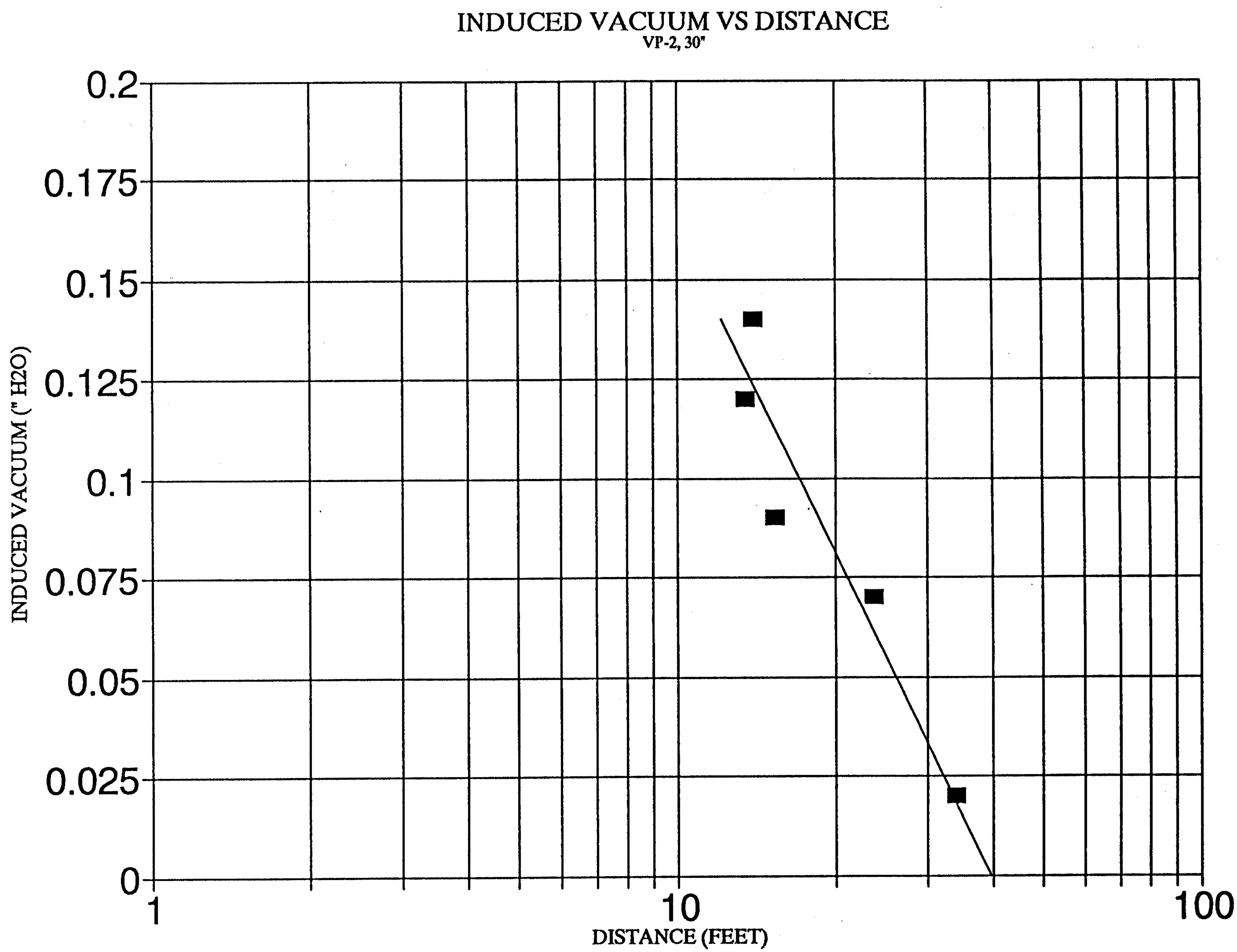
INDUCED VACUUM VS DISTANCE

VP-2,20"H20			VP-2,30"H20			VP-2,38"H20		
WELL	DISTANCE(FEET)	VACUUM("H20)	WELL	DISTANCE(FEET)	VACUUM("H20)	WELL	DISTANCE(FEET)	VACUUM("H20)
VP-5	13.5	0.09	VP-5	13.5	0.12	VP-5	13.5	0.15
VP-3	14	0.1	VP-3	14	0.14	VP-3	14	0.16
VP-6	15.4	0.073	VP-6	15.4	0.09	VP-6	15.4	0.115
VP-4	23.7	0.055	VP-4	23.7	0.07	VP-4	23.7	0.085
VP-1	34	0.015	VP-1	34	0.02	VP-1	34	0.04

VP-5,20"H20			VP-5,30"H20			VP-5,35"H20		
WELL	DISTANCE(FEET)	VACUUM("H20)	WELL	DISTANCE(FEET)	VACUUM("H20)	WELL	DISTANCE(FEET)	VACUUM("H20)
VP-3	13.4	0.2	VP-3	13.4	0.26	VP-3	13.4	0.29
VP-2	13.5	0.09	VP-2	13.5	0.12	VP-2	13.5	0.14
VP-6	28.7	0.04	VP-6	28.7	0.05	VP-6	28.7	0.05
VP-4	30.5	0.04	VP-4	30.5	0.05	VP-4	30.5	0.06
VP-1	46.75	0.015	VP-1	46.75	0.02	VP-1	46.75	0.025

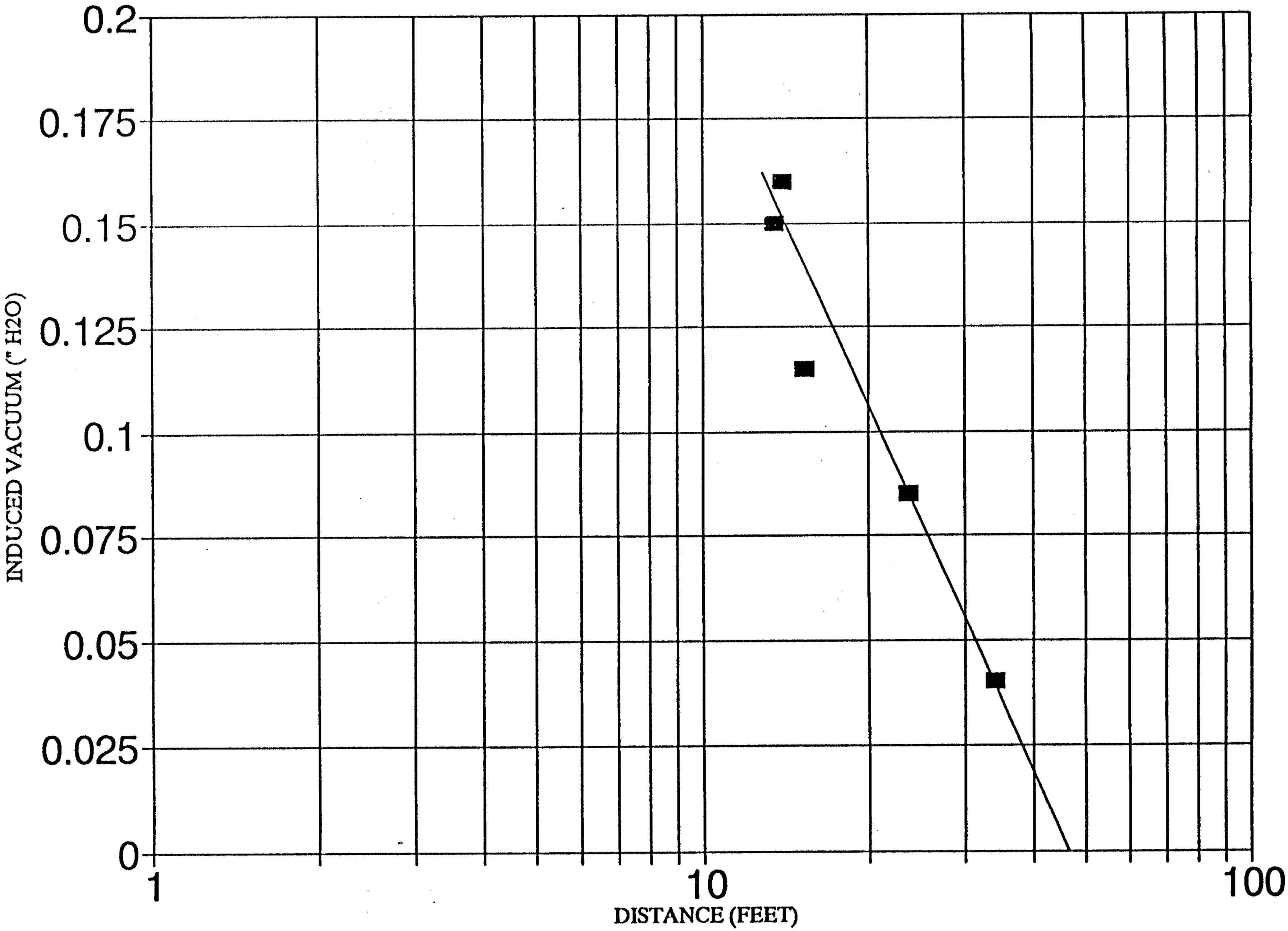
VP-4,20"H20			VP-4,30"H20			VP-4,34"H20		
WELL	DISTANCE(FEET)	VACUUM("H20)	WELL	DISTANCE(FEET)	VACUUM("H20)	WELL	DISTANCE(FEET)	VACUUM("H20)
VP-6	17.3	0.07	VP-6	17.3	0.09	VP-6	17.3	0.1
VP-3	17.4	0.1	VP-3	17.4	0.13	VP-3	17.4	0.15
VP-1	23	0.07	VP-1	23	0.1	VP-1	23	0.12
VP-2	23.7	0.05	VP-2	23.7	0.07	VP-2	23.7	0.08
VP-5	30.5	0.03	VP-5	30.5	0.045	VP-5	30.5	0.05

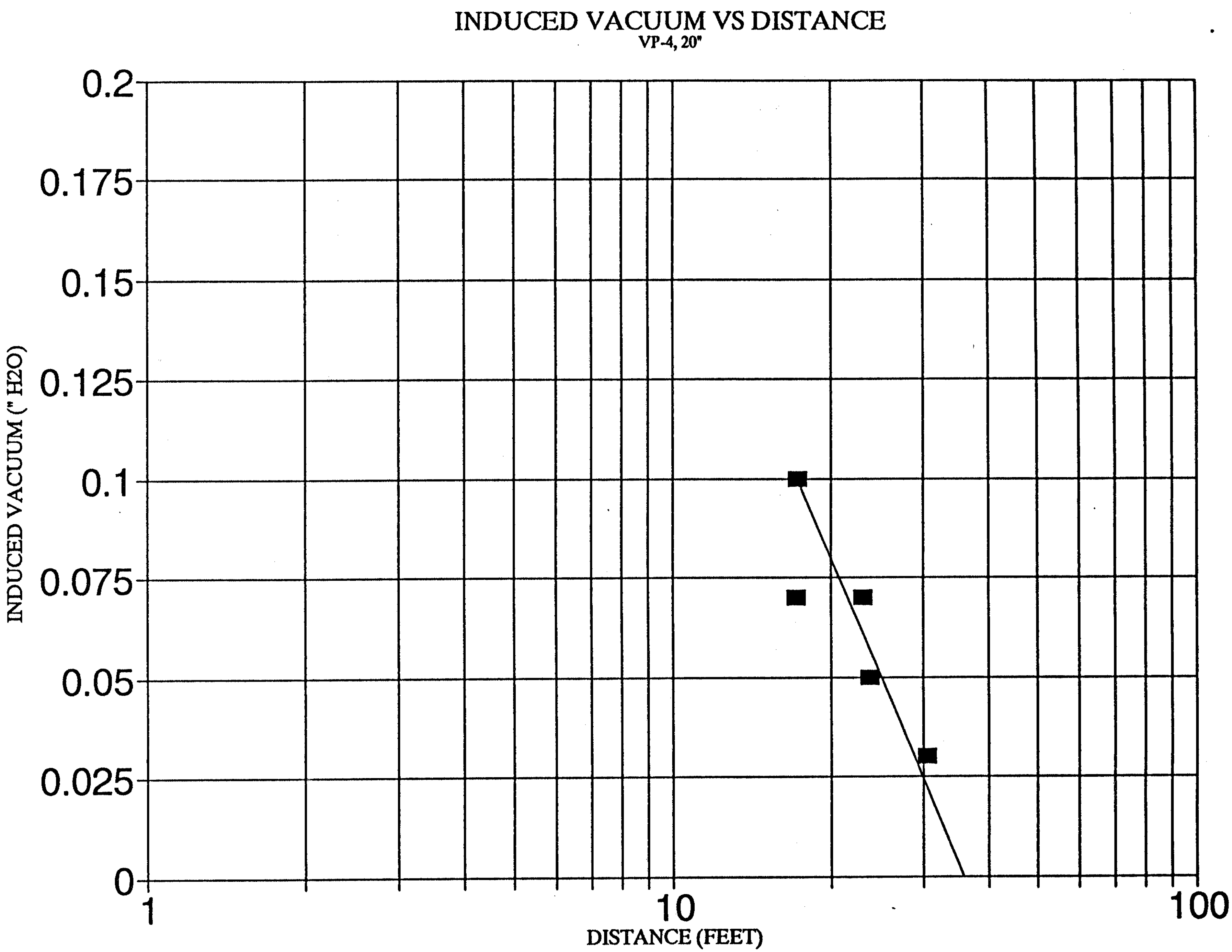

INDUCED VACUUM VS DISTANCE
VP-2, 20"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

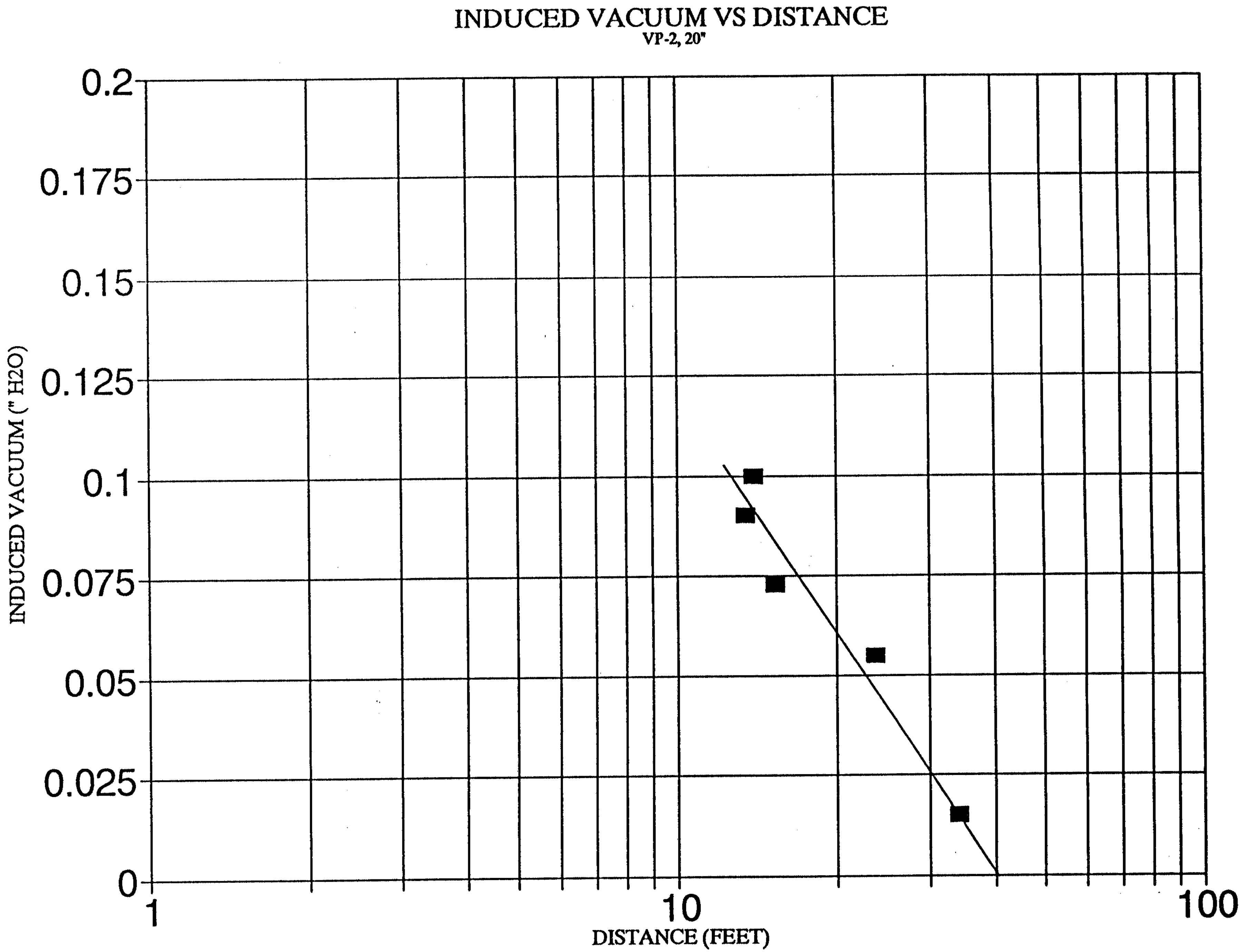

INDUCED VACUUM VS DISTANCE
VP-2, 30"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

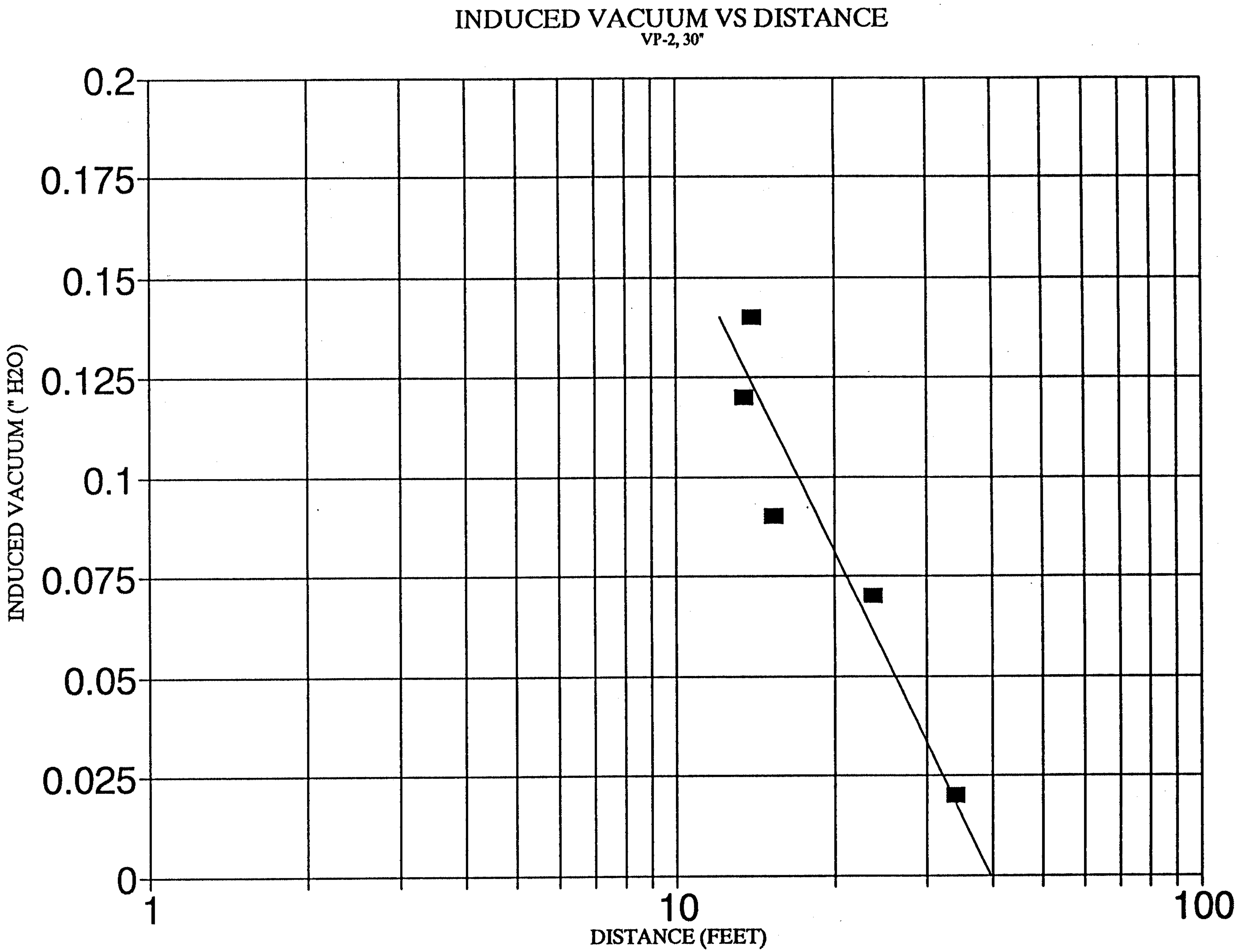
INDUCED VACUUM VS DISTANCE

VP-2, 38"



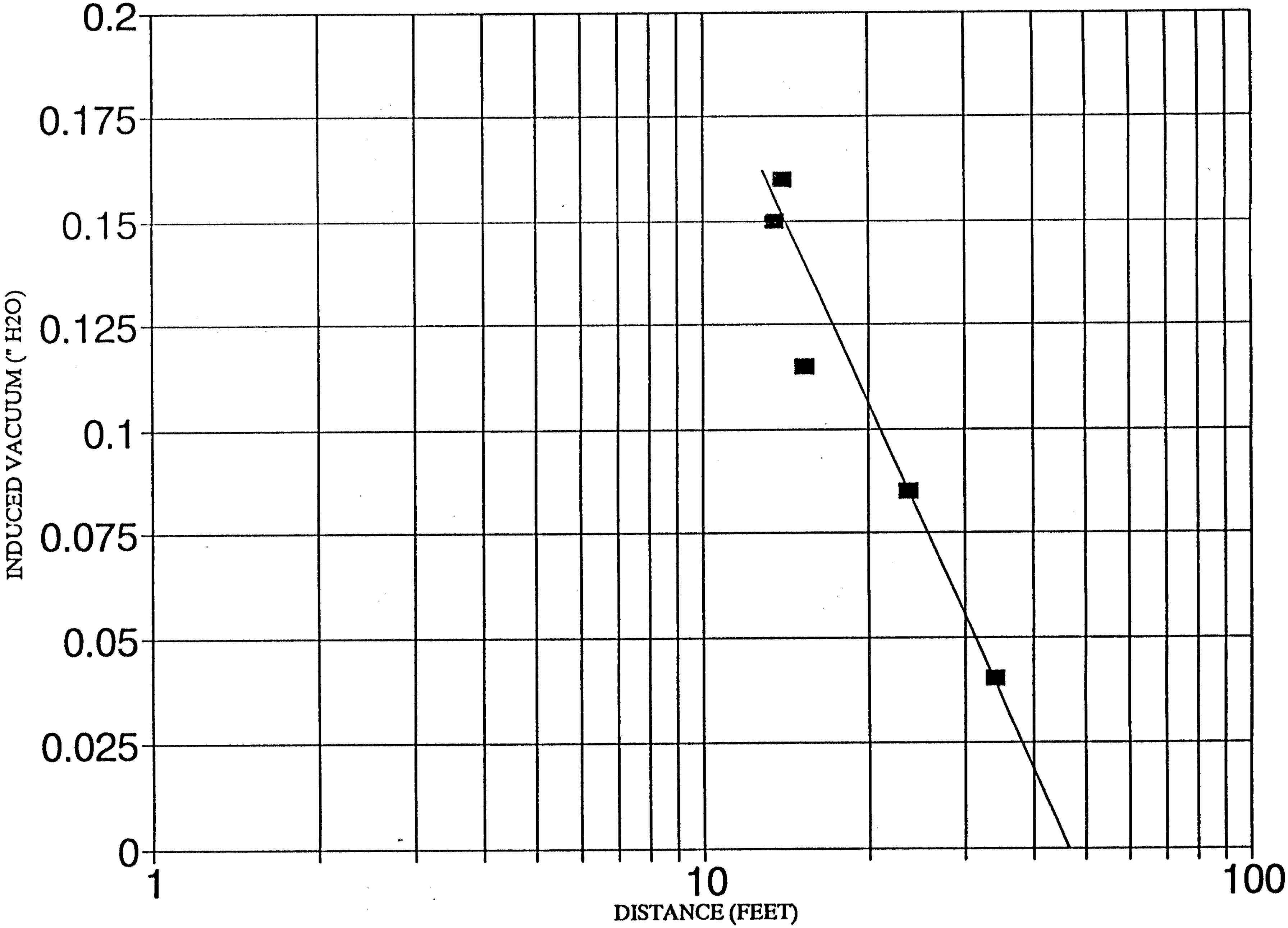

INDUCED VACUUM VS DISTANCE
VP-4, 20"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

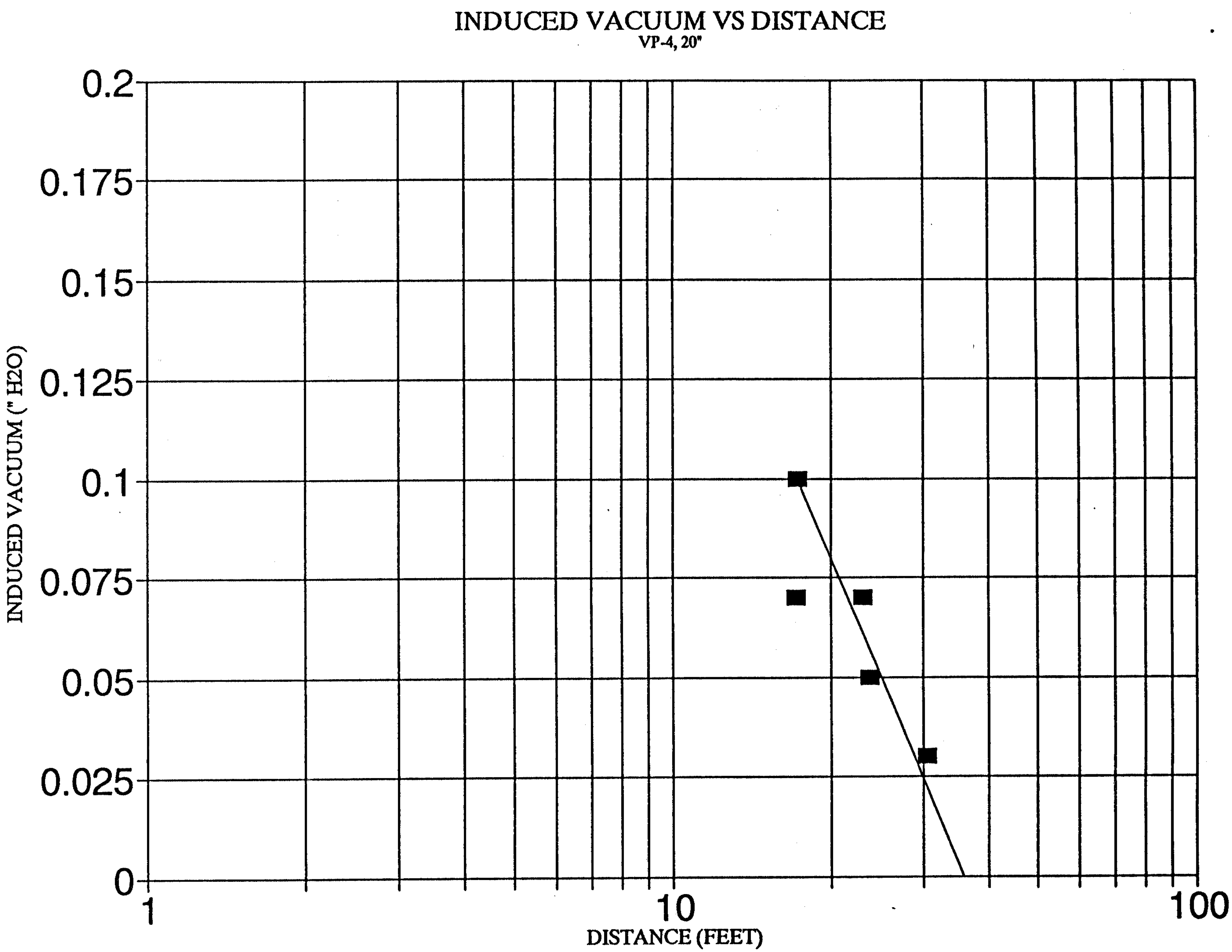

INDUCED VACUUM VS DISTANCE
VP-2, 20"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

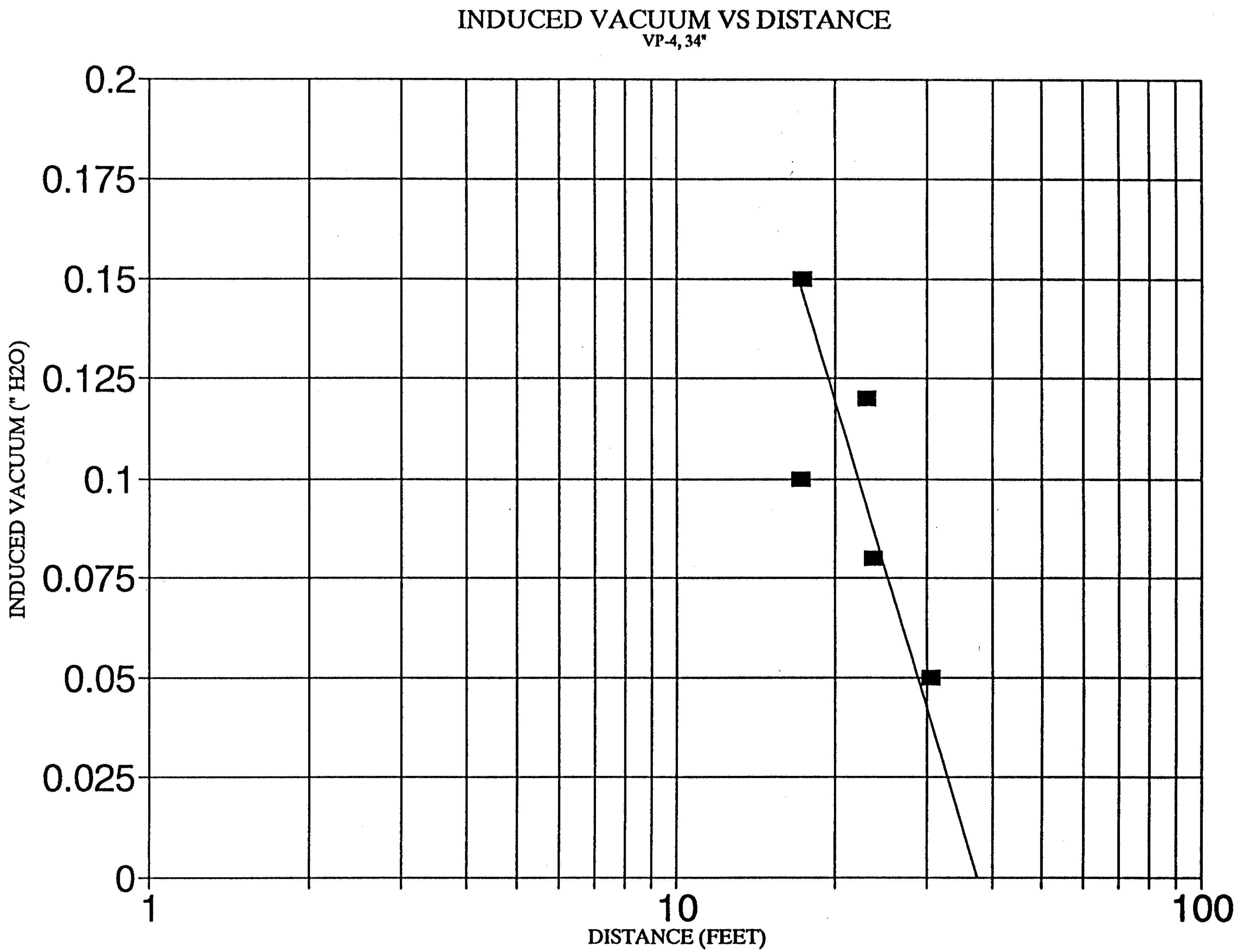

INDUCED VACUUM VS DISTANCE
VP-2, 30"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

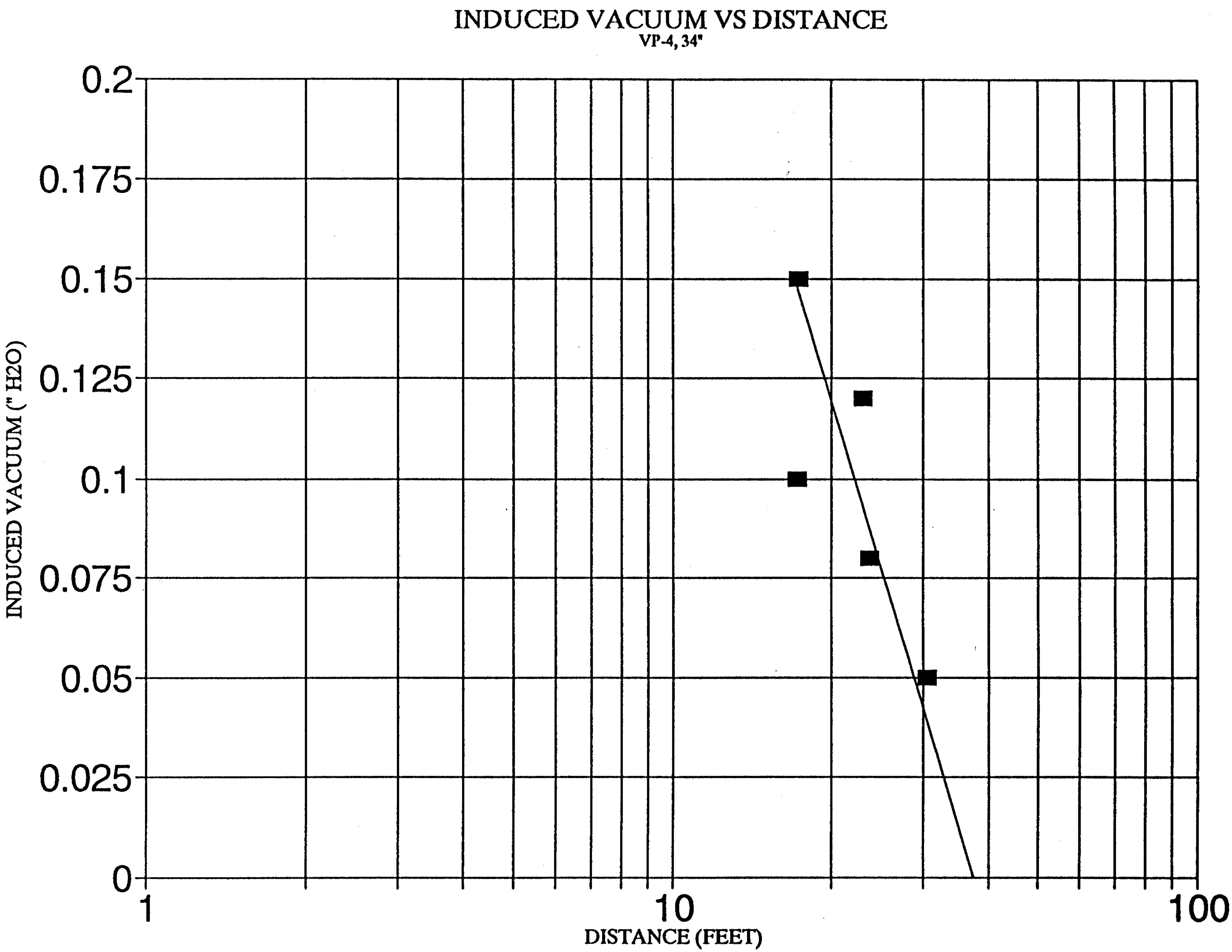
INDUCED VACUUM VS DISTANCE

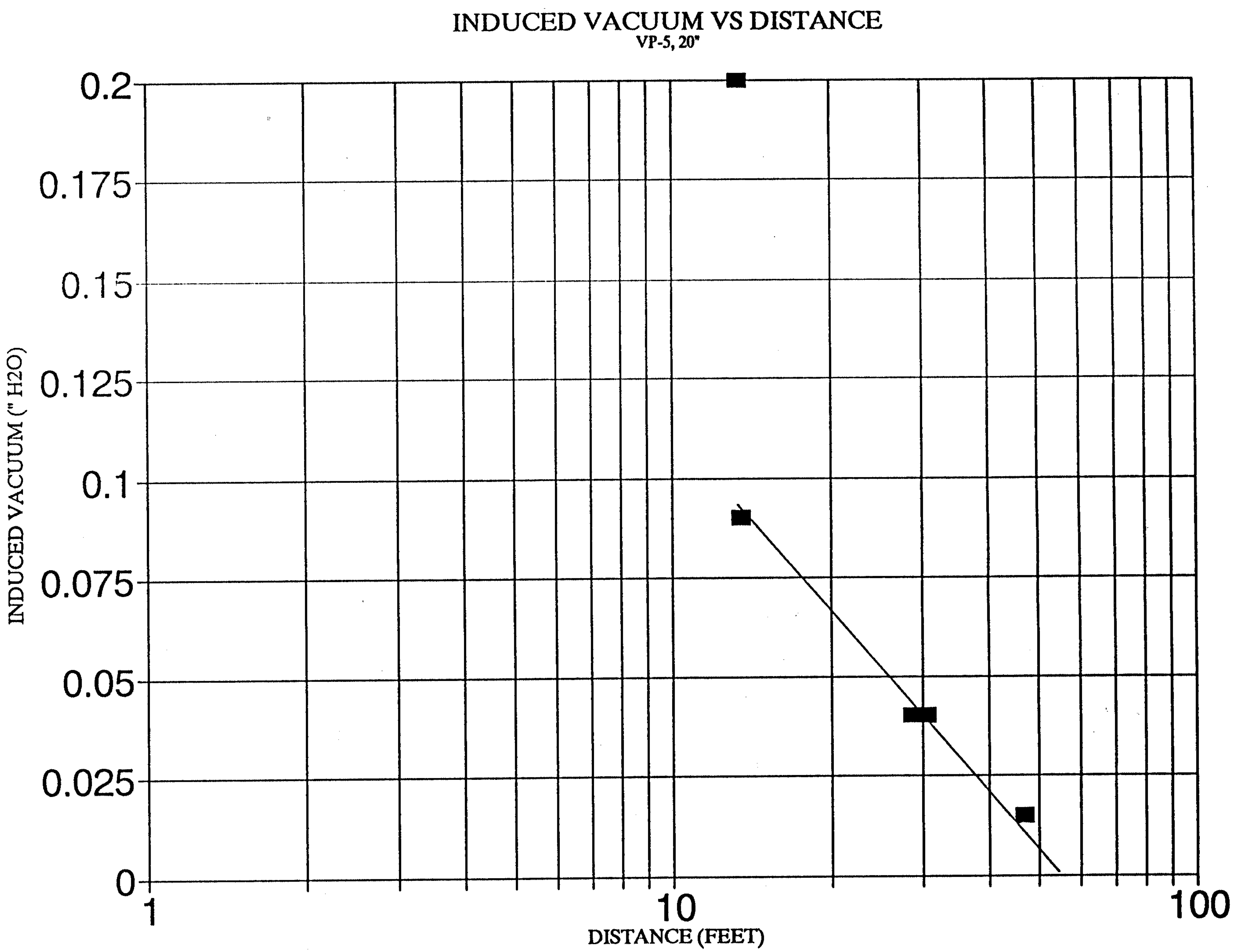
VP-2, 38"

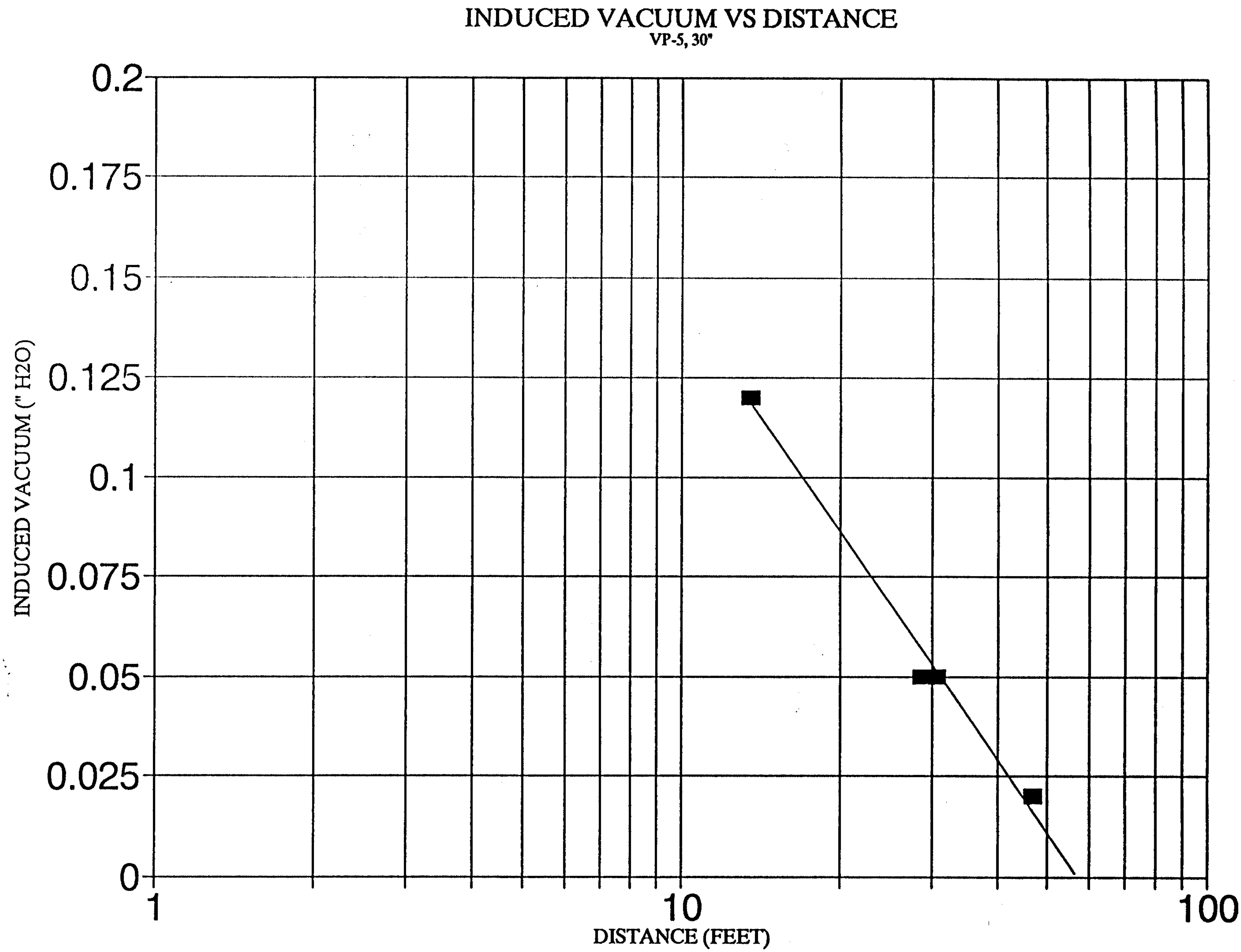



INDUCED VACUUM VS DISTANCE
VP-4, 20"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

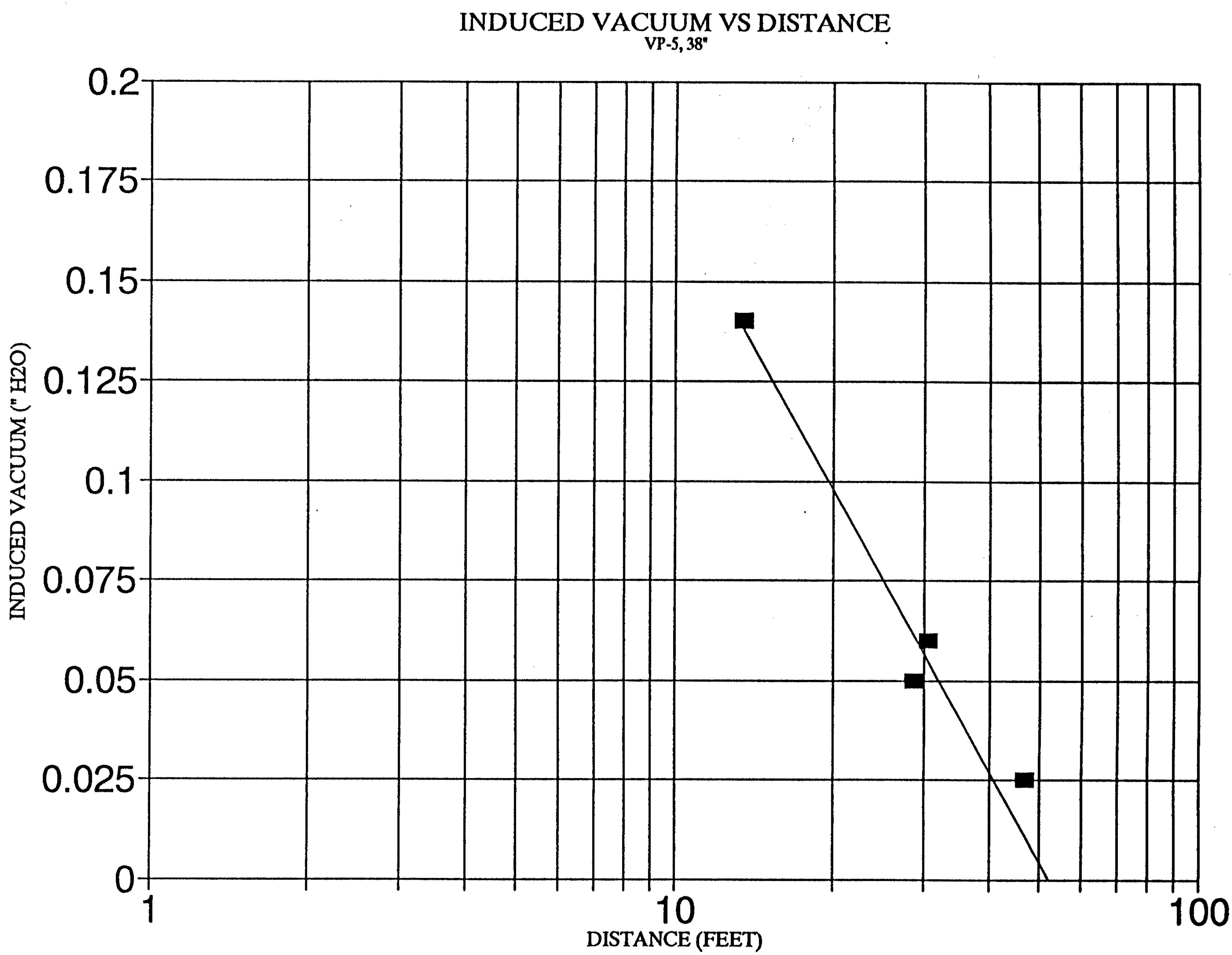

INDUCED VACUUM VS DISTANCE
VP-4, 34"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)


INDUCED VACUUM VS DISTANCE
VP-4, 34"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)


INDUCED VACUUM VS DISTANCE
VP-5, 20"
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
INDUCED VACUUM (" H2O)
1
10
100
DISTANCE (FEET)



INDUCED VACUUM VS DISTANCE
VP-5, 30"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)


INDUCED VACUUM VS DISTANCE
VP-5, 38"
INDUCED VACUUM (" H2O)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
1
10
100
DISTANCE (FEET)

Appendix G

APPENDIX G

WASHINGTON DEPARTMENT OF ECOLOGY

21 OCTOBER 1992 CORRESPONDENCE

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (206) 649-7000

October 21, 1992

Mr. Wayne Reisenauer
Northwest Building Corporation
1300 Norton Building
801 Second Avenue
Seattle, Washington 98104

Re: Washington State Department of Ecology Meeting
With RZA AGRA, Inc.
Former Y-PAY-MOR Dry Cleaners Remedial Investigation

Dear Mr. Reisenauer:

Pursuant to our meeting of 13 October, 1992, the Washington State Department of Ecology (Ecology) would like to document the pertinent issues discussed concerning trichloroethylene (TCE) and tetrachloroethylene (PCE) contaminated soils and the ongoing Remedial Investigation at the former Y-PAY-MOR dry cleaner in Federal Way, Washington.

Ecology understands that the site has operated as a dry cleaner for approximately four years. Ecology and Federal Way Fire Department responded to two PCE spills on 8 August and 4 October 1991. Volumes of the 8 August spill were estimated by Ecology to be six gallons of PCE dry cleaning solution. The 4 October spill encompassed an area of approximately 10 feet by 15 feet, involving a solution of approximately 99.9% PCE. TCE and PCE are solvent compounds that are typically used in dry cleaning operations.

CHARACTERIZATION/REMEDIAL INVESTIGATION

Characterization and Remedial Investigation conducted by RZA AGRA, Inc. (RZA AGRA) has identified PCE and TCE contaminated soils to a depth of at least 7.5 feet beneath the west central area of the former dry cleaners. RZA AGRA reports that PCE and TCE contamination exists mainly as vapors trapped within the soil air space (vadose zone) and to a minor extent, as liquid in the form of globules. The fill soils were analyzed for PCE and TCE and were found to exceed clean up standards set forth in the Model Toxic Control Act (MTCA) WAC 173-340. The occurrence of ground water and ground water contamination at the site has not been investigated to date.

Pursuant to our meeting, Ecology understands that a final exploration below the fill/native soil contact (approximately 7.5 feet) will be conducted by RZA AGRA to assess soils and ground water integrity to approximately 20 feet.

REMEDIAL ALTERNATIVE

Ecology understands that RZA AGRA has investigated the feasibility of extracting PCE and TCE vapors by applying a vacuum to the vadose zone using six stainless steel vapor extraction well points.

Vapor extraction (soil venting) is a remedial alternative by which a vacuum is applied to the contaminated soils using a high volume blower attached to perforated well points installed within the contaminated soils. PCE and TCE removal is amenable to vapor extraction due to the relative low boiling points which enable the contaminants to readily evaporate and become available for removal as a vapor. This method of remediation has been widely used for contaminants of this nature and has proven to be most successful. Ecology concurs with the recommendations offered by RZA AGRA that vapor extraction be utilized as a primary clean-up option.

The Department of Ecology appreciates your efforts and compliance with clean up regulations set forth in MTCA WAC 173-340. If you have any questions, please feel free to call.

Sincerely,

Brian S. Sato

Brian S. Sato, P.E.
Project Manager
Toxics Cleanup Program
(206) 649-7265

cc: Bill Toy, John Bickley - Northwest Building Corp.
Michael Moore, Dale Kramer - RZA AGRA
Ann Lawler, Steve Loltz, Esq. - Schwabe, Williamson, Ferguson & Burdell