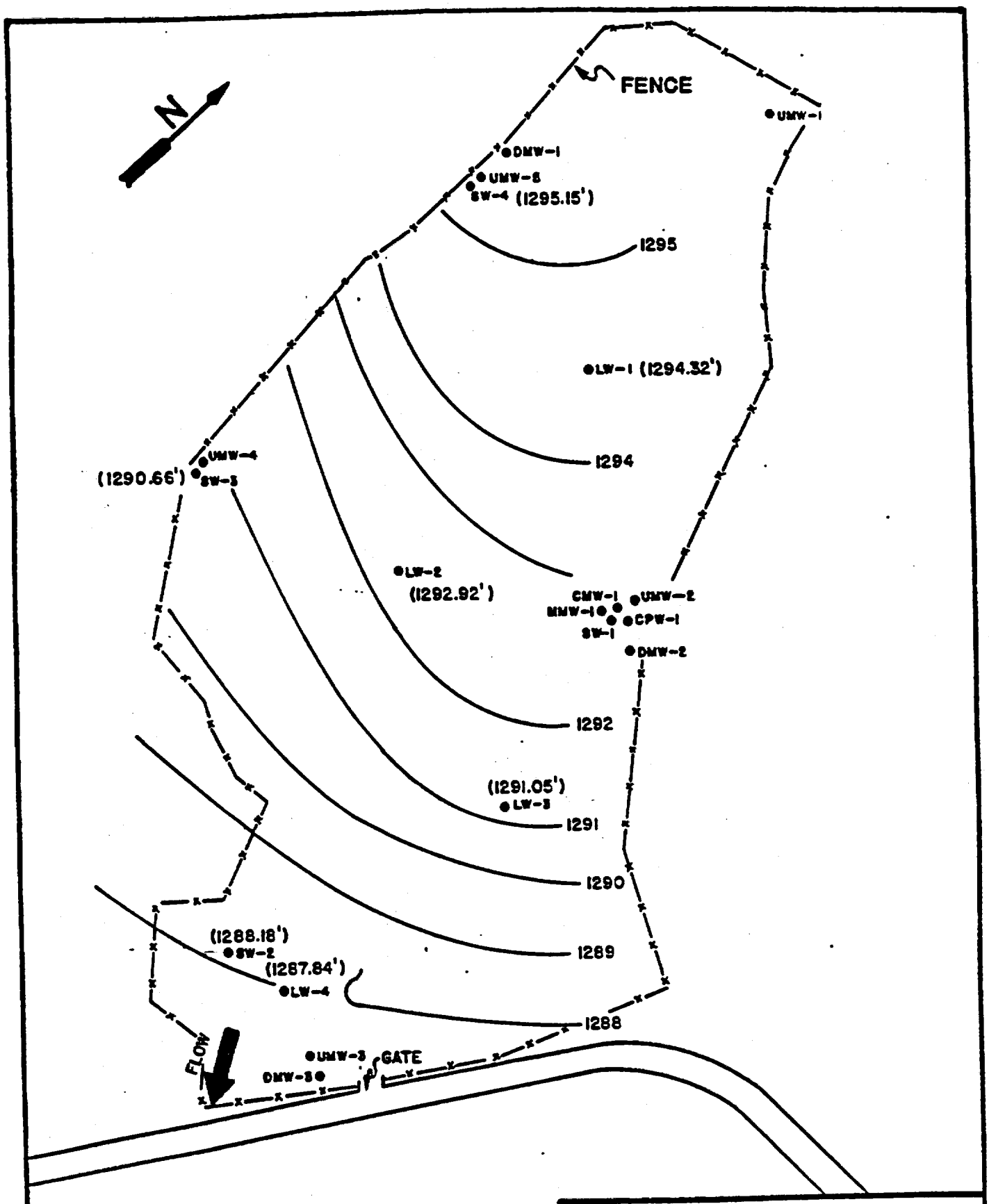
132162

the location of the present highwall--the strip mine operations ceased. Runoff accumulated in the mine pit and formed a pond. Sometime afterward, the pond was used as a disposal area. The filled material created an artificial land surface above the water table. Infilling was not completed, and several ponds still exist on-site.

As described in Chapter IV, the stream entering the site from the north presently drains into the large pond. Surface water runoff from the site also drains into the pond. There is no outlet from the pond. During periods of high rainfall, water levels in the pond are raised by surface water inflow. Since the natural water table is somewhat lower, the introduction of large amounts of surface water creates a mounding effect.

This mound of water will dissipate via the path of least resistance (i.e., along the route of greatest permeability). The investigation indicates that this path may lie to the south into the glacial materials or to the east into the void zones. Downward flow of groundwater is prevented by the firm, tight, underclay which lines the base of the disposal area. The till soils and mine spoils which surround the site contain large amounts of fine sand and silt which tend to retard but not prevent groundwater flow. Figure V-6 is a map of the water table surface at the Osborne site. This figure suggests that groundwater under water table conditions flows to the southeast through the disposal area. Groundwater in this zone, however, may not flow exclusively to the southeast. Based on information gathered and reviewed for the Osborne site void investigation report (Hart 1983), there is reason to believe that the site is in limited hydraulic connection with the groundwater in the void zone near well CMW-1. Water levels in the ponds and shallow wells (i.e., LW-2) are at least seven to eight feet higher in elevation than the water levels in wells open to the mine void zone (CMW 1), indicating limited hydraulic connection. An attempt to effect a water level drawdown in the ponds at the disposal site was unsuccessful, indicating that this connection may not allow unrestricted groundwater flow. In addition, the absence of a change in water level in the underlying Homewood formation during the same test is an indication of the impermeability of the underclay layer.



200 100 0 100 200

(SCALE IN FT.)

MEASUREMENTS TAKEN DECEMBER 6 THROUGH 9, 1983

300506

FIGURE V-6

WATER TABLE AT OSBORNE SITE

FRED C. HART ASSOCIATES, INC.

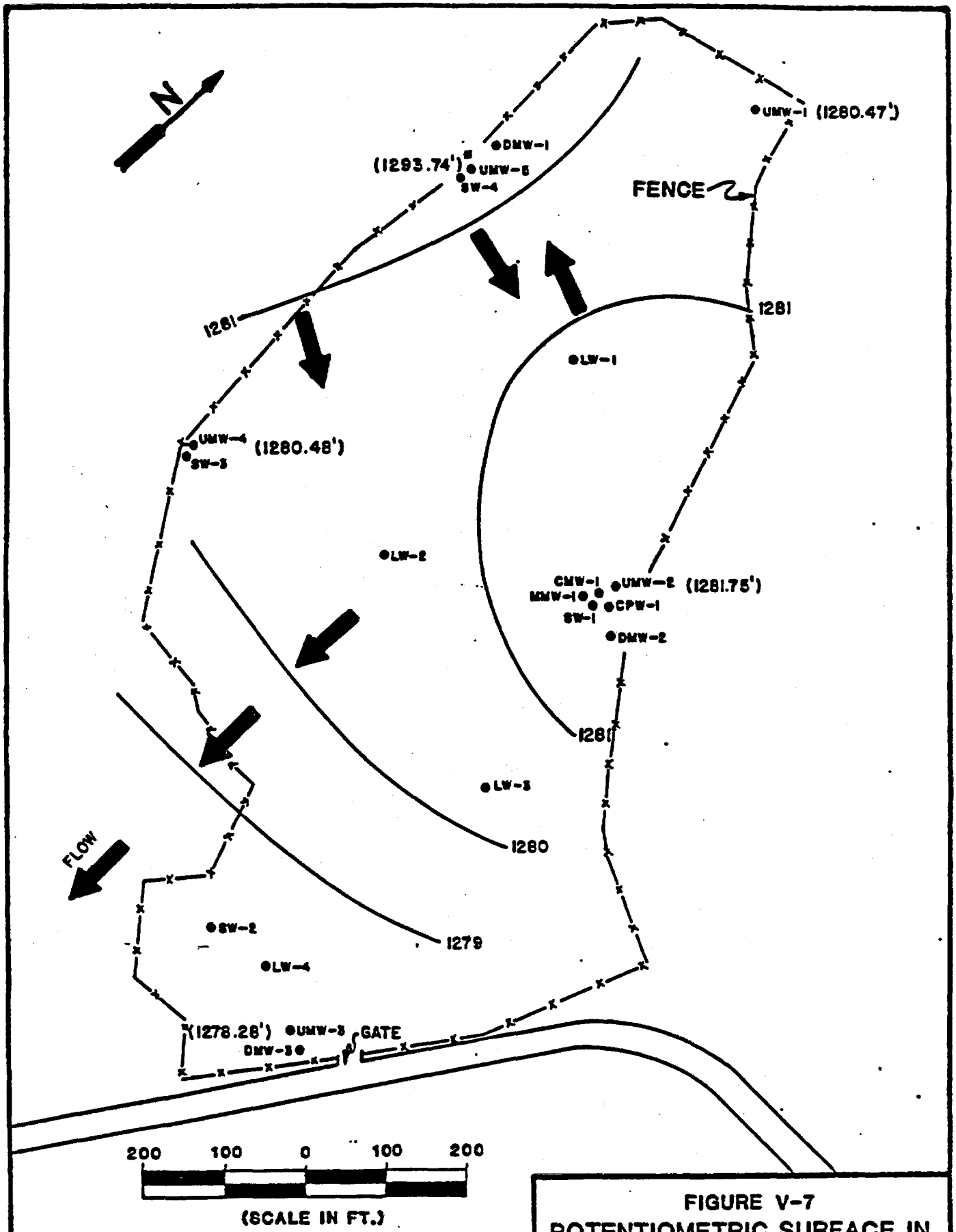
Figure V-7 shows the potentiometric surface in the Homewood formation. This information suggests that groundwater is flowing to the south. The location of the disposal site and strip mine is at the margin of the "hydrologic island". Therefore the coal seam and underclay have been eroded away to the southest beyond the site. Under some conditions, in these margin areas, surface water recharging the glacial deposits in the valley may raise the water levels in underlying bedrock formations. This condition is found in the Homewood formation in the area of well UMW-5, which is demonstrated by the unusually high water level in that location.

Based on the pressure testing, the upper and lower Connoquennessing sandstones were found to be relatively permeable. As no wells were installed or open to these formations, the flow directions and gradients were not determined. The upper and lower Connoquennessing sandstones are capped by the Mercer shale formation and middle shale member of the Connoquennessing formation, both of which were measured to be impermeable.

Underlying the Connoquennessing formation is the Burgoon formation. The Burgoon formation is composed of two units, a sandstone unit and a shale unit. The shale unit is approximately 10 feet thick and caps the sandstone unit. The shale unit, similar to the other overlying shale units, was tested and determined to be essentially impermeable. The lower sand unit is relatively permeable.

Figure V-8 shows the potentiometric surface map of the Burgoon aquifer. Groundwater in this aquifer is flowing to the northeast. Under the "hydrologic island" concept, the discharge area for the Burgoon aquifer is located well beyond the area of the site, several miles up Wolf Creek to the north.

Groundwater level measurements from well nests support the regional hydrogeologic picture. Most of the site appears to be in a groundwater recharge area, receiving infiltration from rainfall and surface water inflow. Under normal conditions, the groundwater would generally continue to move downward if it were not for the confining effects of the underclay and shale zones. As noted, the aquifer permeability tests performed on these shale zones indicated that these shale zones are essentially impermeable.



*CONTOUR LINES ABOVE 1281' ARE NOT SHOWN DUE TO 12' DIFFERENCE IN HEAD

MEASUREMENTS TAKEN DECEMBER 6 THROUGH 9, 1983

300508

FIGURE V-7

POTENTIOMETRIC SURFACE IN THE HOMEWOOD FORMATION OSBORNE SITE

FRED C. HART ASSOCIATES, INC.

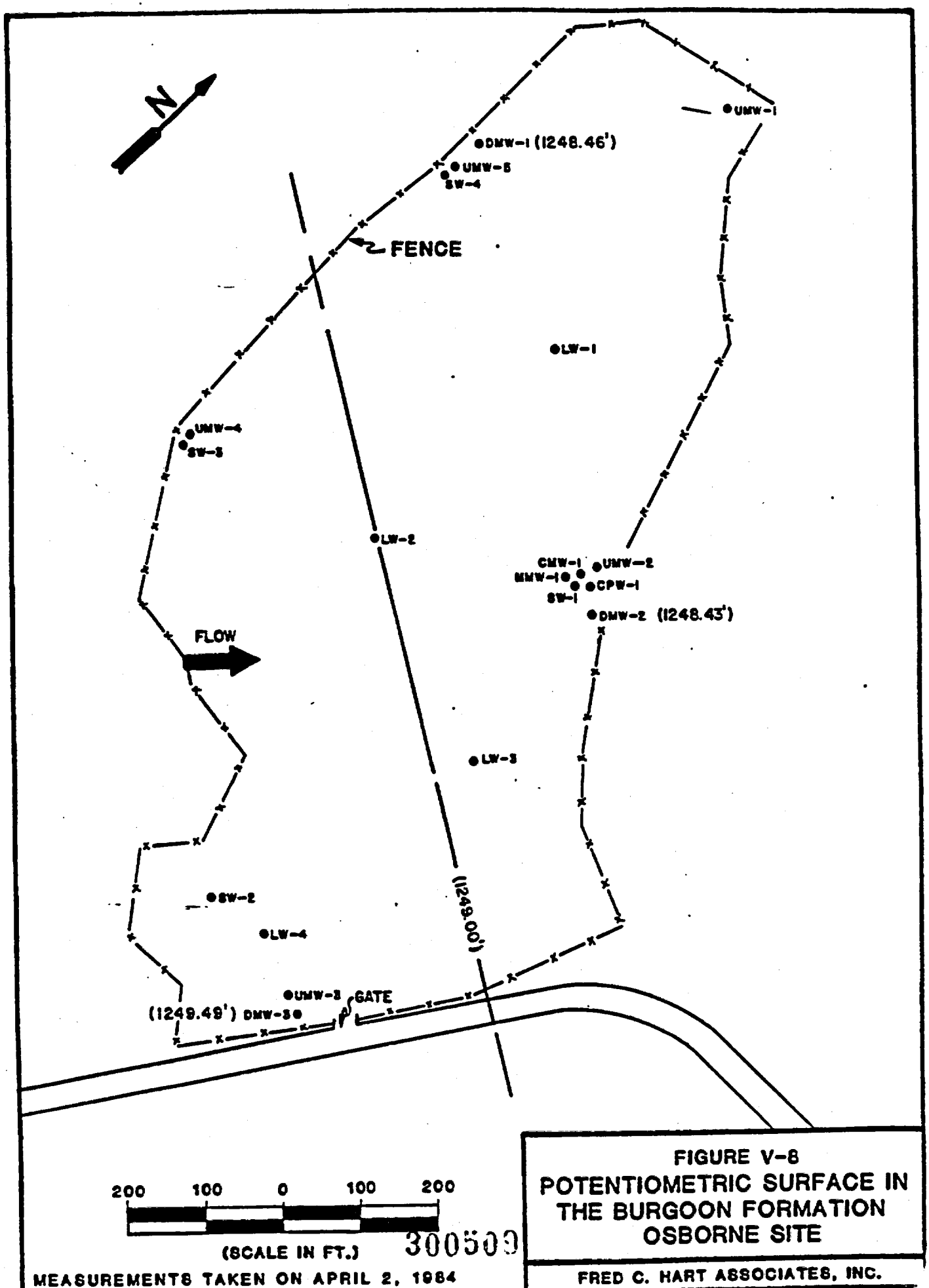


FIGURE V-8
POTENTIOMETRIC SURFACE IN THE BURGOON FORMATION OSBORNE SITE

FRED C. HART ASSOCIATES, INC.

The shale zones prevent groundwater from moving downward and divert the groundwater to flow more horizontally to the sides of the "hydrologic island" as shown on Figures V-2 and V-5.

Figure V-9 is a hydrograph showing water levels measured in each monitoring well during the course of this investigation. The difference in water levels in different aquifers suggests that there may be some potential for downward vertical migration of groundwater. Appendix H presents a series of hypothetical groundwater models developed to indicate the potential migration of contaminants from the site through the groundwater system. The models, assumptions, calculations and results are found in Appendix H. Utilizing a leakage model from Bear (1979), an estimation of the groundwater leakage through the clay layer underlying the site into the Homewood formation was made. The model accounts for the water leaking through the clay layer, and the flow through volume of the Homewood System under the site. The model shows a 77 percent reduction in contaminant levels in the Homewood due to simple mixing and flow through dilution.

C. Potential Groundwater Pathways and Users

Four potential pathways for contaminant migration off-site through groundwater have been identified based on the regional and site hydrogeology. These potential pathways include the water table groundwater pathway and the Clarion, Homewood and Burgoon aquifer pathways. This section describes the potential for contaminant transport through each pathway in terms of groundwater flow, aquifer and confining layer permeabilities, and proximity of users downgradient of the site.

Water Table Groundwater. Figure V-10 is a schematic diagram showing the water table groundwater pathway. The pathway includes the groundwater in the foundry sand, mine spoils and glacial desposits. Water level measurements show that water table groundwater flows to the southeast of the site. Water from the site may remain as groundwater or may emrege and discharge to surface water, as far away as Swamp Run.

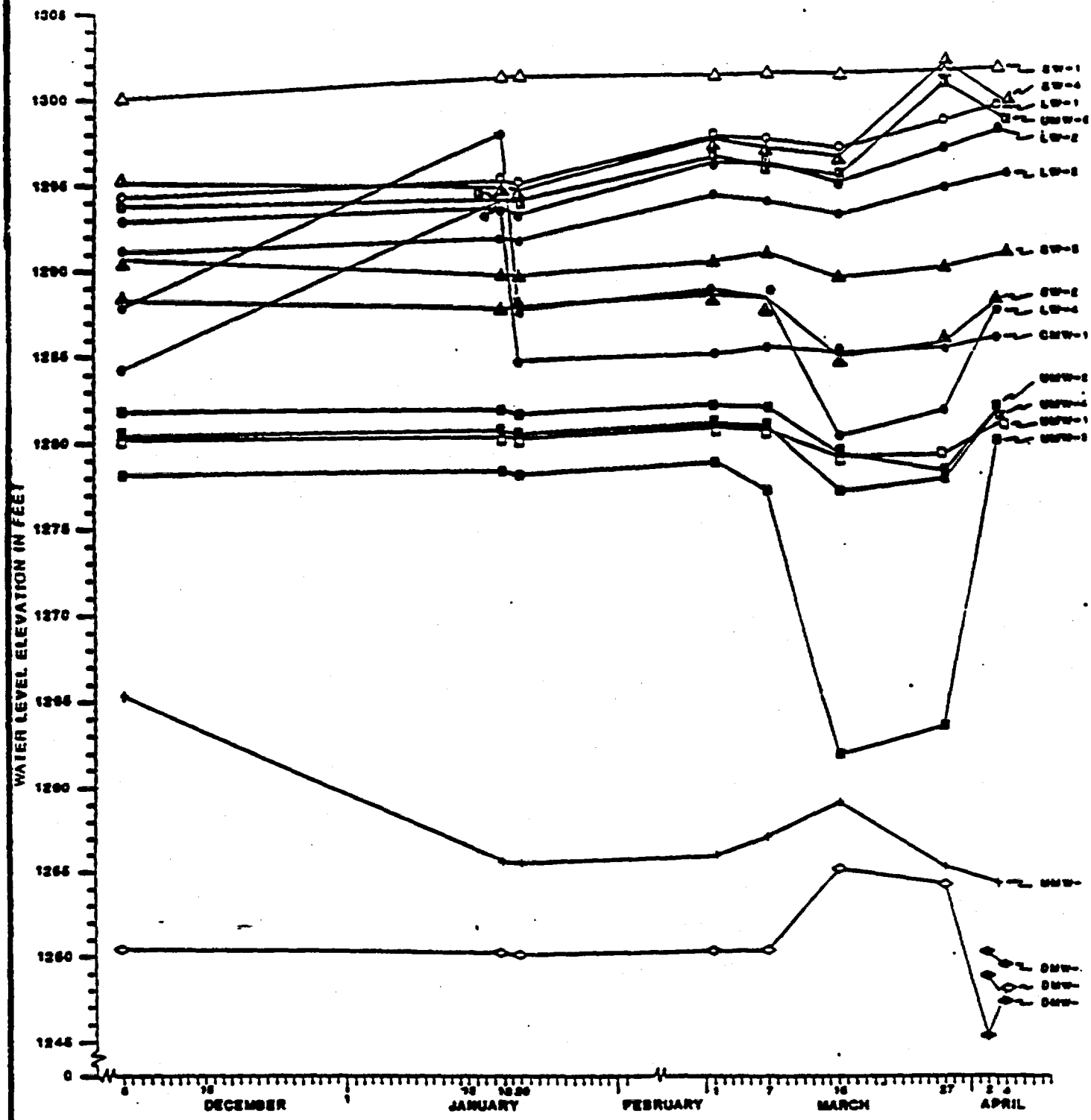
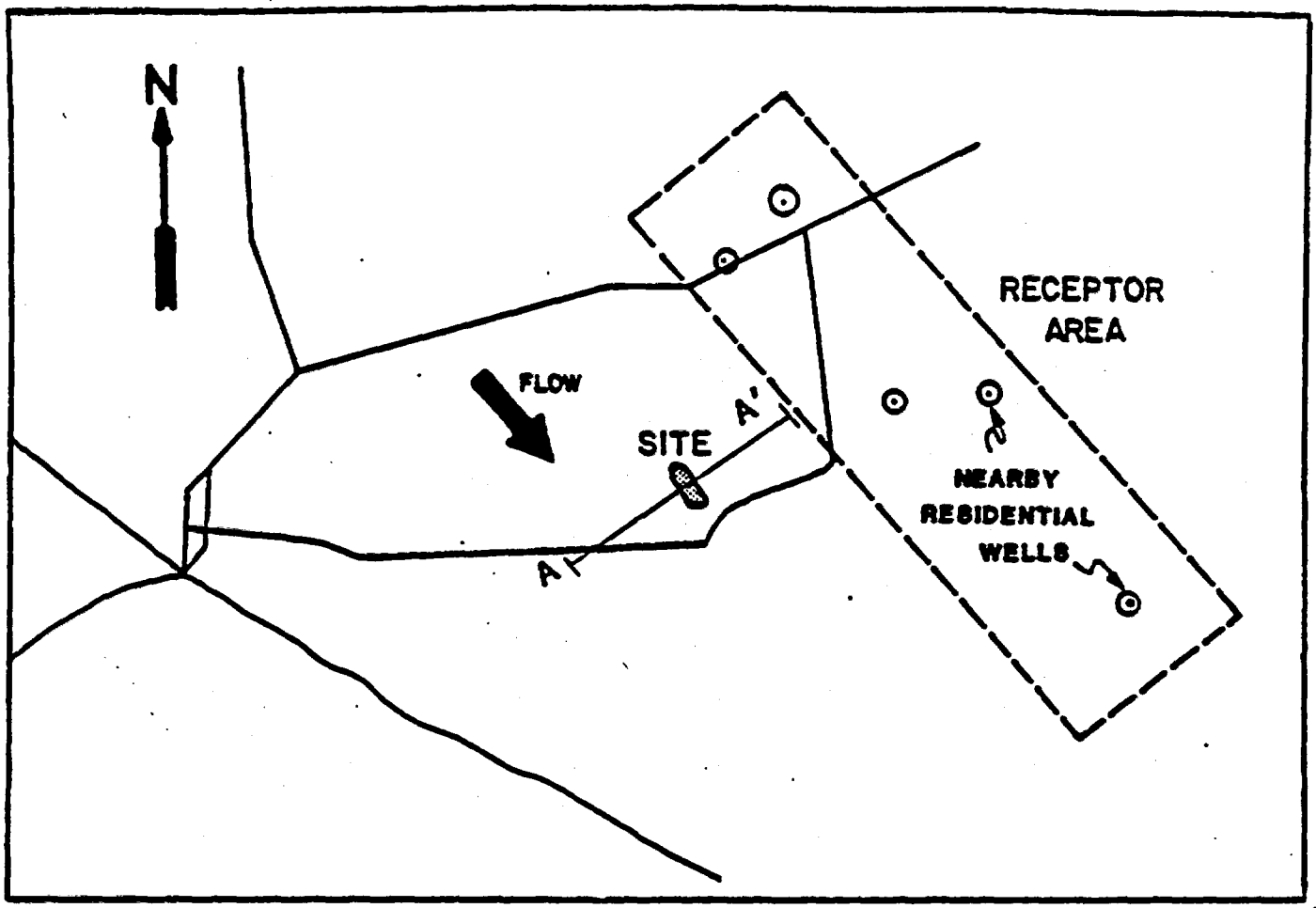


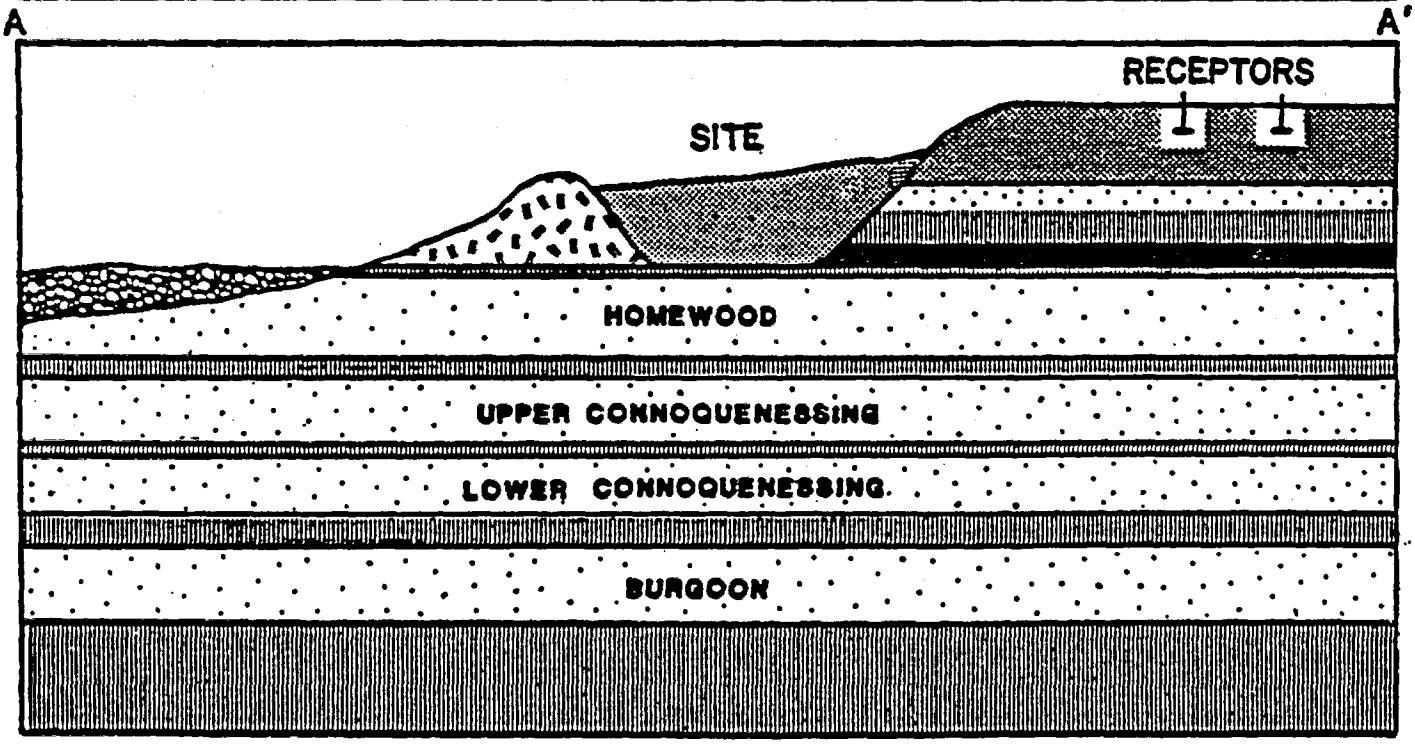
FIGURE V-9

HYDROGRAPH OF WELLS AT THE OSBORNE SITE

300511

FRED C. HART ASSOCIATES, INC.





KEY:

- TILL
- MINE SPOILS
- FILL MATERIAL
- COAL OR VOID SPACE
- SANDSTONE
- SHALE OR CLAY
- PATHWAY

APPROX. 1"=2,000FT.

FIGURE V-10
WATER TABLE PATHWAY
OSBORNE SITE

300512

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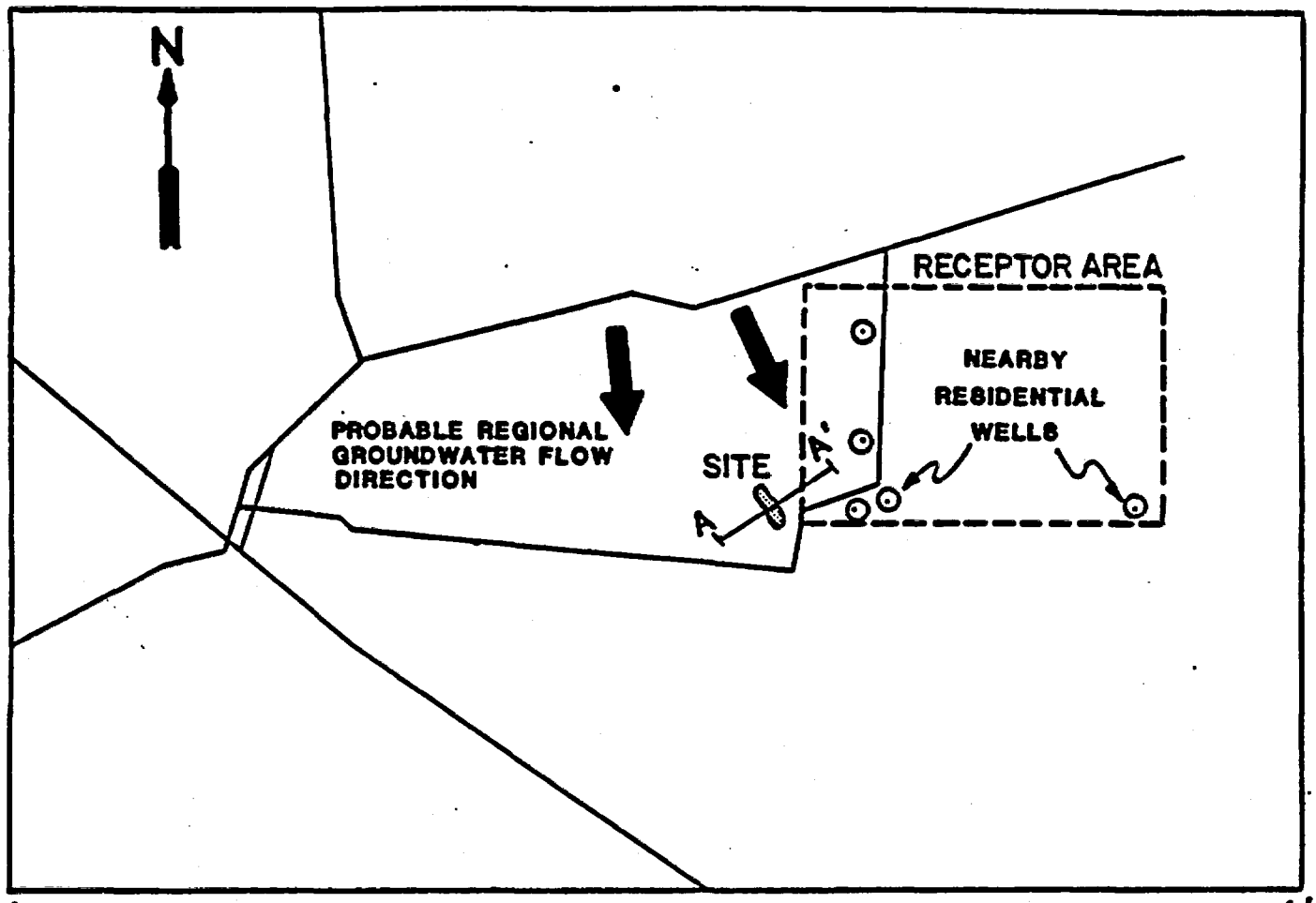
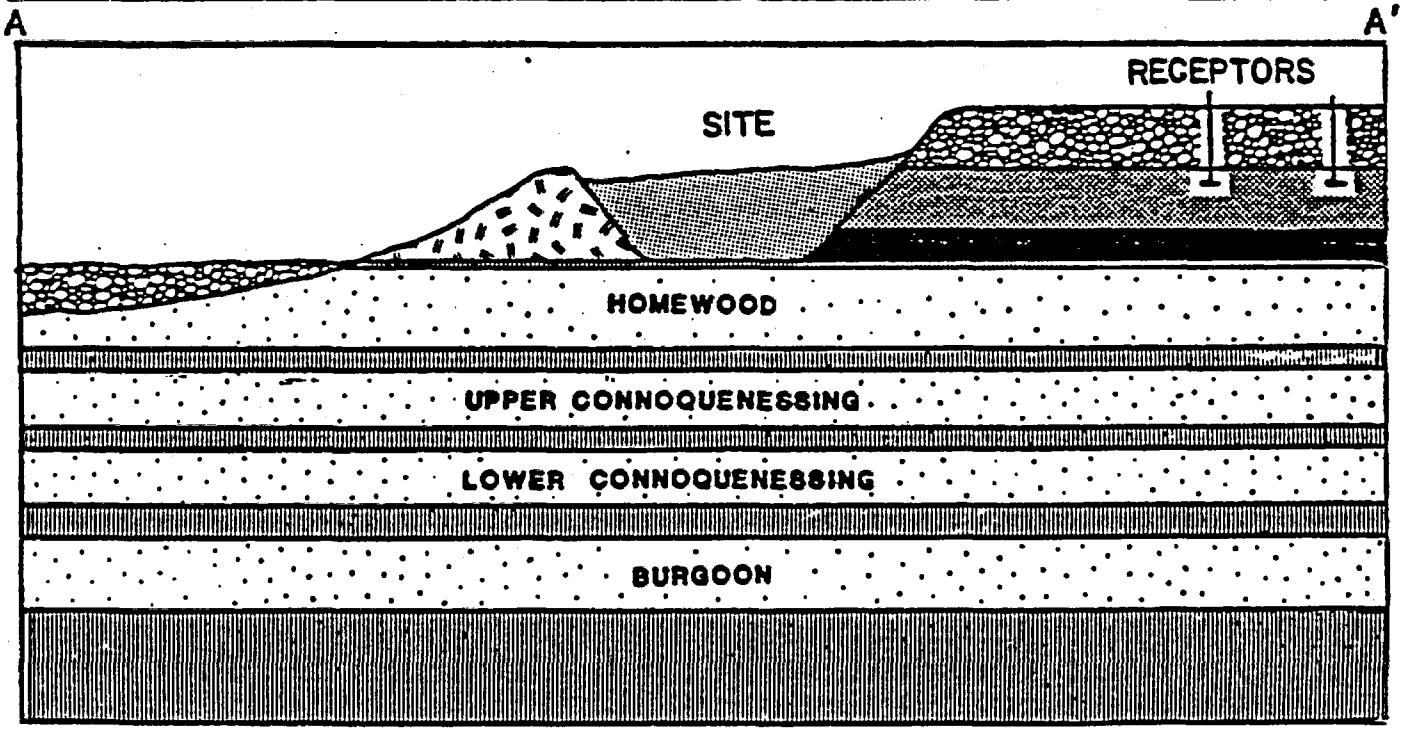




KEY:

- TILL
- MINE SPOILS
- FILL MATERIAL
- SANDSTONE
- SHALE OR CLAY
- PATHWAY

300513

FIGURE V-11
CLARION GROUNDWATER PATHWAY
OSBORNE SITE

Available information indicates that there are five domestic wells which draw water from the water table groundwater pathways. These wells are located to the north and east of the site. Figure V-10 indicates that these wells draw water from zones located at higher topographic levels than the site and located upgradient from the site. Accordingly, the flow from the site cannot intercept these wells.

Clarion Groundwater Pathway. Figure V-11 is a schematic diagram showing the Clarion Pathway. The Clarion bedrock formation extends to the northeast of the dispoal area. It consists of sandstone, shale, coal and/or void space and the underlying clay layer which acts as an impermeable lining at the base of the formation and the disposal site.

It is likely that there is a limited connection between the groundwater in the disposal site and the Clarion formation. The water level in Well CMW-1 is lower than the water level within the disposal area. This indicates potential for some fraction of groundwater to flow from the disposal site northeast into the Clarion formation. The direction of the flow in the Clarion has not been established. Based on the regional hydrogeology, it is expected that groundwater flows away from the site to the south.

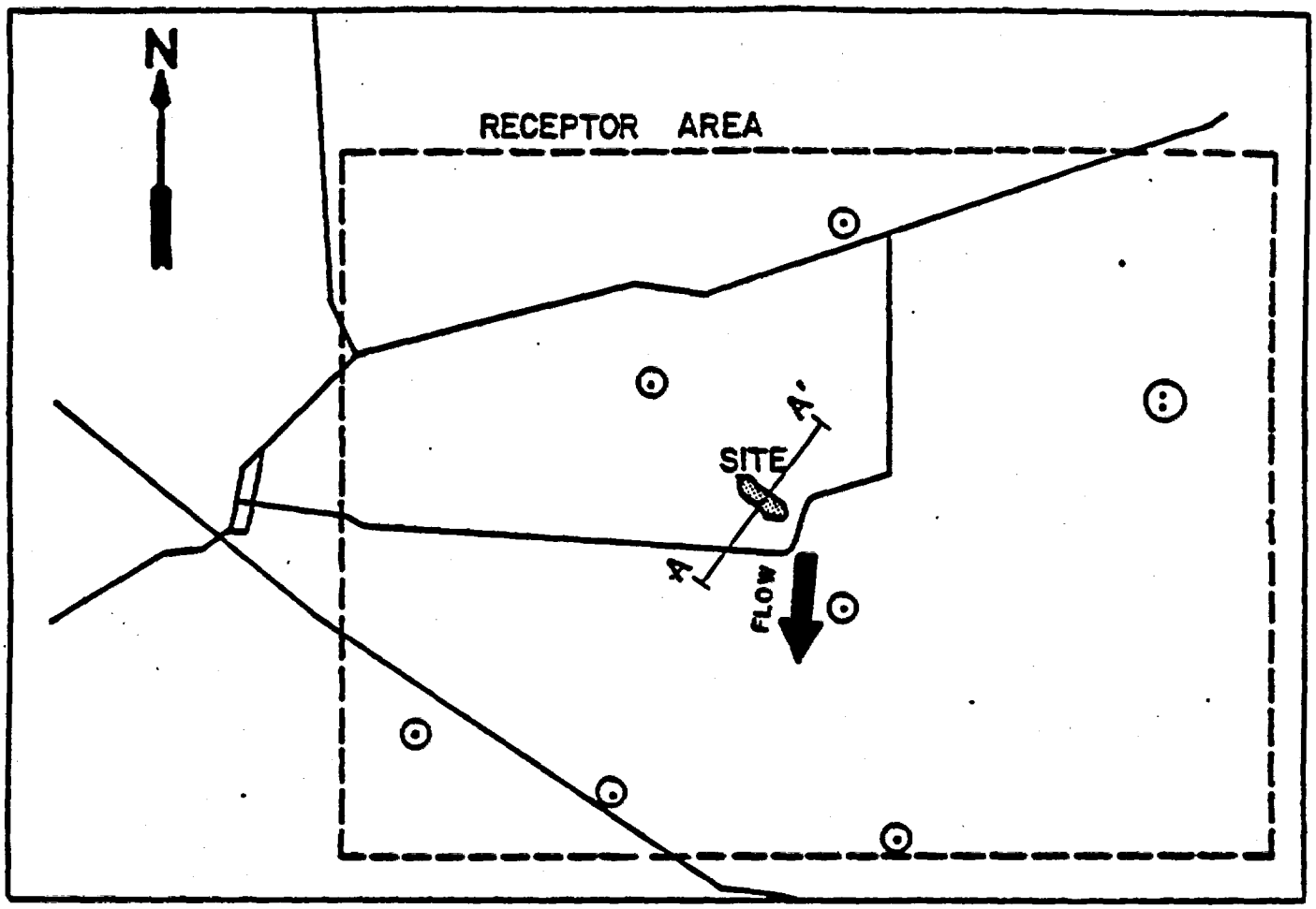
Use of groundwater from wells open to the Clarion formation is restricted to the sandstone units which lie above the Brookville Coal. Below this level, groundwater is of poor quality due to the existence of coal seams. Based upon regional geology, the Clarion sandstone outcrops are restricted to higher elevations upgradient of the site. Contaminants which could leave the site via the coal mine shaft system would not affect Clarion well users because usable Clarion groundwater zones are located above the mine shaft systems.

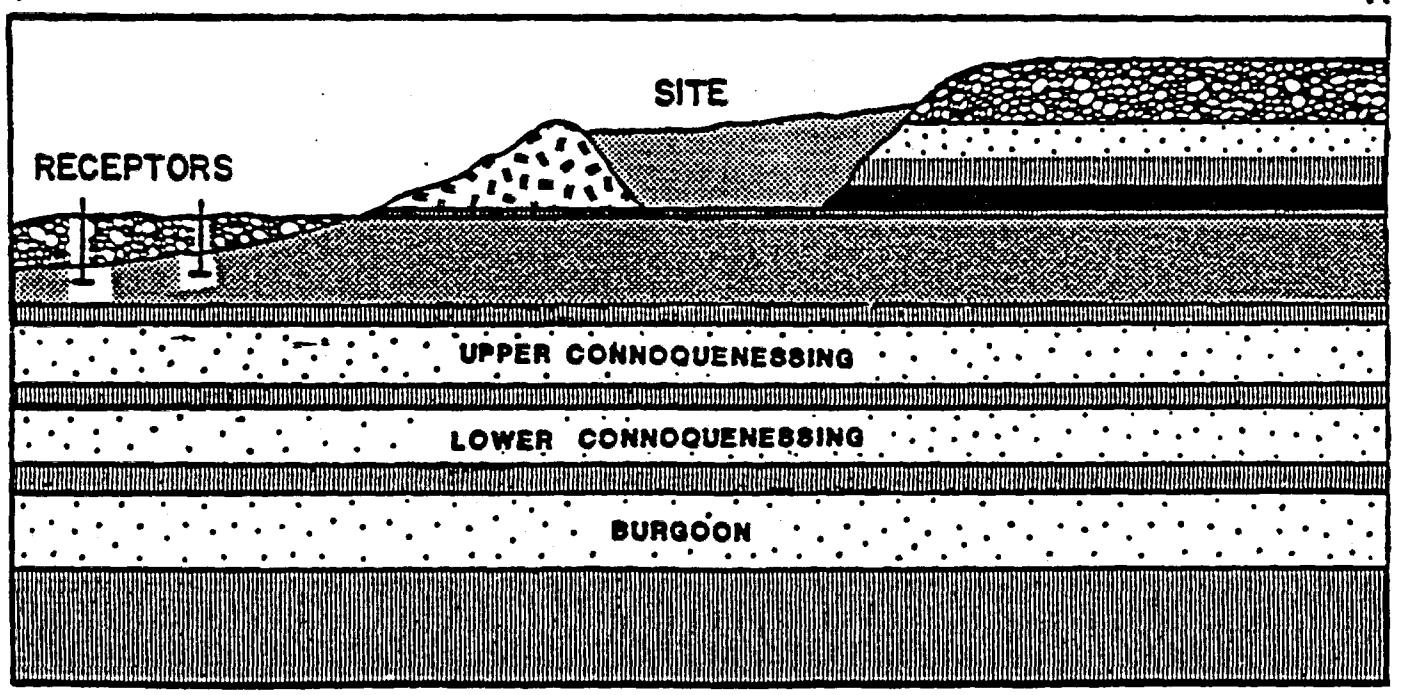
A model was developed to analyze the disperions of any contamination that might migrate from the site. The model, presented in Appendix H, is a transport model for radial geometric spreading. The model assumes a continuous source of contamination. The model indicates that at a distance of 400 feet from the waste boundary, contaminant concentrations would drop about 50 percent due to mixing and dilution. At a distance of one-quarter mile, contaminant concentrations would drop over 80 percent.

Homewood Groundwater Pathway. Figure V-12 is a schematic diagram showing the Homewood Groundwater Pathway. The Homewood formation is the uppermost aquifer underlying the site. This aquifer is separated from the disposal materials by the underclay, a layer of low permeability clay. Based on its inherent density and tightness, this clay layer is expected to be an effective natural barrier, thus isolating the Homewood aquifer from possible contaminants in the overlying disposal materials. At locations as close as the Enterprise Mine, the clay reportedly had been excavated for commercial uses. Data gathered during the mine void investigation (Hart, 1983) indicated the clay was never removed here and is continuous beneath the site.

Groundwater flow in the Homewood is to the south, towards the Swamp Run valley area. The Homewood is uppermost bedrock aquifer in that valley. Data available at this time indicates that there are two wells downgradient of the site in the Homewood aquifer at distances of 1/4 and one mile. However, it is likely that any contamination entering the Homewood would discharge into near surface groundwater flow systems shortly after leaving the site. Calculations of groundwater velocity in the Homewood Formations are found in Appendix H. If any contamination does not discharge in this fashion, it could move downgradient at an extended maximum rate of up to 90 ft/yr.

In the event that contaminants could enter the Homewood and migrate off-site, a contaminant dispersion model was utilized to determine the dilution of contaminants for a steady-state contaminant input from the source. The model chosen was a transport model for vertical and horizontal spreading for Domenicas and Palciauskas (1982). The model indicates that contaminants potentially migrating out of the disposal area could undergo up to a 50 percent reduction in concentration before reaching the downgradient boundary of the site, Well UMW-3. At a receptor well located approximately one-quarter mile downgradient of the site, the contaminant concentration would reach about 0 to 50 percent of any potential initial concentration found in the Homewood directly under the site.





KEY:

APPROX. 1"=2,000FT.

- TILL
- MINE SPOILS
- FILL MATERIAL
- SANDSTONE
- SHALE OR CLAY
- PATHWAY

300516

FIGURE V-12

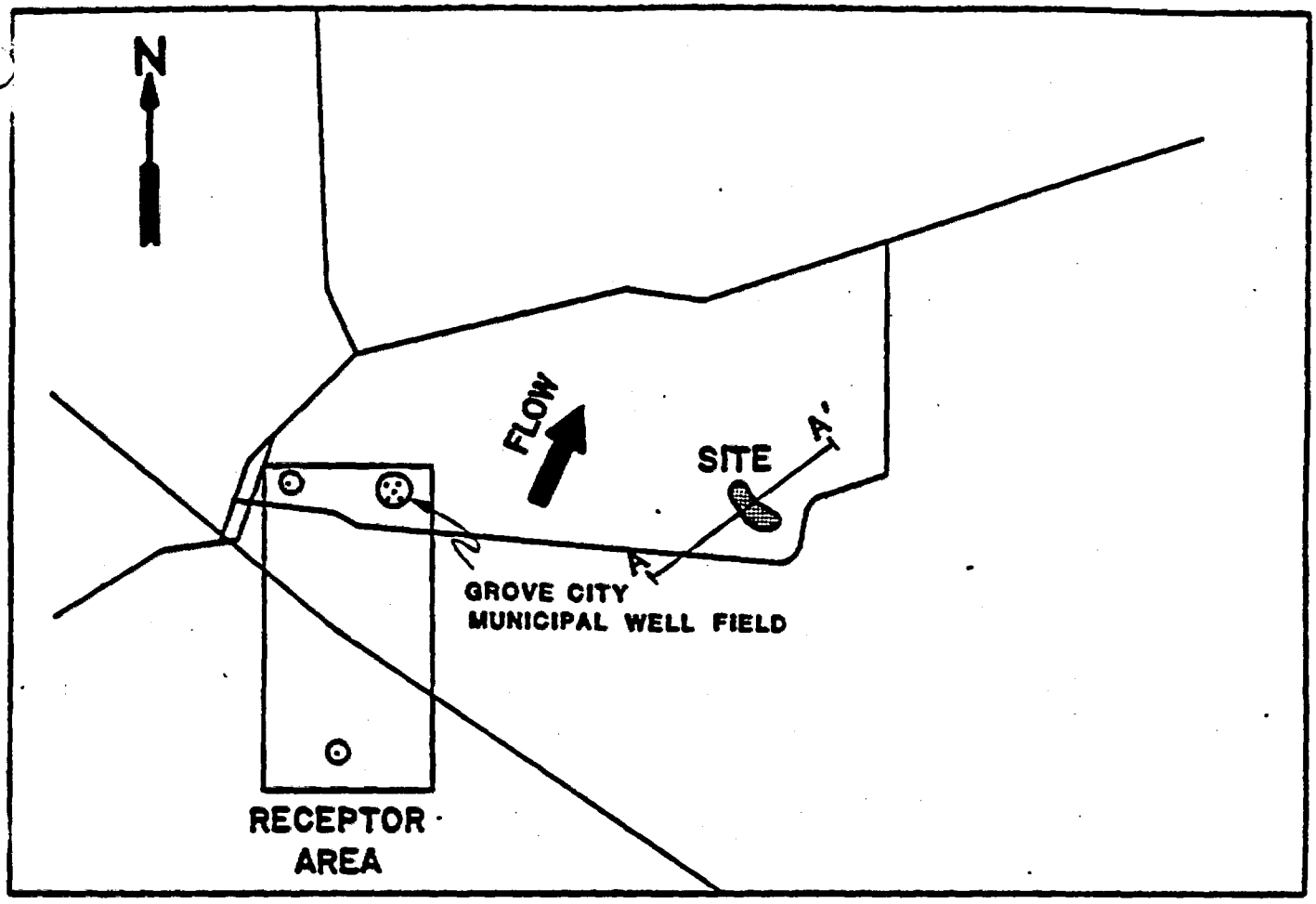
HOMEWOOD GROUNDWATER PATHWAY
OSBORNE SITE

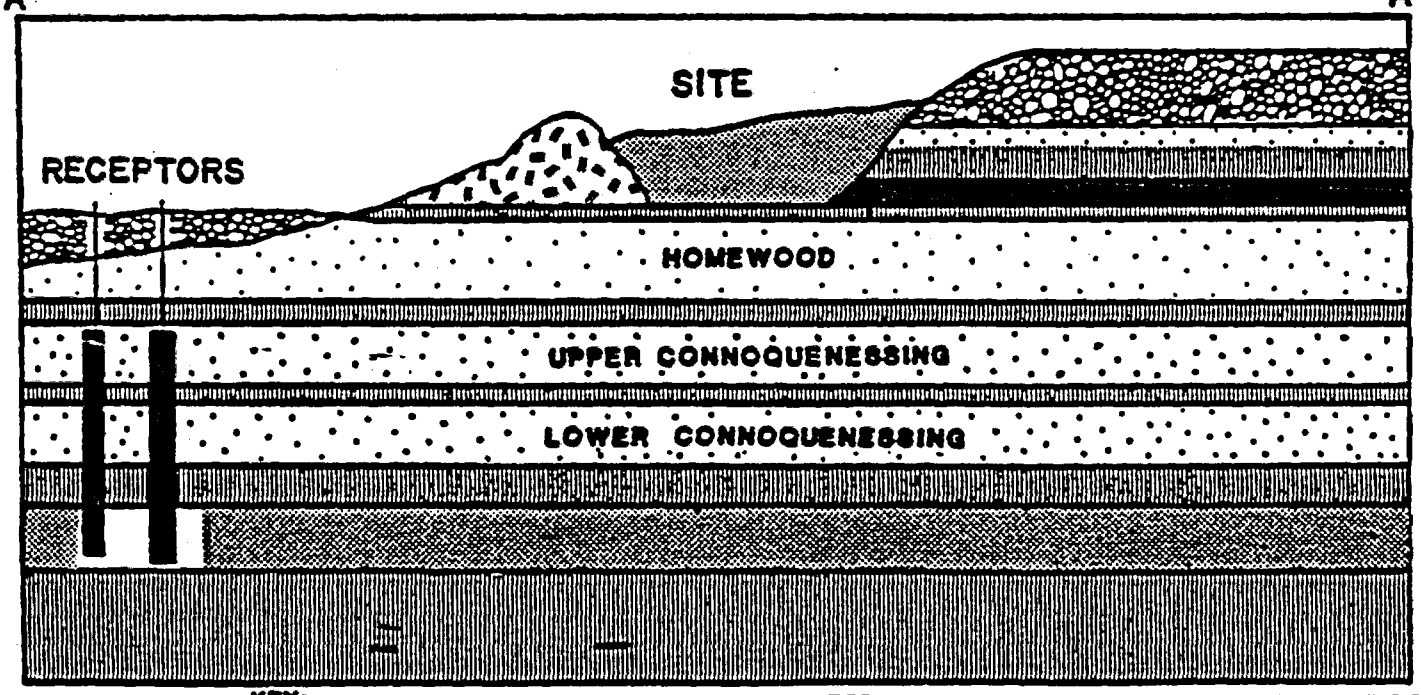
FRED C. HART ASSOCIATES, INC.

Burgoon Groundwater Pathway. Figure V-13 is a schematic diagram showing the Burgoon groundwater pathway. The Burgoon aquifer is the lowermost aquifer underlying the site. It is laterally extensive. The Grove City municipal wells tap the Burgoon formation and may also be open to and may be drawing water from the upper and lower Connoquennessing formations, although these formations generally supply much less water the Burgoon. The direction of flow in the Burgoon is to the northeast, toward its outcrop discharge area. The direction of flow in the Connoquennessing units has not been measured but regional flow patterns suggest the flow to be toward the outcrop discharge areas in the same direction as the Burgoon.

The Burgoon sandstone and each of the two overlying sandstone units are capped by low permeability shale units. The permeability of these shale units has been measured at the site. Each of these shale units exhibited very low permeability (i.e., lower than 10^{-8} cps), and would preclude groundwater circulation and contaminant migration between aquifers below the Homewood. Vertical fractures which might permit downward groundwater circulation and contaminant migration were completely absent in any of the rock cores taken below the Clarion formation of the site, thus confirming the pressure test permeability measurements. Additionally, dispersion and dilution by the intervening aquifers would reduce concentrations to below measurable detection limits. Calculations show groundwater flow velocity in the Burgoon could reach as high as 2,000 feet per year. The Burgoon aquifer is used extensively for high yield applications such as municipal or industrial supply wells. The groundwater flow direction in this aquifer in the area of the site places the Grove City area municipal and industrial supply wells upgradient of the site. No Burgoon aquifer receptor wells are known to be located downgradient of the site.

Although any contamination migrating from the site would be diverted by other pathways or precluded from entering the Burgoon by the low permeability shale zones, a hypothetical model was utilized to indicate the dispersion of any contamination potentially reaching the Burgoon. The Dominicus and Palciauskas (1982) vertical and horizontal spreading transport model was used. Any contaminants potentially entering the Burgoon would undergo an at least a 50 percent reduction in concentration before reaching





KEY:

- TILL
- MINE SPOILS
- FILL MATERIAL
- COAL OR VOID SPACE
- SANDSTONE
- SHALE OR CLAY
- PATHWAY

APPROX. 1"=2,000FT.

FIGURE V-13

BURGOON GROUNDWATER PATHWAY

300518 OSBORNE SITE

FRED C. HART ASSOCIATES, INC.

the site boundary assuming a constant contaminant input rate. At a distance of one-quarter mile away from the site, the concentration would be reduced to 10 to 30 percent of the input concentration.

D. Groundwater Quality

Hart sampled groundwater wells and wells installed in the disposed materials at the Osborne site to assess the groundwater quality in December 1983, January 1984 and April 1984. The location of the monitoring wells is provided in Figure V-14.

DER split samples with Hart on the December 1983 sampling survey. The DER samples were analyzed for volatile organics and metals. Table V-2 compares Hart's analytical data with DER's analytical data. DER's samples were field-filtered, while Hart's samples for metals analysis were not. No quality assurance/quality control (QA/QC) data was included with the DER analytical results.

Methylene chloride was detected in some samples at relatively high concentrations in Hart's first sampling survey when the bailers were field cleaned with methylene chloride. However, no methylene chloride was detected in the second sampling survey when the bailers were field cleaned with methanol. Concurrently, when the DER lab was running the DER samples, the gas chromatography/mass spectroscope (GC/MS) became contaminated with methylene chloride. For this reason, some of the reported quantities of methylene chloride on the PADER analyses reporting forms were estimated values. Consequently, methylene chloride appears to be an artifact of the field sampling or analytical procedures associated with the December 1983 sampling survey.

Table V-3 compares the results the of the first, second and third sampling surveys. In general, only very low levels of contaminants exist at the Osborne site. Table V-4 presents the organics detected at the site and ambient water quality criteria. Table V-5 compares the inorganics detected at the site with EPA Drinking Water Standards and/or Ambient Water Quality

Criteria. Methylene Chloride is not included on the organic list because it appears to be an artificial field contaminant, not a groundwater contaminant.

Of importance, the Drinking Water Standards and/or Ambient Water Quality Criteria are only useful for comparing relative levels of contaminants; neither the Standards or Criteria apply to contaminated groundwater not used for drinking purposes. Nor should a comparison of measured data against these standards serve as the basis for a risk assessment of any particular site, since the actual risks posed by any site occur at the point at which receptors are located which may use potentially contaminated water. In the proper context, however, these data may be useful at the Osborne site since the comparison puts into perspective how low the measured levels of contaminants actually are prior to its dilution or dispersion that would occur if contaminants were migrating off-site.

Considering the above, the shallow wells which draw from the glacial deposits and mine spoils contained low concentrations of lead (60 ug/l) and nickel (31 ug/l) slightly above EPA Drinking Water Standards and Ambient Water Quality Criteria respectively. The filtered PADER metal samples confirmed the nickel levels, but showed lead levels at less than 10 ug/l. The difference in lead concentrations between the filtered and unfiltered samples suggests that some of the lead was in particulate matter which would not be indicative of groundwater quality.

In the leachate wells, generally low concentrations of benzene (109 ug/l), nickel (87 ug/l) and chromium (60 ug/l) were detected. Lead (260 ug/l), mercury (4.2 ug/l) and arsenic (33 ug/l) were also detected. However, PADER's filtered samples showed lead levels at less than 10 ug/l, mercury levels at less than 1, and arsenic levels at less than 10 ug/l. These differences in concentration levels suggest that most of the lead, mercury, and arsenic in the leachate is present in a suspended state. Thus, these contaminants will not be likely to migrate.

The groundwater in the Clarion formation (Well CMW-1) also contained very low levels of pentachlorophenol (36 ug/l) on the first sampling trip.

However, pentachlorophenol was not detected in Well CMW-1 on the second sampling trip. These results suggest that sampling or analytical error may have resulted in discrepancies or that the groundwater quality may be fluctuating over time.

The upper monitoring wells in the Homewood formation detected very low levels of bis(2-ethylhexyl)phthalate (24.0 ug/l), ethylbenzene (19.0 ug/l), toluene (12.0 ug/l) and chromium (13.0 ug/l) on the first sampling trip. In addition, cadmium was detected in low concentrations at the EPA Drinking Water Standard of 10 ug/l and nickel was detected above the Ambient Water Quality Standard of 13.4 ug/l. The PADER results confirm the presence of cadmium and nickel in the groundwater on the first sampling survey. However, on the second sampling survey, bis(2-ethylhexyl)phthalate and cadmium were not detected, and ethylbenzene, toluene, and chromium were detected below 10 ug/l. Again, the variability of the data suggests that the groundwater may be fluctuating over time or that sampling or laboratory interference are responsible for minor changes in concentrations of these low (ppb) levels. Slight variability in trace levels of contaminants is to be expected.

On the first sampling survey, the following inorganics were detected in the Upper Connequennessing formation above standards or criteria: cadmium, chromium, lead, nickel and zinc. However, except for nickel, the above metals were detected in the PADER filtered samples at concentrations below EPA Drinking Water Standards. Thus, these metals are most likely in a suspended state. On the second sampling survey, zinc was the only metal detected above 10 ug/l, but it was detected well below EPA Drinking Water Standards.

As a result of the first sampling survey of Well DMW-1, the Burgoon aquifer appears to be contaminated with very low levels of bis(2-ethylhexyl)pthalate and pentachlorophenol. The second sampling survey showed the presence of bis(2-ethylhexyl)pthalate but pentachlorophenol was absent. The third sampling survey showed no bis(2-ethylhexyl)pthalate, however, pentachlorophenol was again detected in well DMW-1 and DMW-2. Similarly, ground-

water quality in this well appears to be fluctuating over time. In all cases, the concentration of bis(2-ethylhexyl)pthalate and pentacholophenol was below EPA Ambient Water Quality Criteria.

After inorganics were detected in DMW-1, a subsequent set of samples (1/20/84) indicated that after filtering, these compounds dropped well below EPA Drinking Water Standards. Subsequently, all DMW samples were filtered prior to analysis, and no inorganic compounds were found to exceed EPA drinking water standards.

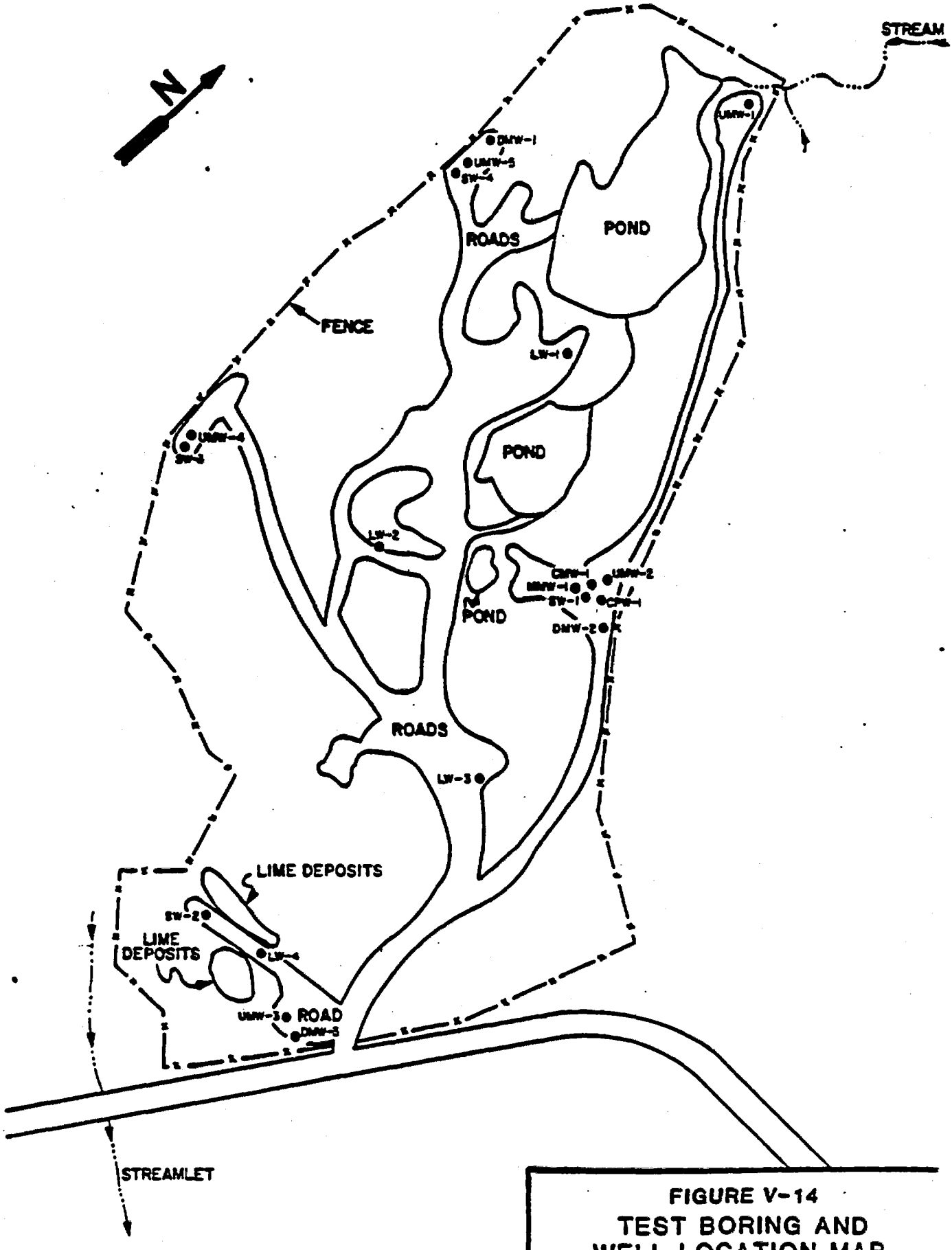


FIGURE V-14
TEST BORING AND WELL LOCATION MAP
OSBORNE SITE

300523

FRED C. HART ASSOCIATES, INC.

TABLE V-2

COMPARISON OF PADER AND HART GROUNDWATER SAMPLING RESULTS (DECEMBER 1983)
Osborne Site

Organic Compounds	UMW-1 HART	UMW-1 PADER	UMW-2 HART	UMW-2 PADER	UMW-3 HART	UMW-3 PADER	UMW-4 HART	UMW-4 PADER	UMW-5 HART	UMW-5 PADER	CMW-1 HART	CMW-1 PADER	MMW-1 HART	MMW-1 PADER	DMW-1 HART	DMW-1 PADER
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	BMDL	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	BMDL	1.0	ND	ND	ND	ND
Ethylbenzene	ND	LT1.0	ND	ND	ND	ND	19	ND	BMDL	ND	ND	ND	ND	ND	ND	ND
Toluene	BMDL	1.0	BMDL	LT1.0	ND	ND	12	ND	ND	ND	ND	ND	BMDL	LT1.0	BMDL	ND
Trichloroethylene	ND	ND	BMDL	ND	ND	ND	ND	ND	ND	ND	BMDL	1.5	ND	ND	ND	ND
Trichlorofluoro-methane	BMDL	LT1.0	BMDL	ND	BMDL	ND	BMDL	ND	BMDL	ND	BMDL	ND	BMDL	LT1.0	BMDL	LT1.0
Tetrachloroethylene	ND	ND	BMDL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	LT1.0	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	BMDL	13.	ND	ND	ND	ND
Methylene Chloride **	12.	9.0	284.	270.	250.	79.*	26.	37.	1,480.	±390.	23.	±320.	972.	1,700.	937.	±1,100.
Metal Compounds																
Antimony	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--
Arsenic	ND	LT10.0	ND	LT10.0	BMDL	LT10.0	BMDL	LT10.0	ND	LT10.0	BMDL	LT10.0	ND	LT10.0	BMDL	LT10.0
Beryllium	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--
Cadmium	5.0	1.0	BMDL	LT1.0	BMDL	1.0	BMDL	LT1.0	10.0	10.0	ND	LT1.0	22.0	10.0	10.0	10.0
Chromium	BMDL	10.0	BMDL	LT10.0	13.0	LT10.0	BMDL	LT10.0	BMDL	LT10.0	BMDL	LT10.0	80.0	30.0	160.0	40.0
Copper	58.0	30.0	51.0	10.0	260.0	50.0	25.0	30.0	32.0	40.0	61.0	30.0	490.0	80.0	320.0	110.0
Lead	BMDL	LT1.0	BMDL	LT10.0	BMDL	20.0	BMDL	LT10.0	BMDL	13.0	BMDL	LT10.0	180.0	15.0	80.0	14.0
Mercury	ND	LT1.0	ND	LT1.0	ND	LT1.0	ND	LT1.0	ND	LT1.0	ND	LT1.0	BMDL	LT1.0	BMDL	LT1.0
Nickel	13.0	30.0	10.0	60.0	36.0	50.0	BMDL	10.0	BMDL	LT10.0	BMDL	10.0	21.0	1550.0	BMDL	LT10.0
Selenium	ND	LT10.0	ND	LT10.0	ND	LT10.0	ND	LT10.0	ND	LT10.0	BMDL	LT10.0	BMDL	LT10.0	ND	LT10.0
Silver	ND	--	ND	--	BMDL	--	ND	--	BMDL	--	ND	--	ND	--	BMDL	--
Thallium	ND	--	ND	--	BMDL	--	ND	--	ND	--	ND	--	ND	--	ND	--
Zinc	70.0	40.0	150.0	80.0	250.0	100.0	190.0	90.0	95.0	110.0	220.0	50.0	8300	4650	4200	2800

-- Not Tested
BMDL Below Method Detection Limit for EPA Methods 624/625 for priority pollutants and method EPA-600/4-79-020 (FR 1979a) for metals analysis.
LT Less Than
ND Not Detected
* Sample Tested for metals only
** Field contaminant on 12/6-9/83 sampling trip

300524

TABLE V-2 (continued)

COMPARISON OF PADER AND HART GROUNDWATER SAMPLING RESULTS (DECEMBER 1983)
Osborne Site

Organic Compounds	LW-1 HART	LW-1 PADER	LW-2 HART	LW-2 PADER	LW-3 HART	LW-3 PADER	LW-4 HART	LW-4 PADER	SW-1 HART	SW-1 PADER	SW-2 HART	SW-2 PADER	SW-3 HART	SW-3 PADER	SW-4 HART	SW-4 PADER
Benzene	BMDL	4.3	ND	ND	109	ND	ND	ND	BMDL	1.0	ND	ND	ND	ND	ND	ND
Chloroethane	ND	6.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	BMDL	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	BMDL	23.0	BMDL	ND	ND	54.0	BMDL	ND	ND	LT1.0	ND	ND	ND	ND	ND	ND
Toluene	BMDL	5.6	ND	ND	BMDL	5.3	BMDL	ND	BMDL	LT1.0	ND	ND	BMDL	ND	ND	ND
Trichloroethylene	BMDL	LT1.0	BMDL	ND	BMDL	4.9	BMDL	ND	ND	LT1.0	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	BMDL	ND	BMDL	ND	BMDL	ND	BMDL	ND	ND	ND	BMDL	ND	BMDL	ND	BMDL	ND
Tetrachloroethylene	BMDL	ND	BMDL	ND	BMDL	LT1.0	BMDL	ND	ND	ND	ND	ND	ND	ND	BMDL	ND
1,1,1-Trichloroethane	ND	ND	BMDL	ND	ND	ND	BMDL	LT1.0	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	BMDL	2.6	ND	ND	ND	2.6	BMDL	LT1.0	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride **	1260	±1000	502.0	±780	898.0	460.0	24,000	3500.0	219.0	408.0	795.0	±1.1	70.0	68.0	19.0	18.0

Metal Compounds	LW1-4 HART												
Antimony	ND	--	--	--	--	--	--	ND	--	ND	--	ND	--
Arsenic	33.0	LT10.0	LT10.0	LT10.0	LT10.0	--	--	BMDL	LT10.0	BMDL	LT10.0	BMDL	LT10.0
Beryllium	BMDL	--	--	--	--	--	--	ND	--	ND	--	ND	--
Cadmium	ND	LT1.0	LT1.0	LT1.0	LT1.0	--	--	ND	LT1.0	BMDL	LT1.0	BMDL	LT1.0
Chromium	60.0	10.0	10.0	20.0	LT10.0	--	--	14.0	LT10.0	BMDL	10.0	BMDL	10.0
Copper	370.0	10.0	10.0	30.0	20.0	--	--	230.0	10.0	40.0	20.0	420.0	20.0
Lead	260.0	LT10.0	LT10.0	LT10.0	LT10.0	--	--	60.0	LT10.0	BMDL	LT10.0	BMDL	LT10.0
Mercury	4.2	LT1.0	LT1.0	LT1.0	LT1.0	--	--	BMDL	LT1.0	ND	LT1.0	ND	LT1.0
Nickel	87.0	10.0	10.0	30.0	40.0	--	--	31.0	30.0	10.0	LT20	28.0	LT20
Selenium	ND	LT10.0	LT10.0	LT10.0	--	--	--	ND	LT10.0	BMDL	LT10.0	ND	LT10.0
Silver	BMDL	--	--	--	--	--	--	ND	--	BMDL	--	ND	--
Thallium	ND	--	--	--	--	--	--	ND	--	BMDL	--	ND	--
Zinc	570.0	60.0	50.0	70.0	50.0	--	--	210.0	40.0	170.0	50.0	220.0	90.0

-- Not Tested
BMDL Below Method Detection Limit for EPA Methods 624/625 for priority pollutants and method EPA-600/4-79-020 (FR 1979a) for metals analysis.
LT Less Than
ND Not Detected
* Sample Tested for metals only
** Field contaminant on 12/6-9/83 sampling trip

300525

TABLE V-3

COMPARISON OF 1ST, 2ND AND 3RD SAMPLING SURVEY RESULTS

Parameters	UMW-1 83/12/08	UMW-1 84/01/19	UMW-2 83/12/08	UMW-2 84/01/19	UMW-3 83/12/06	UMW-3 84/01/18	UMW-4 83/12/06	UMW-4 84/01/18
PP Volatile Compounds								
Ethylbenzene	ND	ND	ND	ND	ND	BMDL	19	ND
Methylene Chloride	12	BMDL	284	ND	250	BMDL	26	BMDL
Toluene	BMDL	BMDL	BMDL	BMDL	ND	BMDL	12	BMDL
PP Base/Neutral Compounds								
bis(2-Ethylhexyl)phthalate	11	ND	BMDL	ND	20	ND	24	ND
PP Acid Compounds								
Pentachlorophenol	BMDL	ND	ND	ND	ND	ND	BMDL	ND
PP Metals								
Arsenic	ND	ND	ND	BMDL	BMDL	ND	BMDL	ND
Cadmium	5	ND	BMDL	ND	BMDL	ND	BMDL	ND
Chromium	BMDL	ND	BMDL	BMDL	13	ND	BMDL	ND
Copper	58	BMDL	51	BMDL	260	BMDL	25	BMDL
Lead	BMDL	ND	BMDL	BMDL	BMDL	ND	BMDL	ND
Nickel	13	BMDL	10	BMDL	36	ND	BMDL	BMDL
Zinc	70	17	150	14	250	28	190	27

BMDL - Below Method Detection Limit
ND - Parameter not detected

TABLE V-3 (Continued)

Parameters	UMW-5 83/12/06	UMW-5 84/01/18	CMW-1 83/12/08	CMW-1 84/01/20	MMW-1 83/12/09	MMW-1 84/01/20	DMW-1 83/12/08	DMW-1 84/01/20	DMW-1* 84/01/20	DMW-1 84/04/04	DMW-2 84/04/04	DMW-3 84/04/04
PP Volatile Compounds												
Ethylbenzene	BMDL	ND	ND	ND	ND	ND	ND	ND	-	ND	ND	ND
Methylene Chloride	1480	BMDL	23	BMDL	972	BMDL	937	BMDL	-	ND	ND	ND
Toluene	ND	BMDL	ND	BMDL	BMDL	BMDL	BMDL	BMDL	-	ND	ND	ND
PP Base/Neutral Compounds												
bis(2-Ethylhexyl) phthalate	14	ND	BMDL	ND	BMDL	BMDL	43	383	-	BMDL	ND	ND
PP Acid Compounds												
Pentachlorophenol	ND	ND	36	ND	BMDL	ND	404	ND	-	112	36	ND
PP Metals												
Arsenic	ND	ND	BMDL	BMDL	ND	ND	BMDL	BMDL	ND	9.0	BMDL	ND
Cadmium	10	ND	ND	ND	22	ND	10	BMDL	ND	6	ND	ND
Chromium	BMDL	ND	BMDL	ND	80	ND	160	11	ND	42	ND	ND
Copper	32	BMDL	61	20	490	BMDL	320	70	BMDL	250	76	58
Lead	BMDL	ND	BMDL	ND	180	ND	80	BMDL	ND	BMDL	ND	ND
Nickel	BMDL	ND	BMDL	ND	21	BMDL	BMDL	ND	ND	12	ND	9
Zinc	95	42	220	78	8300	96	4200	940	530	3100	550	250

BMDL - Below Method Detection Limit
ND - Parameter not detected
\- - Parameter not tested
* - Sample was tested for metals only

TABLE V-4

ORGANICS DETECTED IN THE GROUNDWATER AT THE OSBORNE SITE

Compound	Range Detected at the Osborne Site (ug/l)	Ambient Water Quality Criteria[a] (ug/l)	SNARLS[b] (ug/l)
December 1983 Sampling Trip			
Benzene	LT10-109	0(.66)	--
Bis(2-ethylhexyl) phthalate	LT10-43	15,000	--
Ethylbenzene	LT10-19	1,400	--
Toluene	LT10-12	14,300	340 (long term)
Pentachlorophenol	LT24-404	1,010	--
January 1984 Sampling Trip			
Bis(2-ethylhexyl) phthalate	LT10-383	15,000	--
April 1984 Sampling Trip			
Pentachlorophenol	36-112	1,010	--

a These water quality criteria for ambient water concentration are based on consumption of 2 liters of water daily only. The recommended "safe level" for all known or suspect carcinogens is zero; the concentration that is estimated to result in one additional case of cancer in one million (10^{-6} risk) is given in parentheses.

b SNARLS - suggested no adverse response levels--are given in ppb for various exposure times as indicated.

TABLE V-5

INORGANICS DETECTED IN THE GROUNDWATER AT THE OSBORNE SITE

Compound	Range detected at the Osborne Site (ug/l)	EPA Drinking Water Standard (ug/l)	Ambient Water Quality Criteria (ug/l)
December 1983 Sampling Trip			
Arsenic	LT5-33	50	0(.002)
Cadmium	LT5-10	10	10
Chromium	LT10-160	50	170,000
Copper	40-490	1,000	1,000
Lead	LT50-260	50	50
Mercury	LT.3-4.2	2	.144
Nickel	LT10-87	--	13.4
Zinc	LT5-8,300	5,000	5,000
January 1984 Sampling Trip			
Chromium	LT10-11	50	170,000
Copper	LT5-70	1,000	1,000
Zinc	14-940	5,000	5,000
April 1984 Sampling Trip			
Arsenic	9	50	0 (.002)
Cadmium	6	10	10
Chromium	42	50	17,000
Copper	58-250	1,000	1,000
Nickel	9-12	--	13.4
Zinc	250-3,100	5,000	5,000

a National Interim Primary and Secondary Drinking Water Standards.

b These Water Quality Criteria for ambient water concentrations are based on consumption of 2 liters of water and 18.7 grams fish and shellfish products per day. The recommended "safe level" for all known or suspect carcinogens is zero; the concentration estimated to result in one additional case of cancer in one million people (10^{-6} risk) is given in parentheses.

CHAPTER VI

RISK ASSESSMENT

The objective of this chapter is to assess the risks posed by the Osborne site to public health and the environment. The methodology employed is a traditional source-pathway-receptor analysis. The characterization of the source of contamination -- waste types and quantities -- was presented in Chapter 3. That chapter showed that the principal waste at the site is foundry sand and that data from sampling the drums removed from the site and the leachate wells shows low concentrations of a limited number of priority pollutants. Consistent with the Initial Remedial measures taken at the site, there is no current danger of fires, explosion or direct contact exposure routes at the site. The ambient air has also been characterized as safe, precluding risks by that route. The identification of pathways through which contaminants can leave the site was accomplished in Chapters 4 and 5 of this report. This risk assessment evaluates each pathway to arrive at pathway specific assessments of risk to public health and the environment.

The risk assessment procedure first examines the inorganic and organic compounds present at the source of contamination for each pathway. This information is obtained from surface water and groundwater data quality reported in earlier chapters. This step in the risk assessment procedure typically identifies what contaminants are present at the source which could migrate off-site if a pathway were available, and, if appropriate, which of these contaminants are of environmental or public health concern.

The procedure then examines each potential pathway for flow hydraulics including flow directions, gradients, rates, and hydraulic input from other pathways. This step in the risk assessment procedure serves to evaluate whether a potential pathway could transmit contaminants off-site. Where appropriate, estimates of the expected concentrations of potential contaminants at various points along or within each pathway can be made to assist in determining the potential extent of impacts on available receptors.

Water Table Groundwater Pathway

The Water Table Pathway includes the groundwater in all unconsolidated materials, including the foundry sand, the mine spoils, and the glacial deposits. Water level measurements in the SW and LW series wells show that the flow in the Water Table pathway is to the southeast. The water table groundwater either remains as groundwater or eventually emerges as surface water towards Swamp Run to the south of the site.

The LW series wells screened in the disposal area showed relatively low concentrations of benzene (109 ug/l), nickel (87 ug/l), chromium (60 ug/l), lead (260 ug/l), mercury (4.2 ug/l), and arsenic (33 ug/l). Well SW-2 screened in glacial deposits and mine spoils is the furthest downgradient from the disposal area. This well showed only lead (60 ug/l) above EPA Drinking Water Standards, and nickel (31 ug/l) above Ambient Water Quality Criteria.

No receptors are affected by the Water Table Groundwater Pathway. Wells in this aquifer are limited to the area north and east of the site, and these wells draw water from zones at a higher topographic level and upgradient from the site. There are no receptor wells within this pathway downgradient of the site. Based on this anaysis, there is minimal to no risk to public health posed by the water table pathway.

Clarion Groundwater Pathway

The Clarion Groundwater Pathway consists of the sandstone of the Clarion formation and any possible void spaces contained in the shaft systems due to past coal mining operations in the Brookville Coal. The site is located at the base of the Clarion formation, as evidenced by the strip mining operations which are typical along the formation margins. The Clarion formation extends laterally from the site to the northeast and is lined by an extensive basal underclay layer. Based on the regional geology, it is expected that the flow moves away from the site to the south.

Samples were taken from well DMW-1 three times during the course of the study. Very low levels of pentachlorophenol were present in the first and third rounds at concentrations of 404 ug/l and 112 ug/l, respectively. Bis(2-ethylhexyl)pthalate was also detected during the first and second surveys at 46 ug/l and 383 ug/l, respectively. The two other DMW wells were sampled for the first time along with the third round of sampling in DMW-1. Well DMW-2 showed pentachlorophenol at a concentration of 36 ug/l. Well DMW-3 was clean and these organic compounds occur below EPA ambient water criteria. Because well DMW-1 is essentially an upgradient well, the fluctuating levels of compounds found in the well may not be attributed to the site. This is also supported by the much lower level of pentachlorophenol found in downgradient well. These facts, in conjunction with the impermeability of the three confining layers overlying the Burgoon indicate that the site is not acting as a source for these compounds.

Although contaminant migration into the Burgoon is extremely unlikely, contaminant migration and dispersion through the Burgoon were modeled. The Vertical and Horizontal Spreading transport model (Domenicus and Palciauskas, 1982) reported in Appendix H indicates that contaminants moving off iste through the Burgoon would undergo a 50 percent reduction in contamination concentration upon reaching the site boundary. Upon reaching a distance of one-quarter mile, contaminant concentration will drop to below 20 percent of the original on site concentration.

With respect to receptors, all existing water supply wells in the Burgoon Groundwater Pathway are all located upgradient of the site, and no wells utilize this aquifer downgradient of the site. Consequently, the occurrence of organic compounds below the EPA Ambient Water Quality Criteria coupled with the absence of downgradient wells indicates no risk to public health.

CHAPTER VII

FINDINGS AND CONCLUSIONS

This chapter briefly summarizes the main findings and conclusions of the remedial investigation:

The Source

- Most of the material disposed at the site consisted of foundry sand. Minor amounts of slag, municipal refuse and wood waste were also disposed, along with some industrial waste which could have been hazardous.

- As an Initial Remedial Measure, the site was surrounded by a security fence, and 83 filled drums, 460 empty drums, and 45 cubic yards of contaminated soil were removed from the site.

- Chemical analysis of the wastes present in the full and sealed drums showed low concentrations of a limited number of priority pollutants.

- Chemical analysis of the leachate wells identified a limited number of priority pollutants at low concentrations.

The Pathways

- The geology and hydrogeology of the site is complex as the result of the regional geology, previous deep and strip mining activities and filling operations.

- The drainage patterns are determined and have been altered by the transformation of the site during mining and filling operations.

- Six potential pathways - two surface water pathways and four groundwater pathways - were identified:

- the Disposal Area Surface Water Pathway does not exist because runon to the two ponds on the site does not run off the site but instead recharges the groundwater table in the disposal area.

- the Southwest Corner Surface Water Pathway flows to the southeast toward Swamp Run. No contamination was detected.

- the Water Table Pathway flows to the southeast and either remains as groundwater or eventually emerges as surface water. The leachate wells showed relative low concentrations of benzene, nickel, cromium, lead, mercury and arsenic.

- the Clarion Groundwater Pathway may possibly be connected to the water table pathway. The flow direction is suspected to be towards the south. One low level measurement of pentachlorophenol was detected in the Clarion formation; it was not detected in the second sample.

- the Homewood Groundwater Pathway extends laterally under the site. Groundwater flow is to the southeast. Low levels of two organic and three inorganic contaminants commonly associated with coal and acid mine drainage were identified The presence of a clay layer under the site and the flow hydraulics for the site likely prevent the Homewood from serving as a pathway.

- the Burgoon Groundwater Pathway is the lowermost aquifer underlying the site. It flows to the northeast. The presence of a clay layer and three impermeable shale units likely prevent the Burgoon from serving as a pathway. Pentachlorophenol and bis(2-ethylhexyl)pthalate were detected at low, intermittent and fluctuating levels.

- In summary, of the six potential pathways:

- Three (the Disposal Area Surface Water Pathway, the Homewood Groundwater Pathway and the Burgoon Groundwater Pathway) are unlikely to exist.

- one (the Southwest Corner Surface Water Pathway) showed no contamination

- one (the Clarion Groundwater Pathway) may exist.

- one (the Water Table Pathway) does exist.

The Receptors

- There are no available receptors for five of the six pathways.

- The single pathway in which receptors are located downgradient of the site is the Homewood Groundwater Pathway in which two wells are located one quarter and one mile from the site.

- The Homewood Pathway may not exist because of a clay layer of two to three feet overlying it separating it from the site.

- Based on the groundwater modeling in Appendix H, any contamination reaching the Homewood would be dispersed and diluted before the receptor wells are reached.

Conclusion

The analysis of the source, pathways and receptors at the Osborne site suggests that the risks to public health and the environment are extremely low.

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APPENDIX D

300537

PAGES 300538 AND 300539 ARE MISSING
FROM THE ADMINISTRATIVE RECORD

DATA EVALUATION SCORE CATEGORIES

ACCEPTABLE: Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.

ACCEPTABLE WITH EXCEPTION(S): Data is not completely within established control limits. The deficiences are identified and specific data is still valid, given certain qualifications which are listed below.

QUESTIONABLE: Data is not within established control limits. The deficiences bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.

UNACCEPTABLE: Data is not within established control limits. The deficiences imply the results are not meaningful.

PAGE 300541 IS MISSING FROM THE ADMINISTRATIVE RECORD

DATA COMPLETENESS	CONC./MATRIX	LO/SOIL	LO/SOIL	LO/SOIL	LO/SOIL	LO/SOIL	LO/SOIL						
...CTION	TRAFFIC REPORT #CC3	48	49	50	51	52	53	54	55	56	57	58	60
	LAB I.D. # CC3	48V	49V	50V	51V	52V	53V	54V	55V	56V	57V	58V	60V
VOA :	RUN DATE/TIME	✓											
	TARGET COMPOUND TAB.	✓											
	TARGET COMPOUND D.L.	✓											
	TENT. I.D. COMPOUND TAB.	✓											
	SURROGATE RECOVERY	✓											
	GC SCREEN TABULATION	N/R											
	GC/MS CHROMATOGRAMS	✓											
	TARGET CMPD. QUAN. LIST	✓											
	TARGET CMPD. SPECTRA	✓											
	TENT. I.D. CMPD. Q.L.	✓											
	TENT. CMPD. LIB. SRCH.	✓											
	CHRO./SENS. CHECKS	✓											
	BFB/DFTPP TUNE DATA	✓											
	I.S AREAS CHARTS	N/R											
	I.S. REL. RESP. FORM	N/R											
	RF & AMTS.: CALIB. CHK.	✓											
	RF & AMTS.: 3-PT CALIB.	✓											
	Chromatograms: Calib. Chk.	✓											
	Chromatograms: 3-Pt. Calib.	✓											
	LINEARITY: 3-PT. CALIB	N/R											
	RF COMPARISON	✓											
	SAMPLE/FIELD BLANK												
	METHOD/INSTR. BLANK												
	LAB DUPLICATE							✓					
	FIELD DUP/REP												
	MAT. SPK./M. STD.							✓					

COMMENTS:

300542

DATA COMPLETENESS	CONC./MATRIX	lo/sol				med/sol							
TION	TRAFFIC REPORT #CC3	61	62	63	71	73	74	75	76	77	78	79	80
	LAB I.D. # CC3	61V	62V	63V	71V	73V	74V	75V	76V	77V	78V	79V	80V
VOA :	RUN DATE/TIME	✓											
	TARGET COMPOUND TAB.	✓											
	TARGET COMPOUND D.L.	✓											
	TENT. I.D. COMPOUND TAB.	✓											
	SURROGATE RECOVERY	✓											
	GC SCREEN TABULATION	N/A											
	GC/MS CHROMATOGRAMS	✓											
	TARGET CMPD. QUAN. LIST	✓											
	TARGET CMPD. SPECTRA	✓											
	TENT. I.D. CMPD. Q.L.	✓											
	TENT. CMPD. LIB. SRCH.	✓											
	CHRO./SENS. CHECKS	✓											
	BFB/DFTPP TUNE DATA	✓											
	I.S AREAS CHARTS	N/A											
	I.S. REL. RESP. FORM	N/A											
	RF & AMTS.: CALIB. CHK.	✓											
	RF & AMTS.: 3-PT CALIB.	✓											
	Chromatograms: Calib. Chk.	✓											
	Chromatograms: 3-Pt. Calib.	✓											
	LINEARITY: 3-PT. CALIB	N/A											
	RF COMPARISON	✓											
	SAMPLE/FIELD BLANK												
	METHOD/INSTR. BLANK												
	LAB DUPLICATE										✓		
	FIELD DUP/REP												
	MAT. SPK./M. STD.										✓		

COMMENTS: No medium VOA reagent blk was performed by the lab.

300543

DATA COMPLETENESS	CONC./MATRIX	LO/SOIL	MED/SOIL	MED/SOIL	MED/SOIL	LO/SOIL	LO/SOIL
FRACTION	TRAFFIC REPORT # CC3	81	82	83	84	85	89
	LAB I.D. # CC3	81V	82V	83V	84V	85	89V
VOA :	RUN DATE/TIME	✓					✓
	TARGET COMPOUND TAB.	✓					✓
	TARGET COMPOUND D.L.	✓					✓
	TENT. I.D. COMPOUND TAB.	✓					✓
	SURROGATE RECOVERY	✓					✓
	GC SCREEN TABULATION	N/R					✓
	GC/MS CHROMATOGRAMS	✓					✓
	TARGET CMPD. QUAN. LIST	✓					✓
	TARGET CMPD. SPECTRA	✓					✓
	TENT. I.D. CMPD. Q.L.	✓					✓
	TENT. CMPD. LIB. SRCH.	✓					✓
	CHRO./SENS. CHECKS	✓					✓
	BFB/DFTPP TUNE DATA	✓					✓
	I.S AREAS CHARTS	N/R					✓
	I.S. REL. RESP. FORM	N/R					✓
	RF & AMTS.: CALIB. CHK.	✓					✓
	RF & AMTS.: 3-PT CALIB.	✓					✓
	Chromatograms: Calib. Chk.	✓					✓
	Chromatograms: 3-Pt. Calib.	✓					✓
	LINEARITY: 3-PT. CALIB	✓					✓
	RF COMPARISON	✓					✓
	SAMPLE/FIELD BLANK						✓
	METHOD/INSTR. BLANK						
	LAB DUPLICATE						
	FIELD DUP/REP						
	MAT. SPK./M. STD.						

COMMENTS: No medium reagent blk run by lab.

300544

DATA COMPLETENESS	CONC./MATRIX	LO/SOIL	LO/SOIL	LO/SOIL	LO/SOIL	LO/SOIL							
FRACTION	TRAFFIC REPORT # CC3	48	49	50	51	52	53	54	55	56	57	58	60
	LAB I.D. # CC3	48V	49V	50V	51V	52V	53V	54V	55V	56V	57V	58V	60V
BNA :	RUN DATE	✓											
	TARGET COMPOUND TAB.	✓											
	TARGET COMPOUND D.L.	✓											
	TENT. I.D. COMPOUND TAB.	✓											
	SURROGATE RECOVERY	✓											
	GC SCREEN TABULATION	N/A											
	GC/MS CHROMATOGRAMS	✓											
	TARGET CMPD. QUAN. LIST	✓											
	TARGET CMPD. SPECTRA	✓											
	TENT. I.D. CMPD. Q.L.	✓											
	TENT. CMPD. LIB. SRCH.	✓											
	CHRO./SENS. CHECKS	✓											
	BFB/DFTPP TUNE DATA	✓											
	I.S AREAS CHARTS	N/A											
	I.S. REL. RESP. FORM	N/A											
	RF & AMTS.: CALIB. CHK.	✓											
	RF & AMTS.: 3-PT CALIB.	✓											
	Chromatograms: Calib. Chk.	✓											
	Chromatograms: 3-Pt. Calib.	✓											
	LINEARITY: 3-PT. CALIB	N/A											
	RF COMPARISON	✓											
	SAMPLE/FIELD BLANK												
	METHOD/INSTR. BLANK												
	LAB DUPLICATE							✓					
	FIELD DUP/REP												
	MAT. SPK./M. STD.							✓					
PEST. :	PESTICIDE TABULATION	✓											
	PEST. D.L. TABULATION	✓											
	PESTICIDE CHRO.	✓											
	PESTICIDE STD. CHRO.	✓											
	PESTICIDE STD. I.D.	✓											
	2nd COLUMN CONF.	✓				✓	✓						
	GC/MS CONFIRMATION	N/A	NO	N/A		NO	NO	N/A					
	PESTICIDE DUPLICATE				✓								
	PESTICIDE SPIKE				✓								
	PESTICIDE BLANK												
	STD SUMMARY	✓											
	LINEARITY CHK.	✓											
	DEGRAD. CHK.	✓											
	DBC RT SHIFT	✓											

300545

DATA COMPLETENESS	CONC./MATRIX	LO/SOIL											
FRACTION	TRAFFIC REPORT # CC3	61	62	63	71	73	74	75	76	77	78	79	80
	LAB I.D. # CC3	61V	62V	63V	71V	73V	74V	75V	76V	77V	78V	79V	80V
BNA :	RUN DATE [redacted]	✓		✓	Not Ready	✓							✓
	TARGET COMPOUND TAB.	✓		✓		✓							✓
	TARGET COMPOUND D.L.	✓		✓		✓							✓
	TENT. I.D. COMPOUND TAB.	✓		✓		✓							✓
	SURROGATE RECOVERY	✓		✓		✓							✓
	GC SCREEN TABULATION	N/R		✓		N/R							✓
	GC/MS CHROMATOGRAMS	✓		✓		✓							✓
	TARGET CMPD. QUAN. LIST	✓		✓		✓							✓
	TARGET CMPD. SPECTRA	✓		✓		✓							✓
	TENT. I.D. CMPD. Q.L.	✓		✓		✓							✓
	TENT. CMPD. LIB. SRCH.	✓		✓		✓							✓
	CHRO./SENS. CHECKS	✓		✓		✓							✓
	BFB/DFTPP TUNE DATA	✓		✓		✓							✓
	I.S AREAS CHARTS	N/R		✓		N/R							✓
	I.S. REL. RESP. FORM	N/R		✓		N/R							✓
	RF & AMTS.: CALIB. CHK.	✓		✓		✓							✓
	RF & AMTS.: 3-PT CALIB.	✓		✓		✓							✓
	Chromatograms: Calib. Chk.	✓		✓		✓							✓
	Chromatograms: 3-Pt. Calib.	✓		✓		✓							✓
	LINEARITY: 3-PT. CALIB	N/R		✓		N/R							✓
	RF COMPARISON	✓		✓		✓							✓
	SAMPLE/FIELD BLANK												
	METHOD/INSTR. BLANK												
	LAB DUPLICATE								✓		*		
	FIELD DUP/REP												
	MAT. SPK./M. STD.								✓				
PEST. :	PESTICIDE TABULATION	✓		✓		✓							✓
	PEST. D.L. TABULATION	✓		✓		✓							✓
	PESTICIDE CHRO.	✓		✓		✓							✓
	PESTICIDE [redacted] CHRO.	✓		✓		✓							✓
	PESTICIDE [redacted] I.D.	✓		✓		✓							✓
	2nd COLUMN CONF.	✓		✓		✓							✓
	GC/MS CONFIRMATION	N/a		✓		N/a							✓
	PESTICIDE DUPLICATE						✓						
	PESTICIDE SPIKE						✓						
	PESTICIDE BLANK												
	STD SUMMARY	✓		✓		✓							✓
	LINEARITY CHK.	✓		✓		✓							✓
	DEGRAD. CHK.	✓		✓	✓	✓							✓
	DBC RT SHIFT	✓		✓		✓							✓

* — field dup w/ sample went to NUS Labs (CC386)

300546

DATA COMPLETENESS	CONC./MATRIX	L/SOIL					
FRACTION	TRAFFIC REPORT # CC3	81	82	83	84	85	89
	LAB I.D. # CC3	81V	82V	83V	84V	85V	89V
BNA :	RUN DATE	✓				✓	Not Avail
	TARGET COMPOUND TAB.	✓				✓	
	TARGET COMPOUND D.L.	✓				✓	
	TENT. I.D. COMPOUND TAB.	✓				✓	
	SURROGATE RECOVERY	✓				✓	
	GC SCREEN TABULATION	N/R				✓	
	GC/MS CHROMATOGRAMS	✓				✓	
	TARGET CMPD. QUAN. LIST	✓				✓	
	TARGET CMPD. SPECTRA	✓				✓	
	TENT. I.D. CMPD. Q.L.	✓				✓	
	TENT. CMPD. LIB. SRCH.	✓				✓	
	CHRO./SENS. CHECKS	✓				✓	
	BFB/DFTPP TUNE DATA	✓				✓	
	I.S. AREAS CHARTS	NR				✓	
	I.S. REL. RESP. FORM	NR				✓	
	RF & AMTS.: CALIB. CHK.	✓				✓	
	RF & AMTS.: 3-PT CALIB.	✓				✓	
	Chromatograms: Calib. Chk.	✓				✓	
	Chromatograms: 3-Pt. Calib.	✓				✓	
	LINEARITY: 3-PT. CALIB	N/R				✓	
	RF COMPARISON	✓				✓	
	SAMPLE/FIELD BLANK						
	METHOD/INSTR. BLANK						
	LAB DUPLICATE						
	FIELD DUP/REP						
	MAT. SPK./M. STD.						
PEST. :	PESTICIDE TABULATION	✓				✓	
	PEST. D.L. TABULATION	✓				✓	
	PESTICIDE CHRO.	✓				✓	
	PESTICIDE STD. CHRO.	✓				✓	
	PESTICIDE RTN. I.D.	✓				✓	
	2nd COLUMN CONF.	✓				✓	
	GC/MS CONFIRMATION	N/A	NO	NO	NO	N/A	
	PESTICIDE DUPLICATE						
	PESTICIDE SPIKE						
	PESTICIDE BLANK						
	STD SUMMARY	✓				✓	
	LINEARITY CHK.	✓				✓	
	DEGRAD. CHK.	✓				✓	
	DBC RT SHIFT	✓				✓	

300547

KEY TO DATA COMPLETENESS FORM

Abbreviation Used on Form	Description of Checklist Item
Conc./Matrix	Concentration category submitted in analysis request (low, med, hi); and matrix (sol., aq.)
Fraction	Fill in acid, base/neutral, acid/base/neutral, or volatiles analysis
Run Date/Time	Instrument run date (to be used for correlating calibration)
Target Cmpd. Tab.	Tabulated results for target compounds
Target Cmpd. D.L.	Detection limits for target compounds (actual/level indicated by screen
Tent. I.D. Cmpd. Tab.	Tabulated results for tentatively identified compounds
Surr. Rec.	Surrogate recoveries results
GC Screen Tab.	Tabulated GC screen results indicating required level of followup
GC/MS Chromatograms	Chromatograms of GC/MS analysis runs
Target Cmpd. Quan. List	Target compounds quantitation list, showing areas, ret. times
Target Cmpd. Spectra	Enhanced and unenhanced spectra of target compound hits
Tent. I.D. Cmpd. Q.L.	Quantitation list for tentatively identified compounds
Tent. Cmpd. Lib. Srch.	Spectra and library match spectra of tentatively identified compounds
Chro./Sens. Checks	EICP's and R.R.F.'s for chromatographic sensitivity checks
BFB/DFTPP Tune Data	Spectra intensity lists, and criteria comparison forms for BFB, DFTPP
I.S. Areas Charts	Internal standards area control charts and description of remedial action
I.S. Rel. Resp. Form	Internal standards relative response listings for each sample run
RF and amts.: Calib. Chk.	Tabulated response factors and amount injected for all cmpds. in calibration check
RF and amts.: 3-Pt. Calib.	Tabulated response factors and amount injected for all cmpds. in 3-point calibration
Chromatograms: Calib. Chk.	Chromatograms for calibration check standard
Chromatograms: 3-Pt. Calib.	Chromatograms for 3-point multilevel calibration standards.
Linearity: 3-Pt. Calib.	Tabulated correlation coefficient or relative standard deviation for calibration
RF Comparison	Tabulated comparison of calibration Response Factor with check standard
Sample/Field Blank	Equipment rinse or reagent water blank shipped with samples from field
Method/Instr. Blank	Method or instrument blank which is prepared at lab
Lab Duplicate	Sample which was split by lab for duplicate analysis
Field Dup/Rep	Sample which was split or collected twice in the field
Mat. Spk./M. Std.	Matrix spike or method standard (blind, or done by lab)
Pest. Tab.	Tabulated results for pesticides
Pest. D.L. Tab.	Tabulated detection limits for pesticides
Pest. Chro.	Chromatograms for pesticide screening
2nd Col. Conf.	Confirmation of pesticide results by using a second GC column and temperature
GC/MS Conf.	Confirmation of pesticide results by GC/MS analysis
Pest. Dup., Spk. Blk.	Pesticide duplicate, spike, and blank
Pest. Std. Chro.	Chromatogram of pesticide standard
Pest. Std. I.D.	Pesticide standard identification form
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TCDD Tab., D.L., EICP, Blk.	TCDD tabulated results, detection limits, extracted ion current profile, blank

KEY TO SYMBOLS USED IN DATA COMPLETENESS TABLE

Symbol	Meaning	Symbol	Meaning
✓	Data item present	I	Incomplete data item
NA	Data item not applicable or not required	NC	Data item not clearly explained (units of conc., etc)
P	Data item within established control limits		
F	Data item outside established control limits	* or [number]	See footnote
MS	Missing item	XX/XX/XX XX:XX	Date/Time of run (calibration, etc.)

300548

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
VOA	field	low	sol	CC371	NUS*	$MeCl_2$ (3 ug/kg / 5) #1 wet —
						2-butanone (17.2 ug/kg / 11) #1
VOA	field	low	sol	CC389	NUS*	$MeCl_2$ (14 ug/kg / 5) #1
						2-butanone (10 ug/kg / 10) #1
						benzene (0.2 ug/kg / 5) #1
VOA	lab	low	sol	29VBLK	S-cubed.	$MeCl_2$ (7 ug/kg / 5) #1
						Acetone (10 ug/kg / 10) #1
						2-butanone (18 ug/kg / 10) #1
BNA	lab	low	sol	8BNBLK	S-cubed	Di-n-butyl phthalate (240 ug/kg / 330) #1
						bis(2-ethylhexyl) phthalate (58 ug/kg / 330) #2
Pest	lab	low	sol	BLK 10-3	S-cubed	ND.
VOA	lab	low	sol	30VBLK	S-cubed	$MeCl_2$ (14 ug/kg / 5) #1
						Acetone (428 ug/kg / 10) #1
						2-butanone (150 ug/kg / 10) #1
BNA	lab	low	sol	SBLK 104	S-cubed	di-n-butyl phthalate (210 ug/kg / 330) #1.
						bis(2-ethylhexyl) phthalate (53 ug/kg / 330) #1
Pest	lab	low	sol	BLK 104	S-cubed	ND.
VOA	lab	low	sol	1VBLK	S-cubed	$MeCl_2$ (4 ug/kg / 5) #1
						Acetone (38 ug/kg / 10) #1
						2-butanone (19 ug/kg / 10) #1
Pest	lab	low	sol	BLK 10/23	S-cubed	ND
VOA	lab	low	sol	3VBLK	S-cubed.	$MeCl_2$ (9 ug/kg / 5) #1
Pest	lab	low	sol	BLK 10/25	S-cubed	ND

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FOR

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

* This field blk only analyzed for VOAs.

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
VOA	lab	low	Sol	4VBLK	S-cubed	$meCl_2$ (10ug/kg / 5) #1 Acetone (10ug/kg / 10) #1
VOA	lab	low	Sol	5VBLK	S-cubed	$meCl_2$ (4ug/kg / 5) #1
VOA	lab	low	Sol	6VBLK	S-cubed	$meCl_2$ (4ug/kg / 5) #1 2-butanone (27ug/kg / 10) #2

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FOR

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

* The laboratory did not submitt a reagent blk for the medium protocol.

METHOD BLANK SUMMARY

Case No. 5027 Region 3 Contractor S-CUBED Contract No. 68-01-7021

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (INCL. TIC OR UNKNOWN)	CONC.	UNITS	CRQL
29VBLK	9/29/85	VOA	S	L	4021	75-09-2	methylene chloride	7	ug/kg	5
29VBLK	9/29/85	VOA	S	L	4021	~~75-09-2~~ 78-93-3	2-butanone	18	ug/kg	10
~~29VBLK~~	~~9/29/85~~	~~VOA~~	~~S~~	~~L~~	~~4021~~	~~67-64-1~~	~~ACETONE~~	~~9J~~	~~ug/kg~~	~~10~~
29VBLK	9/29/85	VOA	S	L	4021	NA	unknown	9J	ug/kg	NA
30VBLK	9/30/85	VOA	S	L	4021	75-09-2	methylene chloride	14	ug/kg	5
30VBLK	9/30/85	VOA	S	L	4021	78-93-3	2-butanone	15	ug/kg	10
30VBLK	9/30/85	VOA	S	L	4021	67-64-1	acetone	42	ug/kg	10
30VBLK	9/30/85	VOA	S	L	4021	NA	unknown	30J	ug/kg	NA
1VBLK	10/1/85	VOA	S	L	4021	75-09-2	methylene chloride	4J	ug/kg	5
1VBLK	10/1/85	VOA	S	L	4021	67-64-1	acetone	30	ug/kg	10
1VBLK	10/1/85	VOA	S	L	4021	78-93-3	2-butanone	19	ug/kg	10
1VBLK	10/1/85	VOA	S	L	4021	NA	unknown	13J	ug/kg	NA
4VBLK	10/4/85	VOA	S	L	4021	75-09-2	methylene chloride	~~10~~ 9	ug/kg	5
4VBLK	10/4/85	VOA	S	M	4021	67-64-1	acetone	10	ug/kg	10
4VBLK	10/4/85	VOA	S	M	4021	75-09-2	methylene chloride	10	ug/kg	5
5VBLK	10/5/85	VOA	S	M	4021	75-09-2	methylene chloride	4J	ug/kg	5
6VBLK	10/5/85	VOA	S	M/L	4021	75-09-2	methylene chloride	4J	ug/kg	5
~~6VBLK~~	~~10/10/85~~	~~VOA~~	~~S~~	~~M/L~~	~~4021~~	~~78-93-3~~	~~2-butanone~~	~~27~~	~~ug/kg~~	~~10~~
8BNBLK	10/5/85	ABN	S	L	4500	84-74-2	dinbutyl phthalate	240J	ug/kg	500
~~8BNBLK~~	~~10/5/85~~	~~ABN~~	~~S~~	~~L~~	~~4500~~	~~117-84-0~~	~~Bis (2-ethyl hexyl) phthalate~~	~~53J~~	~~ug/kg~~	~~500~~
8BNBLK	10/8/85	ABN	S	L	4500	NA	unknown	12,000J	ug/kg	NA

Comments:

No method blank was submitted for medium VOA protocol.

300551

METHOD BLANK SUMMARY

Case No. 5027 Region 3 Contractor S-CUBED Contract No. 68-01-~~6868~~ 7021

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (HSL, TIC OR UNKNOWN)	CONC.	UNITS	CRDL
8BNBLK	10/8/85	ABN	S	L	4500	15870-10-7	1 heptene, 2 methyl	330J	ug/kg	NA
8BNBLK	10/8/85	ABN	S	L	4500	NA	unknown	260J	ug/kg	NA
SBLKR04	10/9/85	ABN	S	L	4500	84-74-2	dibutyl phthalate	210J	ug/kg	500
SBLK104	10/9/85	ABN	S	L	4500	117-81-7	bis-(2-ethyl hexyl) phthalate	~~210J~~ 53	ug/kg	500
SBLK104	10/9/85	ABN	S	L	4500	NA	unknown	11,000J	ug/kg	NA
SBLK104	10/9/85	ABN	S	L	4500	NA	unknown	260J	ug/kg	NA
SBLK104	10/9/85	ABN	S	L	4500	NA	unknown	210J	ug/kg	NA
BLANK 10/3	10/22	Pest	S	L	5880A	NA	None	NA	NA	NA
BLANK 10/4	10/22	Pest	S	L	5880A	NA	None	NA	NA	NA
BLANK 10/24	10/25	Pest	S	L	5880A	NA	None	NA	NA	NA
BLANK 10/23	10/25	Pest	S	L	5880A	NA	None	NA	NA	NA

Comments:

300532

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. 5027 Contract Laboratory S-CUBED Contract No. 68-01- 7021

Low ✓ Medium ✓

	VOLATILE			SEMI-VOLATILE								PESTICIDE	
SMO TRAFFIC NO.	TOLUENE-D8 (81-117)	BFB (74-121)	1,2 DICHLORO-ETHANE-D4 (70-121)	NITRO-BENZENE-D5 (23-120)	2-FLUORO-DIPHENYL (30-114)	TERPHENYL-D14 (18-137)			PHENOL-D5 (24-113)	2-FLUORO-PHENOL (25-121)	2,4,6 TRIBROMO-PHENOL (19-122)	DIBUTYL-CHLORENDATE (20-130) **	
CC348	111	92	99	91	98	85			95	[1] 125*	94	56	
CC349	116	88	90	82	96	93			88	85	95	A	
CC350	117	106	78	86	102	92			91	[1] 132*	102	58	
CC351	109	118	85	68	81	97			79	78	81	70	
CC352	103	81	89	87	99	100			83	90	78	44	
CC353	155* [4]	71*	81	82	94	99			80	82	86	64	
CC354	110	92	84	93	98	108			85	113	89	65	
CC354MS	111	85	81	112	105	138* [1]			[1] 119*	111	82	NA	
CC354MSD	109	104	97	102	97	117			99	111	93	NA	
CC355	117	85	87	77	85	76			74	74	67	58	
CC356	112	96	105	96	110	120			100	97	86	56	
CC357	110	92	112	77	90	106			81	83	86	55	
CC358	103	95	108	81	95	111			88	92	88	67	
CC360	113	89	96	79	95	111			83	78	62	67	
CC361	97	87	120	69	83	84			73	71	60	197*	[2]
CC362	117	92	117	74	88	106			82	81	89	90	
CC363	116	90	99	85	98	103			91	92	95	68	
CC373	90	96	105	89	89	87			91	119	70	Ø*	[3]
CC374	87	96	118	96	100	85			90	114	72	27	
CC375	110	112	120	45	92	94			70	59	48	A	
CC376	97	104	112	84	94	101			92	92	82	64	
CC376MS	NA	NA	NA	85	94	103			95	94	95	NA	
CC376MSD	NA	NA	NA	91	99	106			99	100	100	NA	
CC377	90	92	103	91	94	94			90	80	64	Ø*	[3]
CC378	98	85	76	82	90	99			90	86	77	Ø*	[3]

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: ✓ out of ✓ ; outside of QC limits

Semi-Volatiles: ✓ out of ✓ ; outside of QC limits

Pesticides: 4 out of 19 ; outside of QC limits

7/86

Comments: [1] Not substantially out of criteria to effect data.
[2] No positive pesticide results - so no effect on data.
[3] D.L. for pesticides may be substantially higher [4] see rerun data - next page
A - No recovery due to dilution of sample

300553

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SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. 5027 Contract Laboratory S-CUBED Contract No. 68-01-7021

Low ✓ Medium ✓

	SMO TRAFFIC NO.	VOLATILE: TOLUENE-D8 (81-117)	VOLATILE: BFB (74-121)	VOLATILE: 1,2 DICHLORO-ETHANE-D4 (70-121)	SEMI-VOLATILE: NITRO-BENZENE-D5 (23-120)	SEMI-VOLATILE: 2-FLUORO-BIPHENYL (30-116)	SEMI-VOLATILE: TERPHENYL-D14 (18-137)			SEMI-VOLATILE: PHENOL-D5 (24-113)	SEMI-VOLATILE: 2-FLUORO-PHENOL (25-121)	SEMI-VOLATILE: 2,4,6 TRIBROMO-PHENOL (19-122)	PESTICIDE: DIBUTYL-CHLORENDATE ** (20-150)	
	CC378MS	94	92	88	NA	NA	NA			NA	NA	NA	NA	
	CC378MSD	99	99	82	NA	NA	NA			NA	NA	NA	NA	
	CC379	98	97	114	75	88	98			75	37	60	46	
	CC380 ✓	100	96	85	90	106	111			101	98	91	Ø *	[3]
	CC381 ✓	95	91	78	76	86	92			85	79	65	Ø *	[3]
	CC382	94	104	100	113	88	49			96	112	77	A	
	CC383	92	104	113	[2] 127*	102	81			104	[2] 123*	57	A	
	CC384	92	99	97	101	81	52			102	102	45	312	[4]
	CC385	96	97	88	94	108	111			99	101	101	42	
(1)	LABBLANK	100	118	101	102	97	90			84	99	73	59	
(2)	LABBLANK	103	98	90	93	93	89			92	120	73	66	
	1VBLK	101	107	95	NA	NA	NA			NA	NA	NA	NA	
	3VBLK	108	115	89	NA	NA	NA			NA	NA	NA	NA	
	4VBLK	99	105	91	NA	NA	NA			NA	NA	NA	NA	
	5VBLK	93	88	90	NA	NA	NA			NA	NA	NA	NA	
	6VBLK	108	107	112	NA	NA	NA			NA	NA	NA	NA	
	CC353RE	135* [1]	80	93	NA	NA	NA			NA	NA	NA	NA	
	CC371	101	101	103	NA	NA	NA			NA	NA	NA	NA	
	CC389	107	106	77	NA	NA	NA			NA	NA	NA	NA	
10/23	LABBLANK	NA	NA	NA	NA	NA	NA			NA	NA	NA	53	
10/24	LABBLANK	NA	NA	NA	NA	NA	NA			NA	NA	NA	52	
	CC374MS	NA	NA	NA	NA	NA	NA			NA	NA	NA	19	
	CC374MSD	NA	NA	NA	NA	NA	NA			NA	NA	NA	Ø *	[3]
	CC351MS	NA	NA	NA	NA	NA	NA			NA	NA	NA	59	
	CC351MSD	NA	NA	NA	NA	NA	NA			NA	NA	NA	68	

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: 3 out of 126 ; outside of QC limits

Semi-Volatiles: 6 out of 204 ; outside of QC limits

Pesticides: 3 out of 13 ; outside of QC limits

7/86

Comments. [1] Reanalysis still high D8 Tol - no effect since no confident VOAs

[2] - Not substantially out of criteria

A - No recovery due to dilution of sample

[3] The Q.L. for pesticides may be substantially higher - [4] Although questioned, if present [illegible]

300554

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 5027 Contractor S-CUBED Contract No. 68-01-7021

Low Level ✓ (PAN) Medium Level ✓ (VOA)

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. cc378	1,1-Dichloroethene	4400	0	3700	84	3900	89	5	22	59-172
	Trichloroethene	3700	0	3300	89	3100	84	6	24	62-137
	Chlorobenzene	3600	0	3400	94	3800	106	11	21	60-133
	Toluene	3600	180	3200	88	4000	106	8	21	59-139
	Benzene	4600	0	4200	91	4100	89	2	21	66-142
B/N SMO SAMPLE NO. cc376	1,2,4-Trichlorobenzene	3800	0	920	24*	1000	26*	8	23	38-107
	Acenaphthene	3800	0	1800	47	1900	50	5	19	31-137
	2,4 Dinitrotoluene	3800	0	1400	37	1600	42	13	47	28-89
	Pyrene	3800	0	2300	61	2500	66	8	38	35-142
	N-Nitrosodi-n-Propylamine	3800	0	1600	42	1800	47	12	38	41-126
	1,4-Dichlorobenzene	3800	0	1600	42	1600	42	0	27	28-104
ACID SMO SAMPLE NO. cc376	Pentachlorophenol	7500	0	2500	33	2900	39	15	47	17-109
	Phenol	7500	0	3100	41	3400	45	9	35	26-90
	2-Chlorophenol	7500	0	3200	43	3500	47	9	50	25-102
	4-Chloro-3-Methylphenol	7500	0	3000	40	3200	43	6	33	26-103
	4-Nitrophenol	7500	0	3100	41	3600	48	15	50	11-114
PEST SMO SAMPLE NO. cc374	Lindane	0.8	0	0.872	109*	0.832	104	5	50	46-127
	Heptachlor	0.8	0	0.264	33*	0.416	52	58*	31	35-130
	Aldrin	0.8	0	1.024	128	0.616	77	40	43	34-132
	Dieldrin	2.0	0	1.50	75	1.480	74	1	38	31-134
	Endrin	2.0	0	0	0*	0.300	15*	100*	45	42-139
	4,4'-DDT	2.0	0	0.74	37	0.880	44	19	50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N 0 out of 6 ; outside QC limits
ACID 0 out of 5 ; outside QC limits
PEST 2 out of 6 ; outside QC limits

RECOVERY: VOAs 0 out of 10 ; outside QC limits
B/N 2 out of 12 ; outside QC limits
ACID 0 out of 10 ; outside QC limits
PEST 3 out of 12 ; outside QC limits

Comments: [1] Actual D.L 1,2,4-trichlorobenzene may be slightly higher.
[2] Actual D.L endrin may be substantially higher than reported.

300555

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 5027 Contractor S-CUBED Contract No. 68-01-7021

Low Level ✓ Medium Level

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. CC354	1,1-Dichloroethene	67	0	64	96	70	104	9	22	59-172
	Trichloroethene	56	0	56	100	57	102	2	24	62-137
	Chlorobenzene	62	0	62	100	63	102	2	21	60-133
	Toluene	66	0	67	102	67	102	0	21	59-139
	Benzene	62	0	58	94	59	95	2	21	66-142
B/N SMO SAMPLE NO. CC354	1,2,4-Trichlorobenzene	4000	0 [1]	1000	25*	1000	25*	0	23	38-107
	Acenaphthene	4000	0	2200	55	2100	53	5	19	31-137
	2,4 Dinitrotoluene	4000	0	1700	43	1600	40	6	47	28-89
	Pyrene	4000	0	3400	85	3200	80	6	36	35-142
	N-Nitrosodi-n-Propylamine	4000	0	2000	50	1800	45	11	38	41-126
	1,4-Dichlorobenzene	4000	0	1900	48	1700	43	11	27	28-104
ACID SMO SAMPLE NO. CC354	Pentachlorophenol	8100	0	2500	31	2400	30	4	47	17-109
	Phenol	8100	0	4400	54	3500	43	23	35	26-90
	2-Chlorophenol	8100	0	4100	51	3600	44	13	50	25-102
	4-Chloro-3-Methylphenol	8100	0	3200	40	3100	38	3	33	26-103
	4-Nitrophenol	8100	0	3300	41	3300	41	0	50	11-114
PEST SMO SAMPLE NO. CC351	Lindane	0.8	0	0.808	101	0.904	113	12	50	46-127
	Heptachlor	0.8	0	0.832	104	0.888	111	7	31	35-130
	Aldrin	0.8	0	0.808	101	0.848	106	5	43	34-132
	Dieldrin	2.0	0	1.98	99	2.10	105	6	38	31-134
	Endrin	2.0	0	2.06	103	2.22	111	8	45	42-139
	4,4'-DDT	2.0	0	2.82	141*	2.96	148*	5	50	23-134

no positives no effect.

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N 0 out of 6 ; outside QC limits
ACID 0 out of 5 ; outside QC limits
PEST 0 out of 6 ; outside QC limits

RECOVERY: VOAs 0 out of 10 ; outside QC limits
B/N 2 out of 12 ; outside QC limits
ACID 0 out of 10 ; outside QC limits
PEST 2 out of 12 ; outside QC limits

Comments: [1] The actual D.L for 1,2,4-trichlorobenzene may be slightly higher.

300556

FORM III 8/85

Duplicate/Triplicate Analysis of Non-Matrix Spiked (Indigenous) Compounds

Outliers are tabulated below for three types of multiple analyses:

(1) Field duplicates CC378 & CC386

(2) Un-spiked laboratory duplicates

(3) Matrix spike duplicate plus corresponding unspiked sample evaluated for non-matrix spiked (Indigenous) compounds. (Spike recoveries are evaluated on a separate form.)

Analytical Fraction	Outlier Criteria (for tabulation purposes only)			
	Relative standard deviation		Equivalent Relative Percent Difference	
	solid	aqueous	solid	aqueous
VOA				
BNA				
PEST				

	CONCENTRATIONS								
	Analysis No. 1		Analysis No. 2		Analysis No. 3		relative standard deviation or relative percent difference	concentration units	footnotes
COMPOUND	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.			
Methylene Chloride	CC378	3000	CC386	72			191%	ug/g	#1
Acetone	↓	3200	↓	15			190%	↓	#1
2-butanone		7200		ND			200%		#1
Carbon Tet		310		ND			200%		#2
Toluene		180		ND			200%		#3
di-n-butylphthalate		35		1300			190%		#1
bis(2-ethylhexyl)phthalate	↓	190	↓	ND			200%	↓	#1

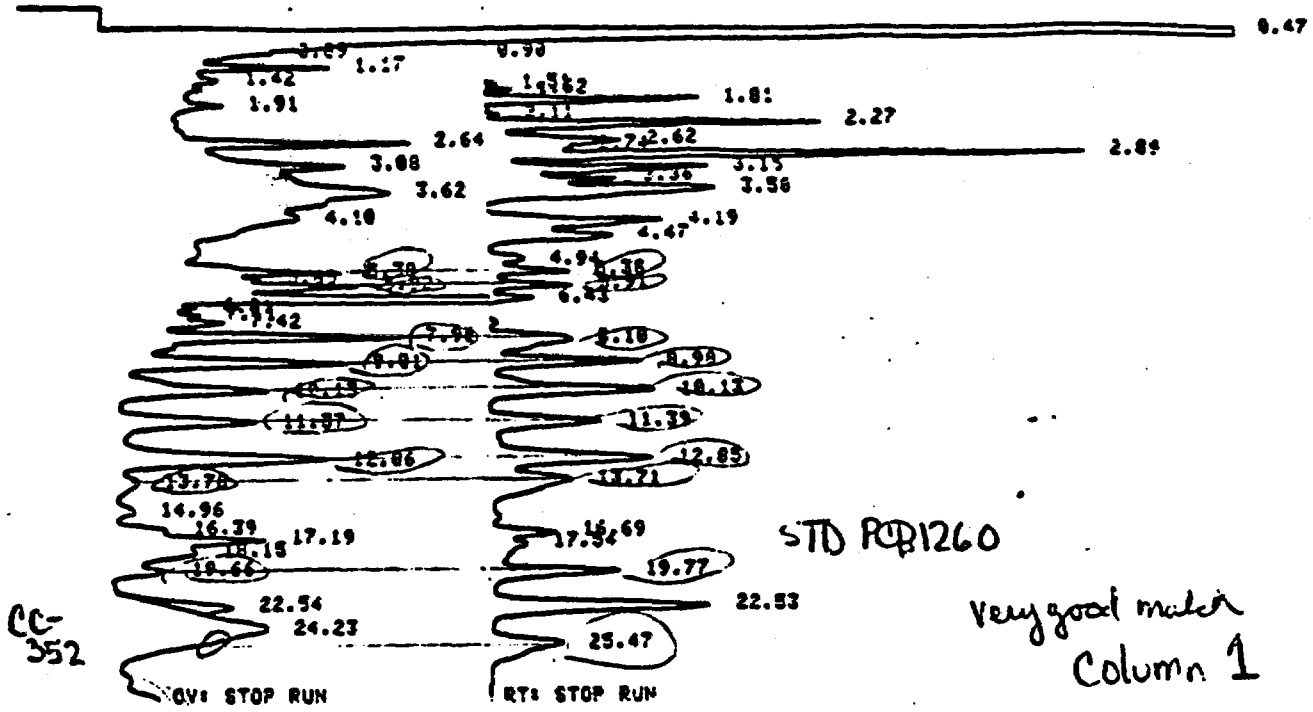
COMMENTS: CC378 - run by medium protocol - analyzed by S-cubed
CC386 run by low protocol - analyzed by NUS Labs

#1 Questioned by blank no effect

#2 Reason to suspect an artifact of medium VOA extraction - No medium level blk was supplied.

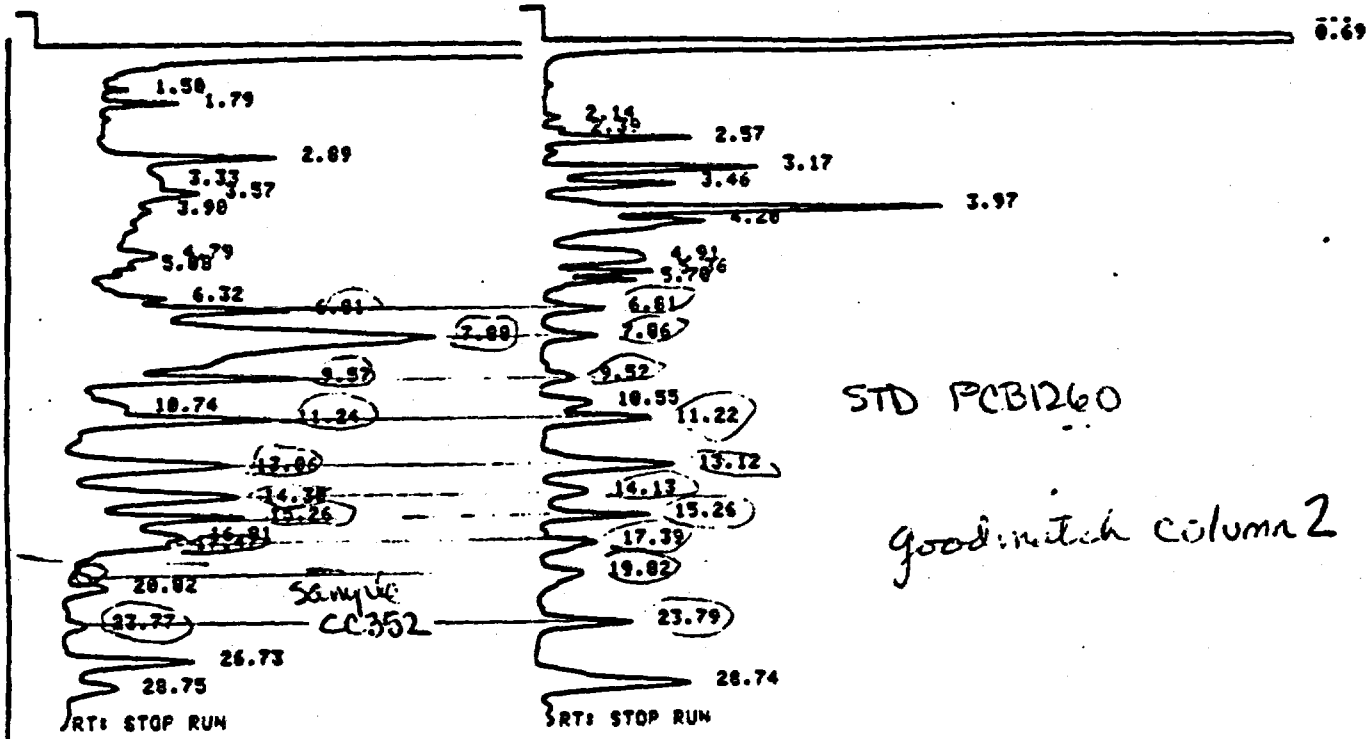
#3 Consider estimated.

300557



very good match
Column 1

HP 5880A SAMPLER INJECTION @ 20:50 OCT 23, 1985
SAMPLE # : ID CODE :
@ PCB 1016/1260 1ppm
CASE# 5027 SP2250/2481 1UL INJ. FV= 20.0 ML IW= NA G %MOIST= NA



good match column 2

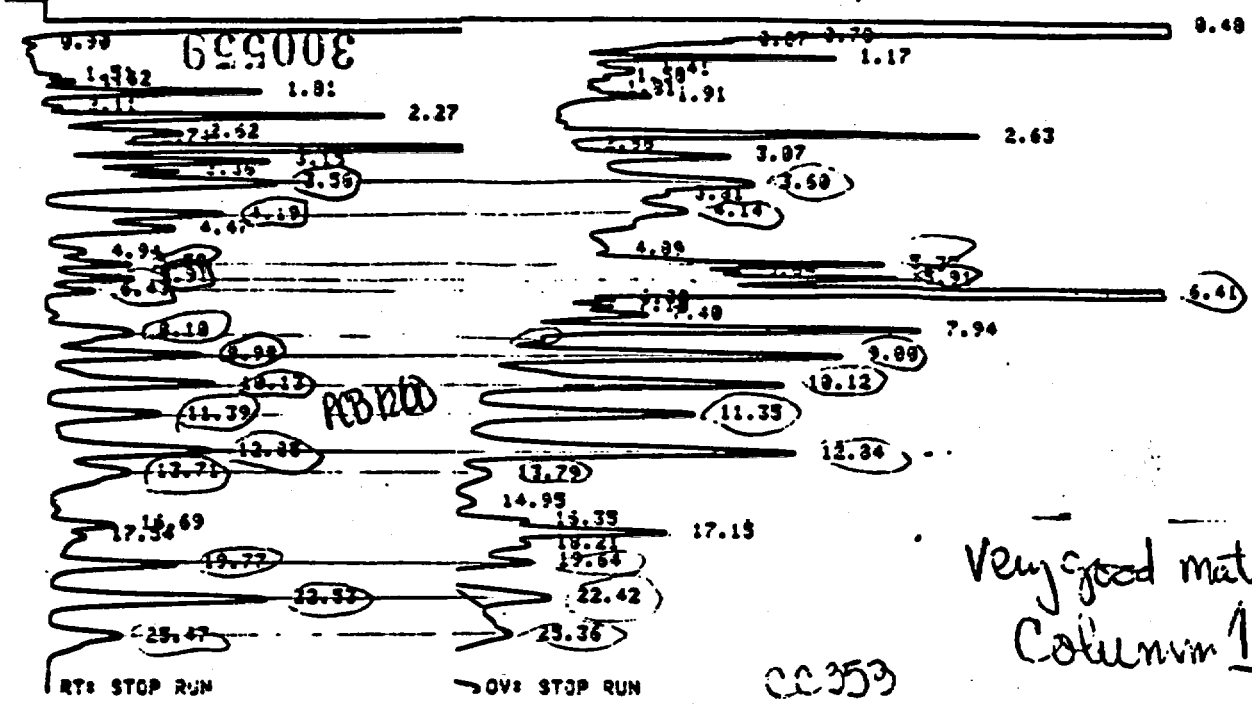
HP 5880A SAMPLER INJECTION @ 20:58 OCT 23, 1985
SAMPLE # : ID CODE :
@ PCB 1016/1260 1ppm
CASE# 5027 SP2180 1UL INJ. FV= 20.0 ML IW= NA G %MOIST= NA

EVALUATION OF CONFIRMATIONS OF GC ANALYSES

lab reported 680 ug/kg reviewer quant 737 ug/kg ✓ OK	300558
2 Column	TYPE OF CONFIRMATION (2 COL / GC/MS)
yes	REVIEWER CONFIDENT

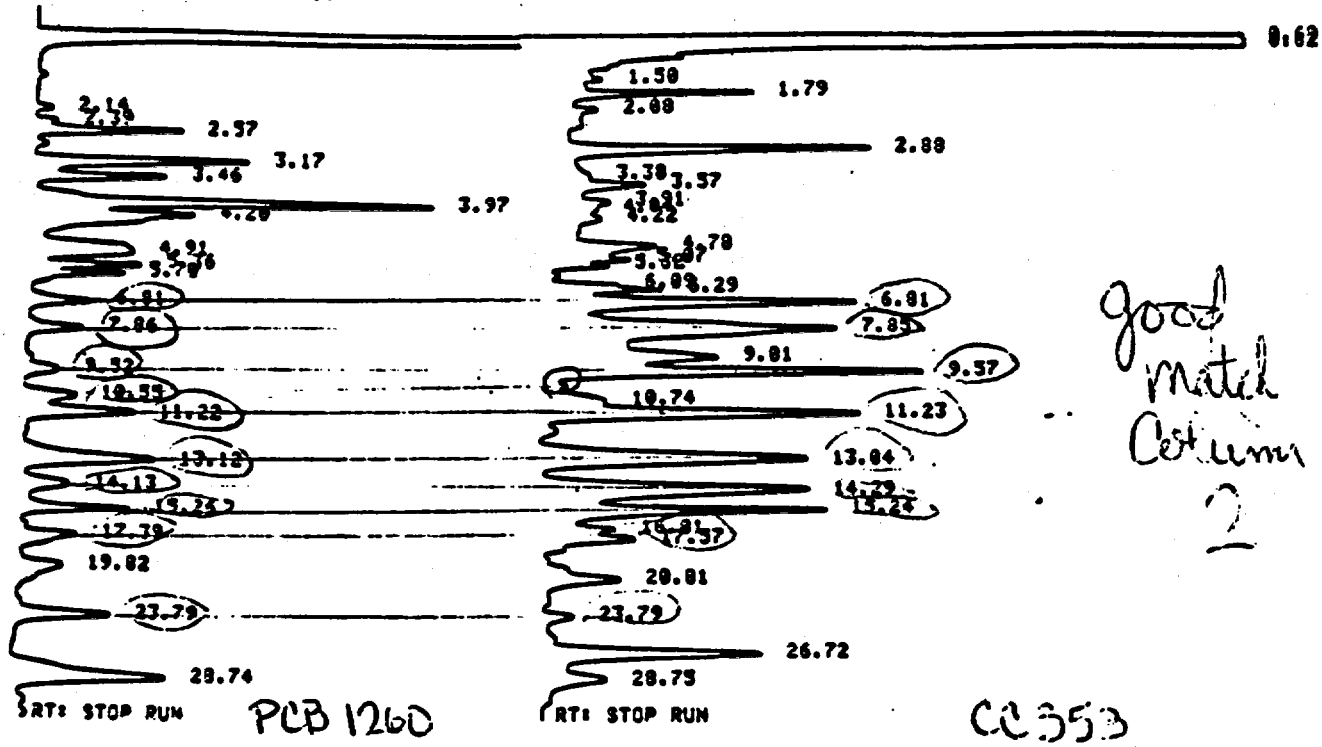
PAGE 2 of 3

300559



Very good match Column 1

EXPT 5880A SAMPLER INJECTION @ 23:58 OCT 25, 1985
SAMPLE # : ID CODE :
11 CC-353



Good match Column 2

EXPT 5880A SAMPLER INJECTION @ 00:12 OCT 26, 1985
SAMPLE # : ID CODE :
11 CC-353
CASE# 5827 SP2100 1UL INJ. FV= 20.0 ML IW=30.0 G %MOIST= 32.4

lab reported 2500 ug/kg
reviewer quant 2619 ug/kg ✓ok

2 Column	TYPE OF CONFIRMATION (2 COL / GC/MS)
yes.	REVIEWER CONFIDENT

EVALUATION OF CONFIRMATIONS OF GC ANALYSES

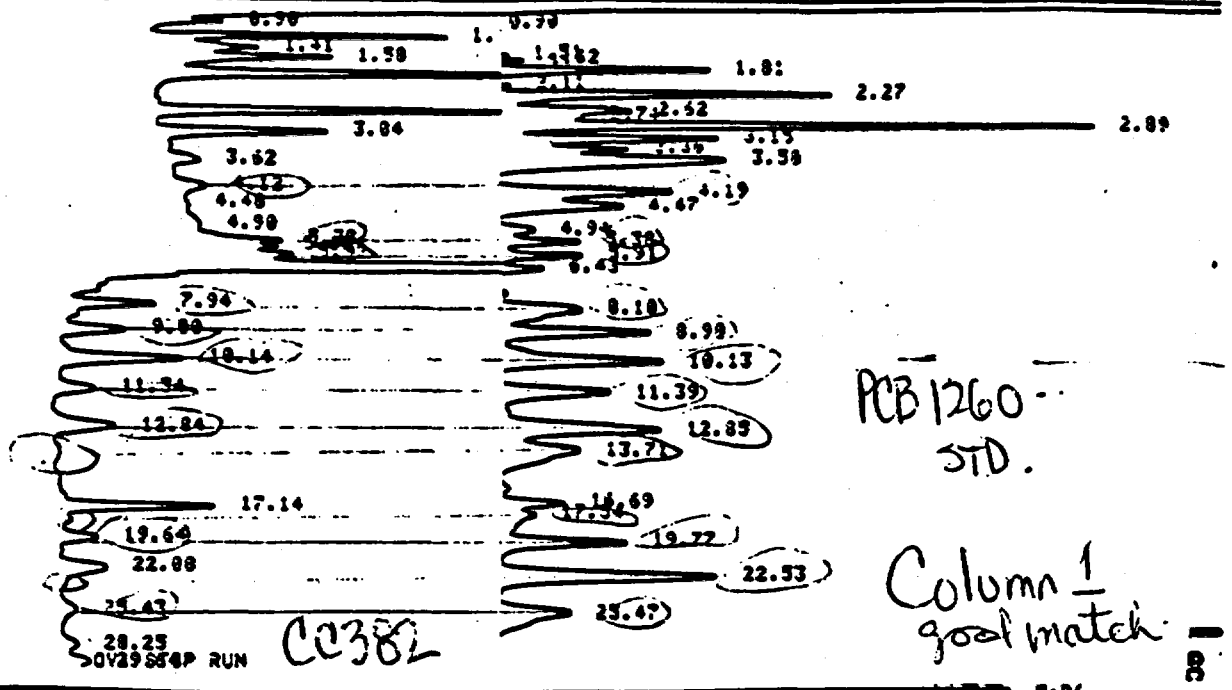
169

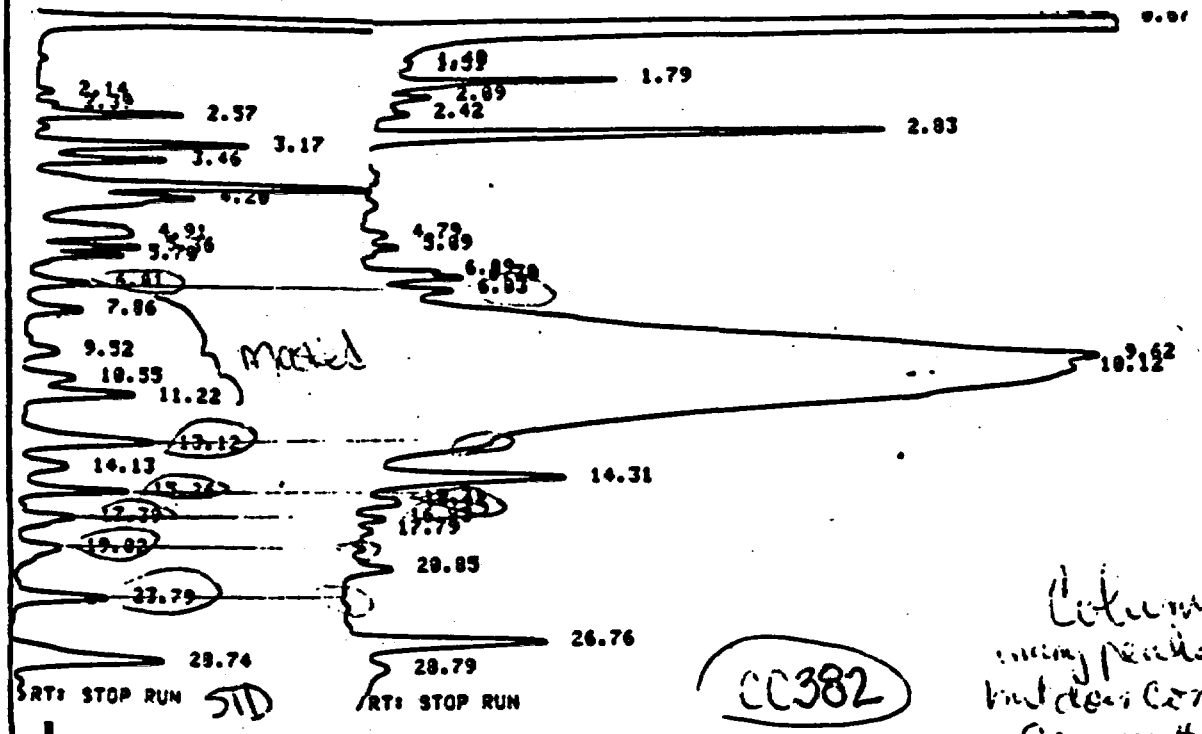
300560

PAGE 3 of 3.

COMMENTS:

EVALUATION OF CONFIRMATIONS OF GC ANALYSES





HP3 5880A SAMPLER INJECTION @ 05:55 OCT 26, 1985
SAMPLE # : ID CODE :
21 CC-382 Y3
CASE# 5027 SP2100 1UL INJ. FV= 20.0 ML IW=30.1 G %MOIST= 15.7
ESTD

lab reported 900 ug/kg
review quad 893 ug/kg ✓ ok

2 Columns	TYPE OF CONFIRMATION (2 COL / GC/MS)
yes	REVIEWER CONCURRENT

INITIAL CALIBRATION DATA - VOLATILE COMPOUNDS

CASE NO. 5027 CONTRACT LAB: S-CUBED
CONTRACT NO. 68-01-7031 INSTRUMENT IDENTIFIER: 4021
CALIBRATION DATE: 09/30/85
MINIMUM MEAN RF FOR SPCC IS 0.300
MAXIMUM %RSD FOR CCC IS 30%

COMPOUND	RF 20NG	RF 50NG	RF 100NG	RF 150NG	RF 200NG	MEAN RF	%RSD
45V METHYL CHLORIDE **	1.223	0.634	1.220	1.195	1.596	1.173	26.250
46V METHYL BROMIDE	1.947	2.479	2.078	3.205	2.979	2.537	19.323
88V VINYL CHLORIDE *	1.822	1.705	1.671	2.538	2.668	2.081	20.718
16V CHLOROETHANE	0.923	0.761	0.879	1.051	1.462	1.015	23.820
44V METHYLENE CHLORIDE	1.655	1.189	1.603	1.624	1.812	1.576	13.146
ACETONE	0.073	0.051	0.089	0.072	0.099	0.077	20.965
CARBON DISULFIDE	4.555	4.944	5.118	5.141	5.545	5.061	6.336
29V 1,1-DICHLOROETHYLENE *	1.226	1.330	1.409	1.388	1.383	1.347	4.907
13V 1,1-DICHLOROETHANE **	2.219	2.148	2.550	2.395	2.352	2.333	6.010
30V 1,2-TRANS-DICHLOROETHYLE	1.273	1.278	1.540	1.465	1.400	1.391	7.487
23V CHLOROFORM *	2.542	2.551	3.030	2.769	2.513	2.681	7.352
10V 1,2-DICHLOROETHANE	0.071	0.154	0.177	0.179	0.175	0.151	27.189
MEK 2-BUTANONE	0.015	0.031	0.019	0.021	0.024	0.022 [1]	24.311
11V 1,1,1-TRICHLOROETHANE	0.435	0.715	0.466	0.488	0.470	0.515	19.721
6V CARBONTETRACHLORIDE	0.216	0.358	0.285	0.303	0.314	0.295	15.629
VINYL ACETATE	0.024	0.043	0.050	0.056	0.060	0.047 [1]	26.749
48V DICHLOROBROMOMETHANE	0.017	0.037	0.040	0.044	0.043	0.037 [1]	26.780
12V 1,2-DICHLOROPROPANE *	0.301	0.232	0.341	0.314	0.325	0.303	12.447
33V TRANS-1,3-DICHLOROPROPYL	0.389	0.373	0.467	0.459	0.465	0.431	9.491
87V TRICHLOROETHYLENE	0.406	0.427	0.432	0.432	0.421	0.423	2.272
51V CHLORODIBROMOMETHANE	0.169	0.189	0.217	0.235	0.246	0.211	13.491
14V 1,1,2-TRICHLOROETHANE	0.267	0.269	0.304	0.327	0.319	0.297	8.290
4V BENZENE	0.836	0.764	0.925	0.955	0.937	0.883	8.201
34V CIS-1,3-DICHLOROPROPYLEN	0.317	0.359	0.381	0.418	0.406	0.376	9.540
19V 2-CHLOROETHYL VINYL ETHE	0.019	0.027	0.047	0.055	0.056	0.041 [2]	36.080 LOQ
47V BROMOFORM **	0.376	0.317	0.311	0.344	0.339	0.337	6.799
2-HEXANONE	0.035	0.029	0.099	0.110	0.121	0.079	48.803 LOQ
4-METHYL-2-PENTANONE	0.012	0.013	0.048	0.063	0.071	0.04[illegible]	59.191
85V TETRACHLOROETHYLENE	1.365	1.096	1.529	1.568	1.503	1.412	12.198
15V 1,1,2,2-TETRACHLOROETH**	1.029	0.664	1.279	1.343	1.374	1.138	23.365
86V TOLUENE *	2.239	1.884	2.520	2.581	2.508	2.346	11.050
7V CHLOROBENZENE **	3.206	3.260	3.411	3.463	3.338	3.335	2.821
38V ETHYLBENZENE *	1.663	1.907	1.871	1.943	1.864	1.849	5.260
STYRENE	3.230	4.513	4.040	4.613	4.452	4.170	12.196
M-XYLENE	2.533	3.738	2.790	3.124	2.915	3.020	13.464
O-XYLENE	2.427	3.679	2.567	2.923	2.748	2.869	15.280
P-XYLENE	2.427	3.679	2.567	2.923	2.748	2.869	15.280

* CCC

** SPCC

[1] Although questioned, 2-butanone estimated in samples 352, 353, 354 & 355

[2] D.L for vinyl acetate, Cl_2 Br methane, 2-chloroethyl vinyl ether & M.IBK unacceptable for 352, 353, 354 & 355

INITIAL CALIBRATION DATA - VOLATILE COMPOUNDS

CASE NO. - 5027 CONTRACT LAB: S-CUBED
CONTRACT NO. 68-01-7021 INSTRUMENT IDENTIFIER: 4021
CALIBRATION DATE: 10/3/85
MINIMUM MEAN RF FOR SPCC IS 0.300
MAXIMUM %RSD FOR CCC IS 30%

COMPOUND	RF 20NG	RF 50NG	RF 100NG	RF 150NG	RF 200NG	MEAN RF	%RSD
45V METHYL CHLORIDE **	1.503	1.115	1.557	1.605	1.866	1.529	15.786
46V METHYL BROMIDE	1.290	1.395	1.794	1.495	1.846	1.564	14.027
88V VINYL CHLORIDE *	1.877	1.784	2.452	2.191	2.367	2.134	12.345
16V CHLOROETHANE	1.151	1.167	1.500	1.408	1.548	1.355	12.243
44V METHYLENE CHLORIDE	2.037	2.232	4.156	2.293	2.368	2.617	29.700
ACETONE	0.164	0.165	0.157	0.168	0.167	0.164	2.344
CARBON DISULFIDE	6.189	6.949	8.850	7.608	*10.2	7.968	18.009
29V 1,1-DICHLOROETHYLENE *	1.629	1.617	2.149	1.854	2.038	1.857	11.478
13V 1,1-DICHLOROETHANE **	3.460	3.668	5.065	4.073	4.612	4.176	14.217
30V 1,2-TRANS-DICHLOROETHYLE	1.715	1.740	2.393	1.898	2.542	2.058	16.699
23V CHLOROFORM *	3.549	3.694	4.961	4.165	4.888	4.251	13.796
10V 1,2-DICHLOROETHANE	0.238	0.261	0.316	0.296	0.291	0.280	9.870
MEK 2-BUTANONE	0.030	0.044	0.027	0.025	0.023	0.030 [1]	24.811
11V 1,1,1-TRICHLOROETHANE	0.368	0.397	0.483	0.466	0.451	0.433	10.039
6V CARBONTETRACHLORIDE	0.313	0.340	0.411	0.419	0.390	0.374	11.001
VINYL ACETATE	0.028	0.039	0.039	0.050	0.046	0.040 [1]	18.198
48V DICHLOROBROMOMETHANE	0.019	0.032	0.030	0.031	0.035	0.029 [1]	17.995
32V 1,2-DICHLOROPROPANE *	0.378	0.400	0.460	0.449	0.426	0.423	7.181
33V TRANS-1,3-DICHLOROPROPYL	0.462	0.522	0.583	0.613	0.620	0.560	10.673
87V TRICHLOROETHYLENE	0.322	0.349	0.337	0.376	0.356	0.348	5.255
51V CHLORODIBROMOMETHANE	0.191	0.246	0.246	0.272	0.266	0.244	11.591
14V 1,1,2-TRICHLOROETHANE	0.255	0.305	0.294	0.325	0.268	0.289	8.712
4V BENZENE	1.098	1.150	1.226	1.271	1.302	1.209	6.236
34V CIS-1,3-DICHLOROPROPYLEN	0.359	0.429	0.494	0.480	0.494	0.451	11.543
19V 2-CHLOROETHYL VINYL ETHE	0.009	0.016	0.015	0.021	0.022	0.017 [1]	27.617
47V BROMOFORM **	0.648	0.610	0.557	0.568	0.690	0.615	8.035
2-HEXANONE	0.054	0.131	0.124	0.119	0.113	0.108	25.407
4-METHYL-2-PENTANONE	0.028	0.075	0.061	0.056	0.055	0.055	27.137
85V TETRACHLOROETHYLENE	1.117	1.212	1.268	1.235	1.340	1.234	5.900
15V 1,1,2,2-TETRACHLOROETH**	1.701	2.249	2.386	2.063	2.026	2.085	11.125
86V TOLUENE *	2.583	2.956	3.850	3.330	3.269	3.198	13.150
7V CHLOROBENZENE **	3.052	3.578	4.067	3.664	3.986	3.669	9.804
38V ETHYLBENZENE *	0.925	1.120	1.403	1.435	1.611	1.299	18.802
STYRENE	0.599	0.653	1.075	1.329	1.356	1.002	32.190 COQ
M-XYLENE	1.189	1.647	2.365	2.514	2.556	2.054	26.422
O-XYLENE	0.904	1.333	2.024	2.038	2.144	1.689	28.818
P-XYLENE	0.904	1.333	2.024	2.038	2.144	1.689	28.818

[1] Although 2-butanone qualified in 385, 381, 380. estimated.

[1] D,L Vinyl acetate, Cl_2 Bromoethane, & 2-chloroethyl vinyl ether in samples 385, 381 & 380 unreliable

* CCC
* * SPCC

300562

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 5027 CONTRACT LAB: S-CUBED

CONTRACT NO. 68-01-7021 INSTRUMENT IDENTIFIER: 4021

CALIBRATION DATE: 09/28/85

STANDARD FILE: 29V50

DATE: 9/29/85 TIME: 9:15

MAXIMUM % D FOR CCC IS 25

Minimum RF for SPCC is 0.3 (0.25 for Bromop

COMPOUND	MEAN RF(I)	RF(O)	% D
45V METHYL CHLORIDE **	0.736	1.026	39.321 LOQ
46V METHYL BROMIDE	1.530	1.251	-18.204
88V VINYL CHLORIDE *	1.021	1.132	10.885
16V CHLOROETHANE	0.552	0.667	20.796
44V METHYLENE CHLORIDE	1.141	1.291	13.163
ACETONE	0.029	0.115	296.204 [1]
CARBON DISULFIDE	3.636	3.965	9.048
29V 1,1-DICHLOROETHYLENE *	1.094	1.154	5.515
13V 1,1-DICHLOROETHANE **	1.642	2.028	23.490
30V 1,2-TRANS-DICHLOROETHYLE	1.222	1.305	6.785
23V CHLOROFORM *	2.231	2.264	1.499
10V 1,2-DICHLOROETHANE	0.159	0.192	20.966
MEK 2-BUTANONE	0.011	0.022	102.842 [2]
11V 1,1,1-TRICHLOROETHANE	0.456	0.486	6.687
6V CARBONTETRACHLORIDE	0.369	0.353	-4.437
VINYL ACETATE	0.045	0.059	31.303 LOQ
48V DICHLOROBROMOMETHANE	0.044	0.049 [3]	10.839
32V 1,2-DICHLOROPROPANE *	0.246	0.270	10.005
33V TRANS-1,3-DICHLOROPROPYL	0.366	0.482	31.507 LOQ
87V TRICHLOROETHYLENE	0.494	0.501	1.512
51V CHLORODIBROMOMETHANE	0.295	0.314	6.313
14V 1,1,2-TRICHLOROETHANE	0.292	0.394	35.147 LOQ
4V BENZENE	0.787	1.032	31.145 LOQ
34V CIS-1,3-DICHLOROPROPYLEN	0.319	0.385	20.697
19V 2-CHLOROETHYL VINYL ETHE	0.027	0.021 [3]	-22.142
47V BROMOFORM **	0.440	0.359	-18.293
2-HEXANONE	0.083	0.099	19.171
4-METHYL-2-PENTANONE	0.038	0.032 [3]	-15.448
85V TETRACHLOROETHYLENE	2.493	2.129	-14.600
15V 1,1,2,2-TETRACHLOROETH**	1.599	2.109	31.892 LOQ
86V TOLUENE *	2.508	2.692	7.336
7V CHLOROBENZENE **	3.590	3.148	-12.305
38V ETHYLBENZENE *	1.657	1.287	-22.315
STYRENE	4.450	2.224	-50.002 LOQ
M-XYLENE	4.317	3.269	-24.260
O-XYLENE	4.424	3.161	-28.561
P-XYLENE	4.521	3.161	-30.081 LOQ

[1] Acetone a contaminant - not connected

[2] Although all 2-butanone quantitation estimated - D.L 2-butanone in CC 349 unreliable

[3] D.L for CH_2Br_2 methane * CCC

2-chloroethylvinylether * SPCC

d MIBK in 348, 349, 350 & 351 unreliable

300563

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 5027 CONTRACT LAB: S-CUBED

CONTRACT NO. 68-01-7034 INSTRUMENT IDENTIFIER: 4021

CALIBRATION DATE: 09/30/85

STANDARD FILE: 1V50

DATE: 10/1/85 TIME: 8:50

MAXIMUM % D FOR CCC IS 25

Minimum RF for SPCC = 0.30

COMPOUND	MEAN RF(I)	RF(O)	% D
45V METHYL CHLORIDE **	1.173	1.876	59.863 LOQ
46V METHYL BROMIDE	2.537	2.346	-7.545
88V VINYL CHLORIDE *	2.081	2.318	11.410
16V CHLOROETHANE	1.015	1.090	7.343
44V METHYLENE CHLORIDE	1.576	1.688	7.099
ACETONE	0.077	0.076	-1.078
CARBON DISULFIDE	5.061	4.573	-9.639
29V 1,1-DICHLOROETHYLENE *	1.347	1.209	-10.227
13V 1,1-DICHLOROETHANE **	2.333	2.063	-11.565
30V 1,2-TRANS-DICHLOROETHYLE	1.391	1.218	-12.466
23V CHLOROFORM *	2.681	2.431	-9.321
10V 1,2-DICHLOROETHANE	0.151	0.133	-11.802
MEK 2-BUTANONE	0.022	0.021 [1]	-6.044
11V 1,1,1-TRICHLOROETHANE	0.515	0.460	-10.606
6V CARBONTETRACHLORIDE	0.295	0.253	-14.424
VINYL ACETATE	0.047	0.043 [2]	-8.945
48V DICHLOROBROMOMETHANE	0.036	0.035	-3.164
32V 1,2-DICHLOROPROPANE *	0.303	0.284	-6.253
33V TRANS-1,3-DICHLOROPROPYL	0.431	0.411	-4.667
87V TRICHLOROETHYLENE	0.423	0.415	-2.041
51V CHLORODIBROMOMETHANE	0.211	0.195	-7.680
14V 1,1,2-TRICHLOROETHANE	0.297	0.299	0.422
4V BENZENE	0.883	0.827	-6.377
34V CIS-1,3-DICHLOROPROPYLEN	0.376	0.361	-4.098
19V 2-CHLOROETHYL VINYL ETHE	0.041	0.041 [2]	0.927
47V BROMOFORM **	0.337	0.360	6.658
2-HEXANONE	0.079	0.093	17.335
4-METHYL-2-PENTANONE	0.041	0.041 [2]	-1.543
85V TETRACHLOROETHYLENE	1.412	1.486	5.214
15V 1,1,2,2-TETRACHLOROETH**	1.138	1.169	2.714
86V TOLUENE *	2.346	2.388	1.758
7V CHLOROBENZENE **	3.335	3.239	-2.898
38V ETHYLBENZENE *	1.849	1.690	-8.642
STYRENE	4.170	3.183	-23.664
M-XYLENE	3.020	2.605	-13.754
O-XYLENE	2.869	2.479	-13.577
P-XYLENE	2.869	2.465	-13.387

[1] → D.L 2-butanone in CC360 unreliable
→ Although 2-butanone quantitation in CC353, CC356, 57, 58, & 71 - estimated

* CCC

** SPCC

[2] D.L Vinyl acetate, Cl_2Br methane, 2-chloroethyl vinyl ether, & MIBK unreliable for samples 353, 356, 357, 358, 360 &

300564

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO. 5027 CONTRACT LAB: S-CUBED

CONTRACT NO. 68-01-7021 INSTRUMENT IDENTIFIER: 4021

CALIBRATION DATE: 10/3/85

STANDARD FILE: 4V50B

DATE: 10/04/85 TIME: 9:15

MAXIMUM % D FOR CCC IS 20.25

Minimum RF for SPCC is 0.

COMPOUND	MEAN RF(I)	RF(O)	% D
45V METHYL CHLORIDE **	1.529	1.297	-15.208
46V METHYL BROMIDE	1.564	1.330	-14.922
88V VINYL CHLORIDE *	2.134	1.758	-17.631
16V CHLOROETHANE	1.355	1.228	-9.365
44V METHYLENE CHLORIDE	2.617	1.947	-25.601
ACETONE	0.164	0.171	4.426
CARBON DISULFIDE	7.968	6.500	-18.427
29V 1,1-DICHLOROETHYLENE *	1.857	1.620	-12.759
13V 1,1-DICHLOROETHANE **	4.176	3.631	-13.049
30V 1,2-TRANS-DICHLOROETHYLE	2.058	1.863	-9.465
23V CHLOROFORM *	4.251	4.050	-4.731
10V 1,2-DICHLOROETHANE	0.280	0.255	-9.069
MEK 2-BUTANONE	0.030	0.025 [1]	-16.003
11V 1,1,1-TRICHLOROETHANE	0.433	0.415	-4.241
6V CARBONTETRACHLORIDE	0.374	0.354	-5.498
VINYL ACETATE	0.040	0.039	-3.009
48V DICHLOROBROMOMETHANE	0.029	0.030	0.999
32V 1,2-DICHLOROPROPANE *	0.423	0.382	-9.591
33V TRANS-1,3-DICHLOROPROPYL	0.560	0.477	-14.779
87V TRICHLOROETHYLENE	0.348	0.337	-3.293
51V CHLORODIBROMOMETHANE	0.244	0.220	-9.797
14V 1,1,2-TRICHLOROETHANE	0.289	0.278	-4.004
4V BENZENE	1.209	0.992	-17.952
34V CIS-1,3-DICHLOROPROPYLEN	0.451	0.408	-9.553
19V 2-CHLOROETHYL VINYL ETHE	0.017	0.010	-41.135
47V BROMOFORM **	0.615	0.651	5.895
2-HEXANONE	0.108	0.087	-19.849
4-METHYL-2-PENTANONE	0.055	0.040	-26.746
85V TETRACHLOROETHYLENE	1.234	1.295	4.932
15V 1,1,2,2-TETRACHLOROETH**	2.085	1.864	-10.578
86V TOLUENE *	3.198	3.029	-5.281
7V CHLOROBENZENE **	3.669	3.661	-0.243
38V ETHYLBENZENE *	1.299	1.088	-16.225
STYRENE	1.002	0.709	-29.206
M-XYLENE	2.054	1.684	-18.030
O-XYLENE	1.689	1.306	-22.633
P-XYLENE	1.689	1.306	-22.633

[1] Although all 2-butanone frestimed in 381, 379, 378, 380 & 376

* CCC estimated

** SPCC [2] D.C vinyl acetate, Cl_2Br methane, 2-chloroethyl vinyl ether + MIBK in CC381, 379, 378 380 + 376 unreliable.

300565

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO 5027 CONTRACT LAB: S-CUBED

CONTRACT NO. 68-01-6868 INSTRUMENT IDENTIFIER: 4021

CALIBRATION DATE: 10/3/85

STANDARD FILE: 5V50

DATE 10/05/85 TIME: 9:56

MAXIMUM % D FOR CCC IS ~~20~~ 25

minimum RF for SPCC 0.3 (0.25 Bromo

COMPOUND	MEAN RF(I)	RF(O)	% D
45V METHYL CHLORIDE **	1.529	1.217	-20.432
46V METHYL BROMIDE	1.564	1.338	-14.467
88V VINYL CHLORIDE *	2.134	1.751	-17.962
16V CHLOROETHANE	1.355	1.148	-15.231
44V METHYLENE CHLORIDE	2.617	1.976	-24.500
ACETONE	0.164	0.124	-24.388
CARBON DISULFIDE	7.968	6.682	-16.136
29V 1,1-DICHLOROETHYLENE *	1.857	1.716	-7.591
13V 1,1-DICHLOROETHANE **	4.176	3.625	-13.197
30V 1,2-TRANS-DICHLOROETHYLE	2.058	1.640	-20.276
23V CHLOROFORM *	4.251	3.702	-12.921
10V 1,2-DICHLOROETHANE	0.280	0.217	-22.654
MEK 2-BUTANONE	0.030	0.022	-26.306
11V 1,1,1-TRICHLOROETHANE	0.433	0.420	-2.954
6V CARBONTETRACHLORIDE	0.374	0.393	4.929
VINYL ACETATE	0.040	0.032	-19.583
48V DICHLOROBROMOMETHANE	0.029	0.029	0.228
32V 1,2-DICHLOROPROPANE *	0.423	0.367	-13.186
33V TRANS-1,3-DICHLOROPROPYL	0.560	0.510	-8.991
87V TRICHLOROETHYLENE	0.348	0.310	-10.880
51V CHLORODIBROMOMETHANE	0.244	0.230	-5.680
14V 1,1,2-TRICHLOROETHANE	0.289	0.269	-6.896
4V BENZENE	1.209	1.164	-3.769
34V CIS-1,3-DICHLOROPROPYLEN	0.451	0.420	-6.966
19V 2-CHLOROETHYL VINYL ETHE	0.017	0.012	-27.735
47V BROMOFORM **	0.615	0.805	30.987 LOQ
2-HEXANONE	0.108	0.068	-36.694
4-METHYL-2-PENTANONE	0.055	0.046	-16.987
85V TETRACHLOROETHYLENE	1.234	1.327	7.488
15V 1,1,2,2-TETRACHLOROETH**	2.085	1.856	-11.002
86V TOLUENE *	3.198	3.074	-3.862
7V CHLOROBENZENE **	3.669	3.518	-4.133
38V ETHYLBENZENE *	1.299	1.369	5.425
STYRENE	1.002	0.811	-19.073
M-XYLENE	2.054	1.875	-8.695
O-XYLENE	~~3.377~~ 1.688	~~3.046~~ 1.523	-9.809
P-XYLENE	~~3.377~~ 1.688	~~3.045~~ 1.523	-9.839

OK OK

* - CCC

** - SPCC → DL 2-butanone in CC377 & CC384 unreliable

→ Although 2-butanone questioned in 374, 376, ~~377~~, 383, 373, 382, 375 estimated

300566

→ DL: Vinylacetate, Cl_2Brmethane, 2chloroethylvinylether & MIBK unreliable in CC374, 376, 377, 384, 383, 373, 382, & 375

CALIBRATION CHECK - VOLATILE HSL COMPOUNDS

CASE NO 5027 CONTRACT LAB: S-CUBED
CONTRACT NO. 68-01-6868 INSTRUMENT IDENTIFIER: 4021
CALIBRATION DATE: 10/3/85
STANDARD FILE: 6V100
DATE 10/06/85 TIME: 10:06
MAXIMUM % D FOR CCC IS ~~20~~ 25

minimum RF for SPCC is 0.300 (0.25 for Bromoform)

COMPOUND	MEAN RF(I)	RF(O)	% D
45V METHYL CHLORIDE **	1.529	1.185 ✓	-22.515
46V METHYL BROMIDE	1.564	1.383	-11.563
88V VINYL CHLORIDE *	2.134	1.740	-18.448 ✓
16V CHLOROETHANE	1.355	1.079	-20.321
44V METHYLENE CHLORIDE	2.617	1.927	-26.379
ACETONE	0.164	0.156	-5.088
CARBON DISULFIDE	7.968	6.092	-23.548
29V 1,1-DICHLOROETHYLENE *	1.857	1.541	-17.043 ✓
13V 1,1-DICHLOROETHANE **	4.176	3.503 ✓	-16.105
30V 1,2-TRANS-DICHLOROETHYLE	2.058	1.603	-22.065
23V CHLOROFORM *	4.251	4.020	-5.450 ✓
10V 1,2-DICHLOROETHANE	0.280	0.261	-6.871
MEK 2-BUTANONE	0.030	0.022	-27.356
11V 1,1,1-TRICHLOROETHANE	0.433	0.444	2.631
6V CARBONTETRACHLORIDE	0.374	0.398	6.375
VINYL ACETATE	0.040	0.034	-15.717
48V DICHLOROBROMOMETHANE	0.029	0.032	9.321
32V 1,2-DICHLOROPROPANE *	0.423	0.377	-10.891 ✓
33V TRANS-1,3-DICHLOROPROPYL	0.560	0.215	-61.628 — LOQ
87V TRICHLOROETHYLENE	0.348	0.330	-5.141
51V CHLORODIBROMOMETHANE	0.244	0.260	6.393
14V 1,1,2-TRICHLOROETHANE	0.289	0.280	-3.288
4V BENZENE	1.209	1.208	-0.135
34V CIS-1,3-DICHLOROPROPYLEN	0.451	0.448	-0.759
19V 2-CHLOROETHYL VINYL ETHE	0.017	0.012	-28.117
47V BROMOFORM **	0.615	0.904 ✓	47.093 — LOQ
2-HEXANONE	0.108	0.097	-10.735
4-METHYL-2-PENTANONE	0.055	0.037	-32.977 — LOQ
85V TETRACHLOROETHYLENE	1.234	1.281	3.770
15V 1,1,2,2-TETRACHLOROETH**	2.085	1.600 ✓	-23.269
86V TOLUENE *	3.198	3.158	-1.230 ✓
7V CHLOROBENZENE **	3.669	3.377 ✓	-7.966
38V ETHYLBENZENE *	1.299	1.218	-6.219 ✓
STYRENE	1.002	0.740	-26.168
M-XYLENE	2.054	2.112	2.821
O-XYLENE	~~3.377~~ 1.685	~~8.335~~ 1.667	-1.231
P-XYLENE	~~3.377~~ 1.685	~~3.335~~ 1.667	-1.231

* - CCC although questioned 2-butanone in 361, 362, 363, & 375 estimated

** - SPCC

D.L vinyl acetate, Cl_2 Bromethane, 2-chloroethylvinyl ether, & MIBK in 361, 362, 363, & 375 unreliable.

300567

INITIAL CALIBRATION DATA - VOLATILE COMPOUNDS

CASE NO. 5027 CONTRACT LAB: S-CUBED
CONTRACT NO. 68-01-7021 INSTRUMENT IDENTIFIER: 4021
CALIBRATION DATE: 09/28/85
MINIMUM MEAN RF FOR SPCC IS 0.300
MAXIMUM %RSD FOR CCC IS 30%

COMPOUND	RF 20NG	RF 50NG	RF 100NG	RF 150NG	RF 200NG	MEAN RF	%RSD
49V METHYL CHLORIDE **	0.700	0.708	0.658	0.742	0.874	0.736	10.013
46V METHYL BROMIDE	1.152	1.144	1.832	1.790	1.732	1.530	20.469
88V VINYL CHLORIDE *	0.878	0.945	1.092	1.039	1.150	1.021	9.619
16V CHLOROETHANE	0.502	0.541	0.551	0.553	0.612	0.552	6.401
44V METHYLENE CHLORIDE	1.201	1.164	1.087	1.106	1.147	1.141	3.582
ACETONE	0.034	0.018	0.036	0.024	0.031	0.029	22.784
CARBON DISULFIDE	3.365	3.527	3.533	3.770	3.987	3.636	5.987
29V 1,1-DICHLOROETHYLENE *	0.998	1.048	1.091	1.147	1.185	1.094	6.113
13V 1,1-DICHLOROETHANE **	1.515	1.637	1.579	1.637	1.840	1.642	6.633
30V 1,2-TRANS-DICHLOROETHYLE	1.137	1.191	1.191	1.273	1.319	1.222	5.335
23V CHLOROFORM *	2.132	2.197	2.111	2.264	2.449	2.231	5.454
10V 1,2-DICHLOROETHANE	0.122	0.146	0.176	0.172	0.177	0.159	13.407
MEK 2-BUTANONE	0.007	0.009	0.015	0.011	0.011	0.011	22.826
11V 1,1,1-TRICHLOROETHANE	0.455	0.451	0.464	0.466	0.444	0.456	1.768
6V CARBONTETRACHLORIDE	0.350	0.347	0.388	0.397	0.365	0.369	5.463
VINYL ACETATE	0.029	0.036	0.061	0.054	0.044	0.045	25.367
48V DICHLOROBROMOMETHANE	0.035	0.042	0.048	0.046	0.047	0.044	10.779
32V 1,2-DICHLOROPROPANE *	0.244	0.244	0.258	0.248	0.235	0.246	2.975
33V TRANS-1,3-DICHLOROPROPYL	0.326	0.349	0.402	0.386	0.369	0.366	7.368
87V TRICHLOROETHYLENE	0.470	0.516	0.496	0.519	0.467	0.494	4.446
51V CHLORODIBROMOMETHANE	0.260	0.291	0.320	0.316	0.287	0.295	7.371
14V 1,1,2-TRICHLOROETHANE	0.254	0.296	0.326	0.302	0.281	0.292	8.145
4V BENZENE	0.730	0.757	0.846	0.828	0.773	0.787	5.556
34V CIS-1,3-DICHLOROPROPYLEN	0.280	0.295	0.357	0.337	0.325	0.319	8.771
19V 2-CHLOROETHYL VINYL ETHE	0.008	0.019	0.035	0.034	0.037	0.027	41.414
47V BROMOFORM **	0.254	0.305	0.462	0.564	0.615	0.440	31.938
2-HEXANONE	0.023	0.068	0.103	0.106	0.113	0.083	40.602
4-METHYL-2-PENTANONE	0.002	0.015	0.053	0.056	0.062	0.038	U 63.501
85V TETRACHLOROETHYLENE	1.844	2.801	2.236	2.899	2.683	2.493	15.865
15V 1,1,2,2-TETRACHLOROETH**	1.100	1.663	1.670	1.809	1.754	1.599	15.960
86V TOLUENE *	1.918	2.316	2.418	3.025	2.862	2.508	15.808
7V CHLOROBENZENE **	3.253	3.308	3.472	4.133	3.784	3.590	9.155
38V ETHYLBENZENE *	1.567	1.097	1.776	2.015	1.830	1.657	18.979
STYRENE	3.756	2.340	5.202	5.836	5.114	4.450	28.179
M-XYLENE	4.062	3.136	4.567	5.310	4.509	4.317	16.519
O-XYLENE	3.962	3.230	4.634	5.400	4.527	4.424	16.973
P-XYLENE	4.443	3.270	4.877	5.400	4.587	4.521	15.829

* CCC
** SPCC

no samples associated with this initial cal.

LOQ - Effects limit of quantitation - not necessarily detection limits.

300568

CALIBRATION CHECK - SEMIVOLATILE HSL COMPOUNDS

CASE NO. 5027 CONTRACT LAB: S-CUBED

CONTRACT NO. 12065 INSTRUMENT IDENTIFIER: FINN 4500

CALIBRATION DATE: 10/14/85

STANDARD FILE: 17HS50

DATE: 10/17/85 TIME: 13:05

MINIMUM RF FOR BPCC IS .0500

MAXIMUM % D FOR CCC IS 25%

COMPOUND	MEAN RF(I)	RF(O)	% D
PHENOL *	2.026	2.021	0.279
16B BIS(2-CHLOROETHYL)ETHER	1.783	1.600	10.263
24A-2-CHLOROPHENOL	1.520	1.426	6.193
26B 1,3-DICHLOROBENZENE	1.568	1.558	0.584
27B 1,4-DICHLOROBENZENE *	1.619	1.571	2.946
BENZYL ALCOHOL	0.960	0.957	0.307
25B-1,2-DICHLOROBENZENE	1.505	1.490	0.973
2-METHYLPHENOL	1.449	1.415	2.385
BIS(2-CHLOROISOPROPYL)ETHER	1.940	1.742	10.193
4-METHYLPHENOL	1.599	1.478	7.529
N-NITROSODI-N-PROPYLAMINE **	1.124	0.971	13.639
12B HEXACHLOROETHANE	0.686	0.614	10.392
56B-NITROBENZENE	0.433	0.404	6.633
54B-ISOPHORONE	0.798	0.788	1.225
57A 2-NITROPHENOL *	0.213	0.235	-10.450
34A 2,4-DIMETHYLPHENOL	0.340	0.386	-13.453
133A BENZOIC ACID	0.184	0.231	-25.549
BIS(2-CHLOROETHOXY)METHANE 4	0.464	0.467	-0.549
31A 2,4-DICHLOROPHENOL *	0.295	0.330	-11.595
8B-1,2,4-TRICHLOROBENZENE	0.310	0.323	-4.226
55B-NAPHTHALENE	1.104	1.070	3.055
4-CHLOROANILINE	0.419	0.433	-3.189
52B-HEXACHLOROBUTADIENE *	0.171	0.170	0.456
4-CHLORO-3-METHYLPHENOL * 2	0.321	0.334	-3.990
2-METHYLNAPHTHALENE	0.701	0.731	-4.266
HEXACHLOROCYCLOPENTADIENE **	0.187	0.278	-48.706 LOQ
21A 2,4,6-TRICHLOROPHENOL *	0.381	0.416	-9.339
2,4,5-TRICHLOROPHENOL	0.390	0.436	-11.557
20B 2-CHLORONAPTHALENE	1.209	1.188	1.761
2-NITROANILINE	0.406	0.365	9.939
71B-DIMETHYLPHTHALATE	1.276	1.253	1.852
77B ACENAPTHYLENE	1.920	1.818	5.305
3-NITROANILINE	0.266	0.361	-35.707 LOQ
1B ACENAPTHENE *	1.112	0.927	16.647
59A 2,4-DINITROPHENOL **	0.163	0.178	-9.112
58A 4-NITROPHENOL **	0.274	0.266	2.892
135B DIBENZOFURAN	1.647	1.578	4.195
35B 2,4-DINITROTOLUENE	0.420	0.395	5.854
36B-2,6-DINITROTOLUENE	0.331	0.287	13.343
70B-DIETHYLPHTHALATE	1.347	1.169	13.228
4-CHLOROPHENYL,PHENYL ETHER	0.605	0.528	12.785
80B-FLUORENE	1.401	1.311	6.451
4-NITROANILINE	0.190	0.273	-43.472 LOQ
4,6 DINITRO-2-METHYLPHENOL 6	0.140	0.153	-8.746
DIPHENYLAMINE *	0.435	0.475	-9.316
4-BROMOPHENYLPHENYLETHER 41B	0.204	0.207	-1.442
9B-HEXACHLOROBENZENE	0.218	0.225	-3.063
64A PENTACHLOROPHENOL *	0.131	0.145	-10.000
81B-PHENANTHRENE	1.021	0.909	10.884
78B-ANTHRACENE	1.045	0.745	28.680
68B-DI-N-BUTYLPHTHALATE	1.234	1.081	12.421

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39B	FLUORANTHENE *	1.052	0.981	6.671
84B	-PYRENE	1.423	2.347	-64.943 [1]
67B	-BUTYLBENZYLPHTHALATE	0.685	0.969	-41.510 -LOQ
28B	-3,3'-DICHLOROBENZIDINE	0.235	0.354	-50.556 -LOQ
72B	-BENZO(A)ANTHRACENE	1.213	1.529	-25.984
81B	(2-ETHYLHEXYL)PHTHALATE 6	0.818	1.144	-39.859 -acequate
76B	-CHRYSENE	1.188	1.207	-4.181
69B	DI-N-OCTYLPHTHALATE *	2.636	2.953	-12.016
74B	BENZO(B)FLUORANTHENE	2.126	2.338	-9.989
75B	BENZO(K)FLUORANTHENE	2.295	2.415	-5.193
73B	BENZO(A)PYRENE *	1.734	1.673	3.468
83B	INDENO(1,2,3-CD)PYRENE	1.606	1.647	-2.567
82B	DIBENZO(A,H)ANTHRACENE	1.268	1.433	-13.032
79B	BENZO(G,H,I)PERYLENE	1.345	1.328	1.318

[1] pyrene in 382 & 384 estimated.

17HS50

Pesticide Evaluation Standards Summary
(Page 1)

Case No: 5022 Region: _____ Laboratory: S-Cubed
Contract No: 68-01-7021 GC Column: SP 2100
Date of Analysis 10-23-85 Instrument ID: HP 5880 II

Evaluation Check for Linearity

Laboratory ID	Eval A	Eval B	Eval C	
Pesticide	Calibration Factor Eval. Mix A	Calibration Factor Eval. Mix B	Calibration Factor Eval. Mix C	% RSD (≤10%)
Aldrin	61331	64213	80845	15
Endrin	56881	62042	78619	17
4,4'- DDT(1)	27475	37271	58318	38 → No positives
Dibutyl Chlorendate	72505	75129	90097	12

Evaluation Check for 4,4'- DDT/Endrin Breakdown
(percent breakdown expressed as total degradation)

	Laboratory I.D.	Time of Analysis	Endrin	4,4'- DDT	Combined(2)
Eval Mix B 72 Hour	Eval B	17:22	Ø	11	
Eval Mix B	Eval B	02:04	Ø	11	
Eval Mix B	Eval B	19:36	Ø	21	
Eval Mix B	Eval B	01:54	—	—	— 1
Eval Mix B					
Eval Mix B					
Eval Mix B					
Eval Mix B					
Eval Mix B					
Eval Mix B					
Eval Mix B					
Eval Mix B					

300571

1. not available due to possible coeluting peak from previous run

(1) See Exhibit E, Section 7.5.4
(2) See Exhibit E, Section 7.3.1.2.2.1

[1] D.L. DDT, ~~DDD DDE~~ may be slightly higher for: 373, 377, 378, & 380, 352, 353, 362, & 381 [illegible]

Form VIII 7/85

SP 2100 10-23-85

Pesticide Evaluation Standards Summary
(Page 2)
Evaluation of Retention Time Shift for Dibutyl Chlorendate
Report all standards, blanks and samples

SMO Sample No.	Lab I.D.	Time of Analysis	Percent Diff.	SMO Sample No.	Lab I.D.	Time of Analysis	Percent Diff.
STANDARD	EVAL A	16:48	0				
"	EVAL B	17:22	0.2				
"	EVAL C	17:57	0.5				
"	IND A	18:31	0.5				
"	IND B	19:10	0.4				
"	TOXAPHENE	19:49	0				
"	CHLORDANE	20:24	0.3				
"	PCB 1016/1260	20:58	0.3				
"	PCB 1242	21:33	0.4				
"	PCB 1248	22:07	0.5				
"	PCB 1254	22:42	0.4				
CC-376	CC-376	23:49	0.5				
CC-379	CC-379	01:30	0.2				
STANDARD	EVAL B	02:04	0.3				
CC-385	CC 385	03:44	0.4				
CC-349	CC 349 1/5	04:18	— *				
STANDARD	IND A	04:53	0.5				
"	IND B	12:40	0.1				
"	SURROGATE	15:22 10/24/85	0.3				
"	SURROGATE	12:09 10/25/85	0.1				
"	MATRIX	12:58	—				
NONE	BLANK 10/23	13:33	0.2				
CC-351	CC-351 MS	14:07	0.1				
CC-351	CC-351 MSD	14:41	0.1				
NONE	METHOD BLK	18:28	0.4				
"	BLANK 10/24	19:03	0.5				
STANDARD	EVAL B	19:36	0.7				
CC-373	CC-373	20:10	— **				
CC-377	CC-377	20:44	— **				
CC-378	CC-378	21:17	— **				
CC-380	CC-380	21:50	— **				
STANDARD	IND B	22:25	0.5				
CC-384	CC-384	23:02	0.7				
CC-352	CC-352	23:37	0.3				
CC-353	CC-353	00:12	0.3				
CC-362	CC-362	00:47	0.2				
CC-381	CC-381	01:21	— **				
STANDARD	EVAL B	01:54	0.4				
CC-355	CC-355	02:28	0.4				
CC-357	CC-357	03:02	0.2				
CC-363	CC-363	03:36	0.5				
CC-375	CC-375	04:10	— *				
STANDARD	IND A	05:19	0.5				
CC-382	CC-382	05:55	0.2				
CC-383	CC-383	06:30	0.2				
STANDARD	IND A	07:39	0.3				

* NO SHIFT DUE TO DILUTION

** No DBC Recovery Due to Sample Matrix effect.

Form VIII (Continued)

300572

7.85

300573

PESTICIDE/PCB STANDARDS SUMMARY

Case No. 5027 Laboratory S-CUBED
Contract No. 68-01-7021 GC Column SP2250/2401 GC Instrument ID HP5880 II

	DATE OF ANALYSIS 10-23-85 TIME OF ANALYSIS 18:27 LABORATORY ID IND A				DATE OF ANALYSIS 10-26-85 TIME OF ANALYSIS 07:14 LABORATORY ID IND. A			
COMPOUND	RT	RETENTION TIME WINDOW	CALIBRATION FACTOR	CONF. OR QUANT.	RT	CALIBRATION FACTOR	CONF. OR QUANT.	PERCENT DIFF.**
alpha-BHC	1.97	±0.03	149355		1.96	153748	Q	3
beta-BHC								
delta-BHC								
gamma-BHC	2.44	±0.05	144440		2.43	139844	Q	3
Heptachlor	2.96	±0.05	138641		2.95	119850	Q	14
Aldrin	3.54	±0.06	110026		3.53	103157	Q	6
Heptachlor Epoxide								
Endosulfan I	6.47	±0.12	116474		6.46	128043	Q	10
Dieldrin	7.83	±0.14	113634		7.81	107272	Q	6
4,4'-DDE								
Endrin	9.44	±0.16	89337		9.42	88411	Q	1
Endosulfan II								
4,4'-DDD	10.93	±0.19	79519		10.91	94317	C	19
Endosulfan Sulfate								
4,4'-DDT	13.07	±0.22	55533		13.05	22543	C	59
Methoxychlor	24.19	±0.44	57622		24.15	33590	C	42
Endrin Ketone								
Tech. Chlordane								
alpha-Chlordane*								
gamma-Chlordane*								
Toxaphene								
Aroclor - 1016								
Aroclor - 1221								
Aroclor - 1232								
Aroclor - 1242								
Aroclor - 1248								
Aroclor - 1254								
Aroclor - 1260								

out of criteria no positives so no effect.

* SEE EXHIBIT E, PART 7

** CONF. = CONFIRMATION (<20% DIFFERE[illegible]
QUANT. = QUANTITATION (<15% DIFFER[illegible]

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PESTICIDE/PCB STANDARDS SUMMARY

Case No. 5027 Laboratory S Cubed
Contract No. 6801-7021 GC Column SP 2100 GC Instrument ID HP5880 II

300574

	DATE OF ANALYSIS 10-23-85 TIME OF ANALYSIS 18:31 LABORATORY ID Ind A				DATE OF ANALYSIS 10-26-85 TIME OF ANALYSIS 0519 LABORATORY ID Ind A			
COMPOUND	RT	RETENTION TIME WINDOW	CALIBRATION FACTOR	CONF. OR QUANT.	RT	CALIBRATION FACTOR	CONF. OR QUANT.	PERCENT DIFF.**
alpha-BHC	2.54	0.03	108586		2.55	115950	q	-6.8
beta-BHC								
delta-BHC								
gamma-BHC	2.93	0.05	106101		2.93	110479	q	-4.1
Heptachlor	4.52	0.06	107072		4.52	97763	q	8.7
Aldrin	5.51	0.07	73718		5.51	78832	q	-6.9
Heptachlor Epoxide								
Endosulfan I	8.12	0.10	86572		8.12	90188	q	-4.2
Dieldrin	9.38	0.11	58148		9.38	93702	q	-6.1
4,4'-DDE								
Endrin								
Endosulfan II								
4,4'-DDD	11.42	0.13	61436		11.42	71749	q	-16.3
Endosulfan Sulfate								
4,4'-DDT	14.74	0.19	37196		14.93	26910		226
Methoxychlor	21.2	0.27	46596		21.2	33488		~~27.6~~ 28.1
Endrin Ketone								
Tech. Chlordane								
alpha-Chlordane*								
gamma-Chlordane*								
Toxaphene								
Aroclor - 1016								
Aroclor - 1221								
Aroclor - 1232								
Aroclor - 1242								
Aroclor - 1248								
Aroclor - 1254								
Aroclor - 1260								

out of curve no positives so no effect

7/85

* SEE EXHIBIT E, PART 7

** CONF. = CONFIRMATION (<20% DIFFERENCE)
QUANT. = QUANTITATION (<15% DIFFE[illegible])

PESTICIDE/PCB STANDARDS SUMMARY

300575

Case No. 5027 Laboratory S. Cubed
Contract No. 6801-7021 GC Column SP-2100 GC Instrument ID HP588D II

	DATE OF ANALYSIS 10-23-85 TIME OF ANALYSIS 18:31 LABORATORY ID Ind A				DATE OF ANALYSIS 10-26-85 TIME OF ANALYSIS 07:39 LABORATORY ID Ind A			
COMPOUND	RT	RETENTION TIME WINDOW	CALIBRATION FACTOR	CONF. OR QUANT.	RT	CALIBRATION FACTOR	CONF. OR QUANT.	PERCENT DIFF.**
alpha-BHC	2.54	0.03	108586		2.55	118319	q	-8.9
beta-BHC								
delta-BHC								
gamma-BHC	2.93	0.05	106101		2.94	111398	q	-4.9
Heptachlor	4.52	0.06	107072		4.53	92465	q	13.6
Aldrin	5.51	0.07	73718		5.52	79598	q	-7.9
Heptachlor Epoxide								
Endosulfan I	8.12	0.10	46086572 (2)		8.13	450	q	2.2
Dieldrin	9.38	0.11	43590523		9.40	260		40.2
4,4'-DDE								
Endrin	10.42	0.13	22554148		10.45	280		-24.4
Endosulfan II								
4,4'-DDD	11.42	0.11	61436	~~[illegible]~~	11.45	—	—	(1)
Endosulfan Sulfate								
4,4'-DDT	14.74	0.19	115		14.73	110	q	4.3
Methoxychlor	21.20	0.27	99		21.23	68		31.3
Endrin Ketone								
Tech. Chlordane								
alpha-Chlordane*								
gamma-Chlordane*								
Toxaphene								
Aroclor - 1016								
Aroclor - 1221								
Aroclor - 1232								
Aroclor - 1242								
Aroclor - 1248								
Aroclor - 1254								
Aroclor - 1260								

although Dieldrin questioned in CC384 estimate

out of criteria no positive po reaffect

7/85

* SEE EXHIBIT E, PART 7
not available due to possible coluting peak from pre[illegible] [illegible] [illegible] measurements

** CONF. = CONFIRMATION (<20% DIFFERENCE)
QUANT. = QUANTITATION (<15% DIFFERENCE)

PROJECT NAME: Osborne Disposal
TDD NO: F3-8508-37

EPA SITE NO.: PA681
REGION: F, T III

QUALITY ASSURANCE REVIEW OF ORGANIC ANALYSIS LAB DATA PACKAGE

Case No.: 5027
Contract No.: 68-01-7098
Contract Laboratory: SRI
Applicable IFB No.: WA85-J005
Reviewer: Rock J. Vitale
Review Date: 2/20/86

Applicable Sample No's.: CC365, CC366, CC367, CC368, CC369, CC370, CC372

The organic analytical data for this case has been reviewed. The quality assurance evaluation is summarized in the following table:

Reviewer's Evaluation*	Fraction				
	VOLATILES	ACIDS	BASE/ NEUTRALS	PCB/ PEST.	TCDD
Acceptable					
Acceptable with exception(s)	✓#1, #3, #4, #6	✓#2, #6	✓#5 #6	✓#6	Not Analyzed
Questionable					
Unacceptable					

* Definitions of the evaluation score categories are listed on next page.

This evaluation was based upon an analysis of the review items indicated below:

- ● DATA COMPLETENESS
- ● BLANK ANALYSIS RESULTS
- ● SURROGATE SPIKE RESULTS
- ● MATRIX SPIKE RESULTS
- ● DUPLICATE ANALYSIS RESULTS
- ○ EVALUATION OF CONFIRMATIONS
- ‡ ● QUANTITATIVE CALCULATIONS
- ● TARGET COMPOUND MATCHING QUALITY
- ● TENTATIVELY IDENTIFIED COMPOUNDS
- ‡ ● CHROMATOGRAPHIC SENSITIVITY CHECKS
- ‡ ● DFTPP AND BFB SPECTRUM TUNE RESULTS
- ● STANDARDS
- ● CALIBRATION CHECK STANDARDS
- ‡ ● HOLDING TIMES

Data review forms are attached for each of the review items indicated above.

‡ No errors noted, no form attached.

◒ Spot Check performed.

Comments: #1 Please see blank analysis documentation
#2 Please see surrogate/matrix spike recoveries
#3 VOA BNA reported using incorrect RF - reviewer has corrected.
#4 Total xylenes in CC366 beyond calibrated range.
#5 Please see calibrations - Low RF.
#6 A field blank was used for matrix spiking

300576

DATA EVALUATION SCORE CATEGORIES

ACCEPTABLE: Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.

ACCEPTABLE WITH EXCEPTION(S): Data is not completely within established control limits. The deficiences are identified and specific data is still valid, given certain qualifications which are listed below.

QUESTIONABLE: Data is not within established control limits. The deficiences bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.

UNACCEPTABLE: Data is not within established control limits. The deficiences imply the results are not meaningful.

DATA COMPLETENESS	CONC./MATRIX	LO/AQ	LO/AQ	LO/AQ	LO/AQ	LO/AQ	LO/AQ	LO/AQ					
CTION	TRAFFIC REPORT # CC3	65	66	67	68	69	70	72					
	LAB I.D. # D503-M	1	2	3	4	5	6	7					
VOA :	RUN DATE/TIME	✓						✓					
	TARGET COMPOUND TAB.	✓						✓					
	TARGET COMPOUND D.L.	✓						✓					
	TENT. I.D. COMPOUND TAB.	✓						✓					
	SURROGATE RECOVERY	✓						✓					
	GC SCREEN TABULATION	N/A						✓					
	GC/MS CHROMATOGRAMS	✓						✓					
	TARGET CMPD. QUAN. LIST	✓						✓					
	TARGET CMPD. SPECTRA	✓						✓					
	TENT. I.D. CMPD. Q.L.	✓						✓					
	TENT. CMPD. LIB. SRCH.	✓						✓					
	CHRO./SENS. CHECKS	✓						✓					
	BFB/DFTPP TUNE DATA	✓						✓					
	I.S AREAS CHARTS	N/A						✓					
	I.S. REL. RESP. FORM	N/A						✓					
	RF & AMTS.: CALIB. CHK.	✓						✓					
	RF & AMTS.: 3-PT CALIB.	✓						✓					
	Chromatograms: Calib. Chk.	✓						✓					
	Chromatograms: 3-Pt. Calib.	✓						✓					
	LINEARITY: 3-PT. CALIB	N/A						✓					
	RF COMPARISON	✓						✓					
	SAMPLE/FIELD BLANK					✓	✓						
	METHOD/INSTR. BLANK												
	LAB DUPLICATE					✓							
	FIELD DUP/REP												
	MAT. SPK./M. STD.					✓							

COMMENTS: —

field blk used for matrix spike

300578

DATA COMPLETENESS	CONC./MATRIX	LO/AQ	LO/AQ	LO/AQ	LO/AQ	LO/AQ	LO/AQ	LO/AQ
FRACTION	TRAFFIC REPORT # CC3	65	66	67	68	69	70	72
	LAB I.D. # D503-14-	1	2	3	4	5	6	7
BNA :	RUN DATE	✓	Not Analyzed	✓	✓	✓	✓	✓
	TARGET COMPOUND TAB.	✓		✓	✓	✓	✓	✓
	TARGET COMPOUND D.L.	✓		✓	✓	✓	✓	✓
	TENT. I.D. COMPOUND TAB.	✓		✓	✓	✓	✓	✓
	SURROGATE RECOVERY	✓		✓	✓	✓	✓	✓
	GC SCREEN TABULATION	N/R		N/R				
	GC/MS CHROMATOGRAMS	✓		✓	✓	✓	✓	✓
	TARGET CMPD. QUAN. LIST	✓		✓	✓	✓	✓	✓
	TARGET CMPD. SPECTRA	✓		✓	✓	✓	✓	✓
	TENT. I.D. CMPD. Q.L.	✓		✓	✓	✓	✓	✓
	TENT. CMPD. LIB. SRCH.	✓		✓	✓	✓	✓	✓
	CHRO./SENS. CHECKS	✓		✓	✓	✓	✓	✓
	BFB/DFTPP TUNE DATA	✓		✓	✓	✓	✓	✓
	I.S AREAS CHARTS	N/R		N/R				
	I.S. REL. RESP. FORM	N/R		N/R				
	RF & AMTS.: CALIB. CHK.	✓		✓	✓	✓	✓	✓
	RF & AMTS.: 3-PT CALIB.	✓		✓	✓	✓	✓	✓
	Chromatograms: Calib. Chk.	✓		✓	✓	✓	✓	✓
	Chromatograms: 3-Pt. Calib.	✓		✓	✓	✓	✓	✓
	LINEARITY: 3-PT. CALIB	N/R		✓	✓	✓	✓	✓
	RF COMPARISON	✓		✓	✓	✓	✓	✓
	SAMPLE/FIELD BLANK					✓	✓	
	METHOD/INSTR. BLANK							
	LAB DUPLICATE					✓		
	FIELD DUP/REP							
	MAT. SPK./M. STD.					✓		
PEST. :	PESTICIDE TABULATION	✓		✓	✓	✓	✓	✓
	PEST. D.L. TABULATION	✓		✓	✓	✓	✓	✓
	PESTICIDE CHRO.	✓		✓	✓	✓	✓	✓
	PESTICIDE [illegible] CHRO.	✓		✓	✓	✓	✓	✓
	PESTICIDE [illegible] I.D.	✓		✓	✓	✓	✓	✓
	2nd COLUMN CONF.	✓		✓	✓	✓	✓	✓
	GC/MS CONFIRMATION	N/R		✓	✓	✓	✓	✓
	PESTICIDE DUPLICATE					✓		
	PESTICIDE SPIKE					✓		
	PESTICIDE BLANK					✓	✓	
	STD SUMMARY	✓		✓	✓	✓	✓	✓
	LINEARITY CHK.	✓		✓	✓	✓	✓	✓
	DEGRAD. CHK.	✓		✓	✓	✓	✓	✓
	DBC RT SHIFT	✓		✓	✓	✓	✓	✓

Field blk used for Matrix spiking

300579

KEY TO DATA COMPLETENESS FORM

Abbreviation Used on Form	Description of Checklist Item
Conc./Matrix	Concentration category submitted in analysis request (low, med, hi); and matrix (sol., aq.)
Fraction	Fill in acid, base/neutral, acid/base/neutral, or volatiles analysis
Run Date/Time	Instrument run date (to be used for correlating calibration)
Target Cmpd. Tab.	Tabulated results for target compounds
Target Cmpd. D.L.	Detection limits for target compounds (actual/level indicated by screen
Tent. LD. Cmpd. Tab.	Tabulated results for tentatively identified compounds
Surr. Rec.	Surrogate recoveries results
GC Screen Tab.	Tabulated GC screen results indicating required level of followup
GC/MS Chromatograms	Chromatograms of GC/MS analysis runs
Target Cmpd. Quan. List	Target compounds quantitation list, showing areas, ret. times
Target Cmpd. Spectra	Enhanced and unenhanced spectra of target compound hits
Tent. LD. Cmpd. Q.L.	Quantitation list for tentatively identified compounds
Tent. Cmpd. Lib. Srch.	Spectra and library match spectra of tentatively identified compounds
Chro./Sens. Checks	EICP's and R.R.F.'s for chromatographic sensitivity checks
BFB/DFTPP Tune Data	Spectra intensity lists, and criteria comparison forms for BFB, DFTPP
I.S. Areas Charts	Internal standards area control charts and description of remedial action
I.S. Rel. Resp. Form	Internal standards relative response listings for each sample run
RF and amts.: Calib. Chk.	Tabulated response factors and amount injected for all cmpds. in calibration check
RF and amts.: 3-Pt. Calib.	Tabulated response factors and amount injected for all cmpds. in 3-point calibration
Chromatograms: Calib. Chk.	Chromatograms for calibration check standard
Chromatograms: 3-Pt. Calib.	Chromatograms for 3-point multilevel calibration standards.
Linearity: 3-Pt. Calib.	Tabulated correlation coefficient or relative standard deviation for calibration
RF Comparison	Tabulated comparison of calibration Response Factor with check standard
Sample/Field Blank	Equipment rinse or reagent water blank shipped with samples from field
Method/Instr. Blank	Method or instrument blank which is prepared at lab
Lab Duplicate	Sample which was split by lab for duplicate analysis
Field Dup/Rep	Sample which was split or collected twice in the field
Mat. Spk./M. Std.	Matrix spike or method standard (blind, or done by lab)
Pest. Tab.	Tabulated results for pesticides
Pest. D.L. Tab.	Tabulated detection limits for pesticides
Pest. Chro.	Chromatograms for pesticide screening
2nd Col. Conf.	Confirmation of pesticide results by using a second GC column and temperature
GC/MS Conf.	Confirmation of pesticide results by GC/MS analysis
Pest. Dup., Spk. Blk.	Pesticide duplicate, spike, and blank
Pest. Std. Chro.	Chromatogram of pesticide standard
Pest. Std. LD.	Pesticide standard identification form
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TCDD Tab., D.L., EICP, Blk.	TCDD tabulated results, detection limits, extracted ion current profile, blank

KEY TO SYMBOLS USED IN DATA COMPLETENESS TABLE

Symbol	Meaning	Symbol	Meaning
✓	Data item present	I	Incomplete data item
NA	Data item not applicable or not required	NC	Data item not clearly explained (units of conc., etc)
P	Data item within established control limits	* or [number]	See footnote
F	Data item outside established control limits	XX/XX/XX XX:XX	Date/Time of run (calibration, etc.)
MS	Missing item		

300580

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
VOA	field/low		AQ	CC369	NUS	$meCl_2$ (8.2 ug/L/5) #2
BNA	field/low		AQ	CC369	NUS	bis(2-ethylhexyl)phthalate (4.2 ug/L/10)
Pest	field/low		AQ	CC369	NUS	ND
VOA	bailer blk/low		AQ	CC370	NUS	$meCl_2$ (10 ug/L/5) #1 Acetone (6 ug/L/10) #2
BNA	bailer blk/low		AQ	CC370	NUS	Bis(2EH)phthalate (4.8 ug/L/10) #2
Pest	bailer blk/low		AQ	CC370	NUS	ND.
BNA2	lab/low		AQ	BNA2	SRI	Bis(2ethylh)phthalate (3.2 ug/L/10) #2
VOA	lab/low		AQ	VOA1	SRI	$meCl_2$ (9.0 ug/L/5) #2 Acetone (9.4 ug/L/10) #2
BNA2	lab/low		AQ	BNA1	SRI	Bis(2EH)phthalate (19.4 ug/L/10) #1
Pest1	lab/low		AQ	Pest1	SRI	ND.

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN TH SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FO

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

Sample CC372 - bis is multiply by 2 instrument value 18ug/L.

BLANK ANALYSIS RESULTS FOR TENTATIVELY IDENTIFIED COMPOUNDS

ALL TENTATIVELY IDENTIFIED COMPOUNDS FOUND IN BLANK ANALYSES ARE LISTED BELOW:

SAMPLE #	FRACTION	SCAN #(S)	SPECTRUM MATCH INDICES				ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
			TYPE	SCORE	TYPE	SCORE			
CC069	VOA.	0.58 RT					200 ug/L	Argon	
		0.77					110 ug/L	CO_2	
CC069	BNA						ND.		
CC070	VOA	0.58 RT					230	Argon	
		0.77					120	CO_2	
		3.2					8.9	Unknown	
	BNA						ND		
BNA/ab	BNA	3.2						Unknown	
		44						cyclohexene	
		16						hexanone.	
VOABL4	VOA	0.52					140	CO_2	
		0.77					83	Unknown	
		8.0					52	Unknown	
BNA-1	BNA						ND		

300582

WATER SURROGATE PERCENT RECOVERY SUMMARY

Case No. 5027 Contract Laboratory Southern Research Institute Contract No. 68-01-7098

	VOLATILE			SEMI-VOLATILE								PESTICIDE
DMO TRAFFIC NO.	TOLUENE-D8 (88-110)	BFB (86-121)	1,2 DICHLORO-ETHANE-D4 (77-120)	NITRO-BENZENE-D5 (41-120)	2-FLUORO-BIPHENYL (44-110)	TERPHENYL-D14 (33-150)			PHENOL-D5 (10-120)	2-FLUORO-PHENOL (20-121)	2,4,6 TRIBROMO-PHENOL (10-120)	DIBUTYL-CHLORENDATE ** (40-130)
RE CC365	100	97	97	93	112	89		[1]	4.6*	10*	20	88
CC366	100	110	117	-	-	-			-	-	-	-
CC367	110	98	120	110	118	97			40	48	92	93
RE CC368	117	103	107	79	111	113		[1]	8.8*	11*	34	103
CC369	102	89	97	95	113	103			59	71	113	102
CC370	95	85	100	96	112	81			59	67	113	108
CC372	106	94	116	105	102	102			60	63	93	81
VOA BLK	95	86	89	-	-	-			-	-	-	-
BNA BLK1	-	-	-	79	96	97			64	72	106	-
BNA BLK2	-	-	-	68	115	116			54	82	118	-
PEST BLK	-	-	-	-	-	-			-	-	-	105
CC369MS	102	87	104	106	119	96			73	85	130	109
CC369MSD	93	86	99	103	117	101			64	76	109	105

300583

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

** ADVISORY LIMITS ONLY

Volatiles: 0 out of 30 ; outside of QC limits

Semi-Volatiles: 4 out of 60 ; outside of QC limits

Pesticides: 0 out of 9 ; outside of QC limits

Comments: NO SAMPLE WAS RECEIVED FOR CC366 BNA AND PEST

CC365 & CC368 are the re extracted sample results

[1] - The actual detection limits for most acids substantially higher CC365 & CC368

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 5027 Contractor Southern Research Institute Contract No. 68-01-7098

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/L)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. CC369	1,1-Dichloroethene	50	5 U	60	120	45	90	29*	14	61-145
	Trichloroethene	50	5 U	57	110	47	94	16*	14	71-120
	Chlorobenzene	50	5 U	59	120	50	100	18*	13	75-130
	Toluene	50	5 U	55	110	46	92	18*	13	76-125
	Benzene	50	5 U	58	120	50	100	18*	11	76-127
B/N SMO SAMPLE NO. CC369	1,2,4-Trichlorobenzene	100	10 U	73	73	72	72	1	28	39-98
	Acenaphthene	100	10 U	94	94	89	89	5	31	46-118
	2,4 Dinitrotoluene	100	10 U	82	82	74	74	10	38	24-96
	Di-n-Butylphthalate	100	10 U	68	68	58	58	16	40	11-117
	Pyrene	100	10 U	110	110	110	110	0	31	26-127
	N-Nitroso-Di-n-Propyfamine	100	10 U	80	80	83	83	4	38	41-116
	1,4-Dichlorobenzene	100	10 U	60	60	59	59	2	28	36-97
ACID SMO SAMPLE NO. CC369	Pentachlorophenol	200	50 U	110	55	91	45	20	50	9-103
	Phenol	200	10 U	91	45	88	44	2	42	12-89
	2-Chlorophenol	200	10 U	210	105	200	100	5	40	27-123
	4-Chloro-3-Methylphenol	200	10 U	260	130*	220	110*	17	42	23-97
	4-Nitrophenol	200	50 U	20	10	15	76*	29	50	10-80 — [1]
PEST SMO SAMPLE NO. CC369	Lindane	0.20	0.05 U	0.15	75	0.15	75	0	15	56-123
	Heptachlor	0.20	0.05 U	0.14	70	0.14	70	0	20	40-131
	Aldrin	0.20	0.05 U	0.12	60	0.13	65	8	22	40-120
	Dieldrin	0.50	0.10 U	0.39	78	0.38	76	3	18	52-126
	Endrin	0.50	0.10 U	0.40	80	0.38	76	5	21	56-121
	4,4'-DDT	0.50	0.10 U	0.44	88	0.43	86	2	27	38-127

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 5 out of 5; outside QC limits
B/N 0 out of 7; outside QC limits
ACID 0 out of 5; outside QC limits
PEST 0 out of 6; outside QC limits

RECOVERY: VOAs 0 out of 10; outside QC limits
B/N 0 out of 14; outside QC limits
ACID 3 out of 10; outside QC limits
PEST 0 out of 12; outside QC limits

Comments: [1] This is a field blk - since 4-nitrophenol recovered so poorly in a clean matrix such as this it is safe to assume the detection limits for 4-nitrophenol in all samples (365, 66, 67, 68-72) may be substantially higher.

300584

INITIAL CALIBRATION DATA

SEMIVOLATILE HSL COMPOUNDS

(Page 2)

Case No: 5027 Instrument ID: 5985

Contractor: SOUTHERN RESEARCH INSTITUTE Calibration Date: 25OCT85

Contract No: 68-01-7098

Minimum $\overline{RF}$ for SPCC is 0.050 Maximum % RSD for CCC is 30%

Laboratory ID	17133	17134	17135	17136	17137			
Compound	RF-20	RF-50	RF-80	RF-120	RF-160	$\overline{RF}$	% RSD	CCC& SPCC**
2,4-Dinitrotoluene	0.346	0.279	0.485	0.291	0.332	0.347	24.0	
2,6-Dinitrotoluene	0.711	0.559	0.620	0.570	0.701	0.632	11.0	
Diethylphthalate	2.48	1.69	1.77	1.43	1.78	1.830	21.0	
4-Chlorophenyl-phenylether	0.0504	0.0445	0.0500	0.0410	0.0468	0.047	8.4	
Fluorene	2.22	1.73	1.63	1.31	1.40	1.660	22.0	
4-Nitroaniline	+0	0.391	0.530	0.432	0.559	0.478	17.0	
4,6-Dinitro-2-Methylphenol	+0	0.177	0.158	0.175	0.157	0.167	6.4	
N-Nitrosodiphenylamine(1)	0.608	0.686	0.507	0.537	0.511	0.570	13.0	*
4-Bromophenyl-phenylether	0.378	0.471	0.326	0.331	0.280	0.357	20.0	
Hexachlorobenzene	0.404	0.478	0.342	0.368	0.285	0.375	19.0	
Pentachlorophenol	+0	0.390	0.338	0.327	0.255	0.328	17.0	*
Phenanthrene	1.19	1.25	1.02	0.987	0.912	1.070	13.0	
Anthracene	1.17	1.24	0.978	0.927	0.827	1.030	17.0	
Di-n-Butylphthalate	1.63	1.39	1.29	1.18	1.19	1.340	14.0	
Fluoranthene	1.31	1.31	1.08	0.949	0.887	1.110	18.0	*
Pyrene	2.00	1.93	1.54	1.57	1.53	1.710	13.0	
Butylbenzylphthalate	0.752	0.702	0.652	0.632	0.687	0.685	6.8	
3,3'-Dichlorobenzidine	0.724	0.223	0.232	0.226	0.238	0.329	67.0	LOQ
Benzo(a)Anthracene	1.16	1.10	1.01	1.09	0.996	1.070	6.3	
bis(2-Ethylhexylphthalate	0.941	0.758	0.765	0.766	0.791	0.806	9.5	
Chrysene	1.20	1.17	1.07	1.01	0.984	1.090	8.8	
Di-n-Octyl Phthalate	1.84	1.60	1.74	1.75	1.72	1.730	5.0	*
Benzo(b)Fluoranthene	1.53	1.23	1.44	1.41	1.35	1.400	8.3	
Benzo(k)Fluoranthene	1.37	1.40	1.44	1.41	1.37	1.400	2.1	
Benzo(a)Pyrene	1.12	1.03	1.26	1.23	1.20	1.170	8.0	*
Indeno(1,2,3-cd)Pyrene	0.750	0.900	1.12	1.20	1.38	1.070	23.0	
Dibenz(a,h)Anthracene	0.752	0.749	1.23	1.20	1.38	1.060	28.0	
Benzo(g,h,i)Perylene	0.750	0.818	1.12	1.06	1.06	0.962	17.0	

RF-Response Factor(subscript is the amount of nanograms)
$\overline{RF}$-Average Response Factor
% RSD-Percent Relative Standard Deviation
CCC-Calibration Check Compounds(*)

SPCC-System Performance Check Compounds(**)
+ -Not Detectable at 20ng. for benzidine
not detectable at 160ng

Form VI

D.L 4-chlorophenylphenyl ether unreliable in C365+368

LOQ - Effect limit of quantitation, Not nessesarily D.L's

300585

CONTINUING CALIBRATION CHECK
SEMIVOLATILE HSL COMPOUNDS
(Page 2)

Case No: 5027
Contractor: SOUTHERN RESEARCH INSTITUTE
Contract No: 68-01-7098
Instrument ID: 5985

Calibration Date: 20OCT85
Time: 0945
Laboratory ID: D501-68-01
Initial Calibration Date 18OCT85

Minimum $\overline{RF}$ for SPCC is 0.050 Maximum % D for CCC is 25%

Compound	$\overline{RF}$	RF-50	% D	CCC	SPCC
2,4-Dinitrotoluene	0.177	0.169	4.5		
2,6-Dinitrotoluene	0.626	0.462	26.2		
Diethylphthalate	1.870	1.50	19.8		
4-Chlorophenyl-phenylether	0.039	0.0322	17.4		
Fluorene	1.900	1.67	12.1		
4-Nitroaniline	0.486	0.322	33.7		
4,6-Dinitro-2-Methylphenol	0.115	0.116	0.9		
N-Nitrosodiphenylamine(1)	0.582	0.684	17.5	*	
4-Bromophenyl-phenylether	0.234	0.259	10.7		
Hexachlorobenzene	0.265	0.306	15.5		
Pentachlorophenol	0.222	0.194	12.6	*	
Phenanthrene	1.120	1.18	5.4		
Anthracene	1.140	1.20	5.3		
Di-n-Butylphthalate	1.440	1.34	6.9		
Fluoranthene	1.190	0.989	16.9	*	
Pyrene	1.580	2.24	41.8 -10%		
Butylbenzylphthalate	0.843	0.925	9.7		
3,3'-Dichlorobenzidine	0.257	0.324	26.1		
Benzo(a)Anthracene	0.982	1.11	13.0		
bis(2-Ethylhexylphthalate	1.140	1.21	6.1		
Chrysene	1.160	1.15	0.9		
Di-n-Octyl Phthalate	2.050	2.36	15.1	*	
Benzo(b)Fluoranthene	1.290	1.51	17.1		
Benzo(k)Fluoranthene	1.290	1.51	17.1		
Benzo(a)Pyrene	1.240	1.51	21.8	*	
Indeno(1,2,3-cd)Pyrene	1.310	1.29	1.5		
Dibenz(a,h)Anthracene	1.270	1.18	7.1		
Benzo(g,h,i)Perylene	1.280	1.17	8.6		

RF-50 -Response Factor from daily standard file at concentration indicated(50 total nanograms)

$\overline{RF}$-Average Response Factor from initial calibration Form VI

%D-Percent Difference

CCC-Calibration Check Compounds(*)

SPCC-System Performance Check Compounds(**)

D.L 4-chlorophenylphenylether in 366, 367 & 372

Form VII

300586

PROJECT NAME: Osborne Disposal
TDD NO: F3-8508-37

EPA SITE NO.: PA681
REGION: ETIII

QUALITY ASSURANCE REVIEW OF ORGANIC ANALYSIS LAB DATA PACKAGE

Case No.: 5027
Contract No.: 68-01-7022
Contract Laboratory: NUS Pitt.
Applicable IFB No.: WA84-A267
Reviewer: Rich J. Vitale
Review Date: 02/20/86

Applicable Sample No's.: CC386, CC387, CC388, CC390, CC391, CC392, CC393

The organic analytical data for this case has been reviewed. The quality assurance evaluation is summarized in the following table:

Reviewer's Evaluation*	Fraction				
	VOLATILES	ACIDS	BASE/ NEUTRALS	PCB/ PEST.	TCDD
Acceptable		✓			
Acceptable with exception(s)	✓#1,#2,#4,#5		✓#1	✓#3	Not Analyzed
Questionable					
Unacceptable					

* Definitions of the evaluation score categories are listed on next page.

This evaluation was based upon an analysis of the review items indicated below:

- ● DATA COMPLETENESS
- ● BLANK ANALYSIS RESULTS
- ● SURROGATE SPIKE RESULTS
- ● MATRIX SPIKE RESULTS
- ● DUPLICATE ANALYSIS RESULTS
- ● EVALUATION OF CONFIRMATIONS
- ‡ ● QUANTITATIVE CALCULATIONS
- ‡ ● TARGET COMPOUND MATCHING QUALITY
- ● TENTATIVELY IDENTIFIED COMPOUNDS
- ‡ ● CHROMATOGRAPHIC SENSITIVITY CHECKS
- ‡ ● DFTPP AND BFB SPECTRUM TUNE RESULTS
- ‡ ● STANDARDS
- ‡ ● CALIBRATION CHECK STANDARDS
- ● HOLDING TIMES

Data review forms are attached for each of the review items indicated above.

‡ No errors noted, no form attached.

◒ Spot Check performed.

Comments: #1 Please see blank analysis documentation
#2 Please see interlab field duplicate results
#3 Lab quantitated but did not report PCB1254 in CC387 because it was below the required DL. Reviewer has added this identification to the sample data summary.
#4 VOA holding times were exceeded for all samples (2-8 days over)
#5 Instrument carryover observed.

300587

DATA EVALUATION SCORE CATEGORIES

ACCEPTABLE: Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.

ACCEPTABLE WITH EXCEPTION(S): Data is not completely within established control limits. The deficiences are identified and specific data is still valid, given certain qualifications which are listed below.

QUESTIONABLE: Data is not within established control limits. The deficiences bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.

UNACCEPTABLE: Data is not within established control limits. The deficiences imply the results are not meaningful.

DATA COMPLETENESS	CONC./MATRIX	w/sol	w/sol	w/sol									
CTION	TRAFFIC REPORT # CC3	86	87	88	90	91	92	93					
	LAB I.D. # 150920	88	89A	90A	91	92	93	94					
VOA :	RUN DATE/TIME	✓						✓					
	TARGET COMPOUND TAB.	✓						✓					
	TARGET COMPOUND D.L.	✓						✓					
	TENT. I.D. COMPOUND TAB.	✓						✓					
	SURROGATE RECOVERY	✓						✓					
	GC SCREEN TABULATION	N/R						✓					
	GC/MS CHROMATOGRAMS	✓						✓					
	TARGET CMPD. QUAN. LIST	✓						✓					
	TARGET CMPD. SPECTRA	✓						✓					
	TENT. I.D. CMPD. Q.L.	✓						✓					
	TENT. CMPD. LIB. SRCH.	✓						✓					
	CHRO./SENS. CHECKS	✓						✓					
	BFB/DFTPP TUNE DATA	✓						✓					
	I.S AREAS CHARTS	N/R						✓					
	I.S. REL. RESP. FORM	N/R						✓					
	RF & AMTS.: CALIB. CHK.	✓						✓					
	RF & AMTS.: 3-PT CALIB.	✓						✓					
	Chromatograms: Calib. Chk.	✓						✓					
	Chromatograms: 3-Pt. Calib.	✓						✓					
	LINEARITY: 3-PT. CALIB	N/R						✓					
	RF COMPARISON	✓						✓					
	SAMPLE/FIELD BLANK												
	METHOD/INSTR. BLANK												
	LAB DUPLICATE	✓											
	FIELD DUP/REP	→ ✓											
	MAT. SPK./M. STD.	✓											

COMMENTS:

No field blank - SMD gave lab permission not to run aqueous blk designated to monitor contamination during shipping & sample storage

All samples exceeded holding times 2 → 8 days

300589

DATA COMPLETENESS	CONC./MATRIX	10/Sal	med/Sal	med/Sal	med/Sal	med/Sal	10/Sal	10/Sal.					
FRACTION	TRAFFIC REPORT # CC3	86	87	88	90	91	92	93					
	LAB I.D. # 1500920	88	89A	90A	91	92	93	94					
BNA :	RUN DATE/TIME	✓						✓					
	TARGET COMPOUND TAB.	✓						✓					
	TARGET COMPOUND D.L.	✓						✓					
	TENT. I.D. COMPOUND TAB.	✓						✓					
	SURROGATE RECOVERY	✓						✓					
	GC SCREEN TABULATION	N/R						✓					
	GC/MS CHROMATOGRAMS	✓						✓					
	TARGET CMPD. QUAN. LIST	✓						✓					
	TARGET CMPD. SPECTRA	✓						✓					
	TENT. I.D. CMPD. Q.L.	✓						✓					
	TENT. CMPD. LIB. SRCH.	✓						✓					
	CHRO./SENS. CHECKS	✓						✓					
	BFB/DFTPP TUNE DATA	✓						✓					
	I.S AREAS CHARTS	N/R						✓					
	I.S. REL. RESP. FORM	N/R						✓					
	RF & AMTS.: CALIB. CHK.	✓						✓					
	RF & AMTS.: 3-PT CALIB.	✓						✓					
	Chromatograms: Calib. Chk.	✓						✓					
	Chromatograms: 3-Pt. Calib.	✓						✓					
	LINEARITY: 3-PT. CALIB	✓						✓					
	RF COMPARISON	✓						✓					
	SAMPLE/FIELD BLANK												
	METHOD/INSTR. BLANK												
	LAB DUPLICATE	✓				✓							
	FIELD DUP/REP												
	MAT. SPK./M. STD.	✓				✓							
PEST. :	PESTICIDE TABULATION	✓						✓					
	PEST. D.L. TABULATION	✓						✓					
	PESTICIDE CHRO.	✓						✓					
	PESTICIDE STD. CHRO.	✓						✓					
	PESTICIDE STD. I.D.	✓						✓					
	2nd COLUMN CONF.	✓						✓					
	GC/MS CONFIRMATION	n/a	N/O	NO	N/a	N/a	NO	N/a					
	PESTICIDE DUPLICATE	✓				✓							
	PESTICIDE SPIKE	✓				✓							
	PESTICIDE BLANK												
	STD SUMMARY	✓						✓					
	LINEARITY CHK.	✓						✓					
	DEGRAD. CHK.	✓						✓					
	DBC RT SHIFT	✓						✓					

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KEY TO DATA COMPLETENESS FORM

Abbreviation Used on Form	Description of Checklist Item
Conc./Matrix	Concentration category submitted in analysis request (low, med, hi); and matrix (sol., aq.)
Fraction	Fill in acid, base/neutral, acid/base/neutral, or volatiles analysis
Run Date/Time	Instrument run date (to be used for correlating calibration)
Target Cmpd. Tab.	Tabulated results for target compounds
Target Cmpd. D.L.	Detection limits for target compounds (actual/level indicated by screen
Tent. LD. Cmpd. Tab.	Tabulated results for tentatively identified compounds
Surr. Rec.	Surrogate recoveries results
GC Screen Tab.	Tabulated GC screen results indicating required level of followup
GC/MS Chromatograms	Chromatograms of GC/MS analysis runs
Target Cmpd. Quan. List	Target compounds quantitation list, showing areas, ret. times
Target Cmpd. Spectra	Enhanced and unenhanced spectra of target compound hits
Tent. LD. Cmpd. Q.L.	Quantitation list for tentatively identified compounds
Tent. Cmpd. Lib. Srch.	Spectra and library match spectra of tentatively identified compounds
Chro./Sens. Checks	EICP's and R.R.F.'s for chromatographic sensitivity checks
BFB/DFTPP Tune Data	Spectra intensity lists, and criteria comparison forms for BFB, DFTPP
I.S. Areas Charts	Internal standards area control charts and description of remedial action
I.S. Rel. Resp. Form	Internal standards relative response listings for each sample run
RF and amts.: Calib. Chk.	Tabulated response factors and amount injected for all cmpds. in calibration check
RF and amts.: 3-Pt. Calib.	Tabulated response factors and amount injected for all cmpds. in 3-point calibration
Chromatograms: Calib. Chk.	Chromatograms for calibration check standard
Chromatograms: 3-Pt. Calib.	Chromatograms for 3-point multilevel calibration standards.
Linearity: 3-Pt. Calib.	Tabulated correlation coefficient or relative standard deviation for calibration
RF Comparison	Tabulated comparison of calibration Response Factor with check standard
Sample/Field Blank	Equipment rinse or reagent water blank shipped with samples from field
Method/Instr. Blank	Method or instrument blank which is prepared at lab
Lab Duplicate	Sample which was split by lab for duplicate analysis
Field Dup/Rep	Sample which was split or collected twice in the field
Mat. Spk./M. Std.	Matrix spike or method standard (blind, or done by lab)
Pest. Tab.	Tabulated results for pesticides
Pest. D.L. Tab.	Tabulated detection limits for pesticides
Pest. Chro.	Chromatograms for pesticide screening
2nd Col. Conf.	Confirmation of pesticide results by using a second GC column and temperature
GC/MS Conf.	Confirmation of pesticide results by GC/MS analysis
Pest. Dup., Spk. Blk.	Pesticide duplicate, spike, and blank
Pest. Std. Chro.	Chromatogram of pesticide standard
Pest. Std. LD.	Pesticide standard identification form
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TCDD Tab., D.L., EICP, Blk.	TCDD tabulated results, detection limits, extracted ion current profile, blank

KEY TO SYMBOLS USED IN DATA COMPLETENESS TABLE

Symbol	Meaning	Symbol	Meaning
✓	Data item present	I	Incomplete data item
NA	Data item not applicable or not required	NC	Data item not clearly explained (units of conc., etc)
P	Data item within established control limits		
F	Data item outside established control limits	* or [number]	See footnote
MS	Missing item	XX/XX/XX XX:XX	Date/Time of run (calibration, etc.)

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
BNA	lab	low	Sol	502710032	NUS Labs	Di-n-butyl phthalate (1200 ug/kg / 330) #1
Pest	lab	low	Sol	502910032	NUS Labs	ND.
BNA	lab	med	Sol	50291003M	NUS Labs	ND
Pest	lab	med	Sol	50291003M	NUS Labs	ND
VOA	lab	low	Sol	VBLK 10098501	NUS Labs * →	$MeCl_2$ (83 ug/kg / 5 ug/kg) #1 Acetone (18 ug/kg / 10 ug/kg) #1 Toluene (1.8 ug/kg / 5) #2
VOA	lab	low	Sol	VBLK 10148502	NUS Labs	$MeCl_2$ (7.7 ug/kg / 5) #1 Acetone (34 ug/kg / 10) #1 2-butanone (10.1 ug/kg / 5) #1
BNA	lab	med	Sol	BNBLK 1016M	NUS Labs.	Bis(2-ethylhexyl) phthalate (90,000 ug/kg / 660) Di-n-butyl phthalate (1160 ug/kg / 20000) #2

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FOR

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

No field blank was analyzed for this lab (SMO gave permission) - to not analyze the aqueous blk designated for field blk d/ot cooler contaminant monitoring.

* Not used. Run after 50ppb cont. cal std.

ISO No. 5027 Contractor NUS CORPORATION Contract No. 68-01-7022

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (TISL.TIC OR UNKNOWN)	CONC.	UNITS	CRQL
50271009L	10-9-85	VOA	Soil	low	Finn4000	75-09-2	Methylene chloride	23	ug/Kg	5
↓	↓	↓	↓	↓	↓	67-64-1	Acetone	18		10
						---	unknown	8		NR
						76-13-1	Ethane,1,1,2-Trichloro-1,2,2-Trifluoro	7		NR
50271014L	10-14-85	VOA	Soil	low	Finn3200	75-09-2	Methylene chloride	7.7		5
↓	↓	↓	↓	↓	↓	67-64-1	Acetone	34		10
						78-93-3	2-Butanone	6.9		10
						---	unknown	30		NR
						76-13-1	Ethane,1,1,2-Trichloro-1,2,2-Trifluoro	20		NR
50271003L	10-17-85	BNA	Soil	low	Finn4000	84-74-2	Di-N-Butylphthalate	1200		330
↓	↓	↓	↓	↓	↓	---	unknown	6000		NR
						123-42-2	2-Pentanone,4-Hydroxy-4-methyl	60,000		NR
50270930M	10-16-85	BNA	Soil	med	Finn4000	117-81-7	bis(2-Ethylhexyl)Phthalate	90,000		200
↓	↓	↓	↓	↓	↓	123-79-5	Hexanedioicacid,Dioctylester	300,000		NR
50271003M	10-17-85	BNA	Soil	med	Finn4000	---	NONE	NR		NR
50271003L	10-3-85	Pest	Soil	LL	CC#2 3700	---	NONE	NR		NR
50271003M	10-3-85	Pest	Soil	ML	CC#2 3700	---	NONE	NR	↓	NR

Comments:

800593

BLANK ANALYSIS RESULTS FOR TENTATIVELY IDENTIFIED COMPOUNDS

ALL TENTATIVELY IDENTIFIED COMPOUNDS FOUND IN BLANK ANALYSES ARE LISTED BELOW:

SAMPLE #	FRACTION	SCAN #(S)	SPECTRUM MATCH INDICES				ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
			TYPE	SCORE	TYPE	SCORE			
BLK 1008L	BNA	170					6000 ug/kg	Unknown	
		189					60,000 ug/kg	Aldol Product	
BLK 1008H	BNA						ND		
BLK 1009L	VOA	35					8 ug/kg	Unknown	
		225					7 ug/kg	Freon 12	
BLK 1014L	VOA	126					30 ug/kg	Unknown	
		228					20 ug/kg	Freon 12	
BLK 0930H	BNA	13400					300,000 ug/kg	dioctyl ester-hexanedioic acid	

300594

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Case No. 027 Contract Laboratory NUS CORPORATION Contract No. 68-0107022

Low ✓ Medium _____

	VOLATILE				SEMI-VOLATILE							PESTICIDE**
SMO TRAFFIC NO.	TOLUENE-D8 (50-100)	BFB (50-100)	1,2 DICHLORO-ETHANE-D4 (50-100)	NITRO-BENZENE-D5 (20-140)	2-FLUORO-BIPHENYL (20-140)	TERPHENYL-D14 (20-130)			PHENOL-D5 (20-140)	2-FLUORO-PHENOL (20-140)	2,4,6 TRIBROMO-PHENOL (10-140)	DIBUTYL-CHLORENDATE (20-150)
0271009L	82	130	88	NR	NR	NR			NR	NR	NR	NR
386	79	140	94	74	64	35			78	78	86	72
386MS	90	106	93	66	60	31			72	66	84	71
386MSD	57	104	93	70	60	32			73	73	87	71
390	87	116	93	62	69	72			67	61	76	67
391	61 [1]	77 ①	97	116	108	115			104	110	114	87
393	69	99	90	71	64	32			76	76	61	73
271014L	101	101	93	NR	NR	NR			NR	NR	NR	NR
387	103	103	102	94	93	100			86	91	100	78
392	103	108	101	47	67	33			65	73	DL	72
388	104	156	102	89	90	82			93	85	113	68
71003L	NR	NR	NR	74	71	34			83	82	86	71
91MS	NR	NR	NR	107	95	88			107	107	112	97
91MSD	NR	NR	NR	109	98	126			119	115	103	103
71003M	NR	NR	NR	78	88	93			77	78	82	88
70930M	NR	NR	NR	74	77	93			74	77	85	NR

800595

LUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

VISORY LIMITS ONLY

Volatiles: 0 out of 33 ; outside of QC limits
Semi-Volatiles: 0 out of 83 ; outside of QC limits
Pesticides: 0 out of 13 ; outside of QC limits

nments: ① M/e 174 was used to calculate BFB % recovery

[1] Qed positives maybe higher (est. Le) Dilution because of b.d.l.

S[illegible] M[illegible]RI[illegible] SPI[illegible]/M[illegible]RI[illegible] SPI[illegible] DU[illegible]LIC[illegible]E [illegible]CO[illegible]RY

e No. 5027 Contractor NUS CORPORATION Contract No. 68-01-7022

Low Level ✓ Medium Level

PAGE 1

FRACTION	COMPOUND	CONC. SPIKE ADDED (µg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. CC386	1,1-Dicholorethene	0.25	0	0.17	68	0.19	76	11	22	59-172
	Trichloroethene	0.25	0	0.18	72	0.21	84	15	24	62-137
	Chlorobenzene	0.25	0	0.22	88	0.24	96	9	21	60-133
	Toluene	0.25	0	0.20	80	0.17	68	16	21	59-139
	Benzene	0.25	0	0.23	92	0.26	104	12	21	66-142
B/N SMO SAMPLE NO. CC386	1,2,4-Trichlorobenzene	90	0	54	60	56	62	4	23	38-107
	Acenaphthene	53	0	36	68	38	72	5	19	31-137
	2,4 Dinitrotoluene	34	0 [1]	41	120*	42	120*	2	47	28-89
	Di-n-Butylphthalate	54	35	78	80	74	72	5	47	29-135
	Pyrene	61	0	38	62	39	64	3	36	35-142
	N-Nitrosodi-n-Propylamine	52	0	30	58	31	60	2	38	41-126
	1,4-Dichlorobenzene	61	0	33	54	33	54	0	27	28-104
ACID SMO SAMPLE NO. CC386	Pentachlorophenol	68	0 [1]	81	120*	110	160*	30	47	17-109
	Phenol	90	0	71	79	67	74	6	35	26-90
	2-Chlorophenol	84	0	63	75	63	75	0	50	25-102
	4-Chloro-3-Methylphenol	100	0	86	86	88	88	2	33	26-103
	4-Nitrophenol	62	0 [1]	110	180*	120	190*	9	50	11-114
PEST SMO SAMPLE NO. CC386	Lindane	0.20	0	0.16	80	0.17	85	6	50	46-127
	Heptachlor	0.20	0	0.10	50	0.13	65	26	31	35-130
	Aldrin	0.20	0 [2]	0.46	230*	0.38	190*	19	43	34-132
	Dieldrin	0.50	0	0.36	72	0.40	80	11	38	31-134
	Endrin	0.50	0	0.40	80	0.42	84	5	45	42-139
	4,4'-DDT	0.50	0	0.34	68	0.36	72	6	50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5; outside QC limits
B/N 0 out of 7; outside QC limits
ACID 0 out of 5; outside QC limits
PEST 0 out of 6; outside QC limits

RECOVERY: VOAs 0 out of 10; outside QC limits
B/N 2 out of 14; outside QC limits
ACID 4 out of 10; outside QC limits
PEST 2 out of 12; outside QC limits

Comments: [1] Unusual for high recoveries of these "bad actor" compounds. Perhaps the lab should be tasked to inject the matrix spike cocktail directly to determine if they are "inadvertently added" more of these compounds than they think.

[2] High recovery of aldrin does not affect data as reported.

300596

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 5027 Contractor. NUS CORPORATION Contract No. 68-01-7022

Low Level ____ Medium Level ✓ : PAGE (2)

FRACTION	COMPOUND	CONC. SPIKE ADDED (µg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO.	1,1-Dicholoroethene								22	59-172
	Trichloroethene								24	62-137
	Chlorobenzene								21	60-133
	Toluene								21	59-139
	Benzene								21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene	150	0	150	100	150	100	0	23	38-107
	Acenaphthene	190	0	130	68	180	95	32*	19	31-137
	2,4 Dinitrotoluene	190 [1]	0	80	42	200	105*	86*	47	28-89
	Di-n-Butylphthalate	200	0	160	80	210	105	27	47	29-135
	Pyrene	190 [1]	5.4	170	87	250	129	39*	36	35-142
CC391	N-Nitrosodi-n-Propylamine	180 [1]	0	220	122	270	150*	20	38	41-126
	1,4-Dichlorobenzene	210	0	110	52	200	95	58*	27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol	130 [1]	0	130	100	93	72	33	47	17-109
	Phenol	210	0	200	95*	220	105*	10	35	26-90
	2-Chlorophenol	190	0	150	79	200	105*	29	50	25-102
	4-Chloro-3-Methylphenol	190 [1]	0	250	132*	200	105*	22	33	26-103
CC391	4-Nitrophenol	170 [1]	0	270	159*	190	112	35	50	11-114
PEST SMO SAMPLE NO.	Lindane	2.0	0	2.0	100	1.9	95	5	50	46-127
	Heptachlor	2.0	0	1.9	95	1.8	90	5	31	35-130
	Aldrin	2.0	0	2.6	130	2.5	120	8	43	34-132
	Dieldrin	5.0	0	5.4	110	5.1	100	10	38	31-134
	Endrin	5.0	0	5.4	110	5.1	100	10	45	42-139
CC391	4,4'-DDT	5.0	0	4.2	84	4.8	80	5	60	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs ____ out of ____ ; outside QC limits
B/N 4 out of 7 ; outside QC limits
ACID 0 out of 5 ; outside QC limits
PEST 0 out of 6 ; outside QC limits

RECOVERY: VOAs ____ out of ____ ; outside QC limits
B/N 2 out of 14 ; outside QC limits
ACID 6 out of 10 ; outside QC limits
PEST 0 out of 12 ; outside QC limits

Comments: [1] see previous page for comment #1

300596

Duplicate/Triplicate Analysis of Non-Matrix Spiked (Indigenous) Compounds

Outliers are tabulated below for three types of multiple analyses:

(1) Field duplicates CC378 & CC386

(2) Un-spiked laboratory duplicates

(3) Matrix spike duplicate plus corresponding unspiked sample evaluated for non-matrix spiked (indigenous) compounds. (Spike recoveries are evaluated on a separate form.)

Analytical Fraction	Outlier Criteria (for tabulation purposes only)			
	Relative standard deviation		Equivalent Relative Percent Difference	
	solid	aqueous	solid	aqueous
VOA				
BNA				
PEST				

	CONCENTRATIONS								
	Analysis No. 1		Analysis No. 2		Analysis No. 3		relative standard deviation — or — relative percent difference	concentration units	footnotes
COMPOUND	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.			
Methylene Chloride	CC378	3000	CC386	72			191%	ug/kg	#1
Acetone		3200		15			190%		#1
2-butanone		7200		ND			200%		#1
Carbon Tet		310		ND			200%		#2
Toluene		180		ND			200%		#3
di-n-butylphthalate		35		1300			190%		#1
bis(2-ethylhexyl)phthalate		190		ND			200%		#1

COMMENTS: CC378 - run by medium protocol - analyzed by S-cubed
CC386 run by low protocol - analyzed by NUS Labs

#1 Questioned by blank no effect

#2 Reason to suspect an artifact of medium VOA extraction - No medium level blk was supplied

#3 Consider estimated.

300598

Instrument Carryover Effects

Possible Instances of Carryover Artifacts are Tabulated and Evaluated Below:

COMPOUND IN QUESTION	Initial Run (High Level) Run I.D.	Instrument Level	Second Run Run I.D.	Instr. Level	Carryover Percent	Third Run Run I.D.	Instr. Level	Carryover Percent	Footnote Reference
Toluene	CC386MS	198.6ng	CC393	6.3ng	3.1%				good possible of carryover
			also chlorobenzene & benzene present in grant list of CC393						

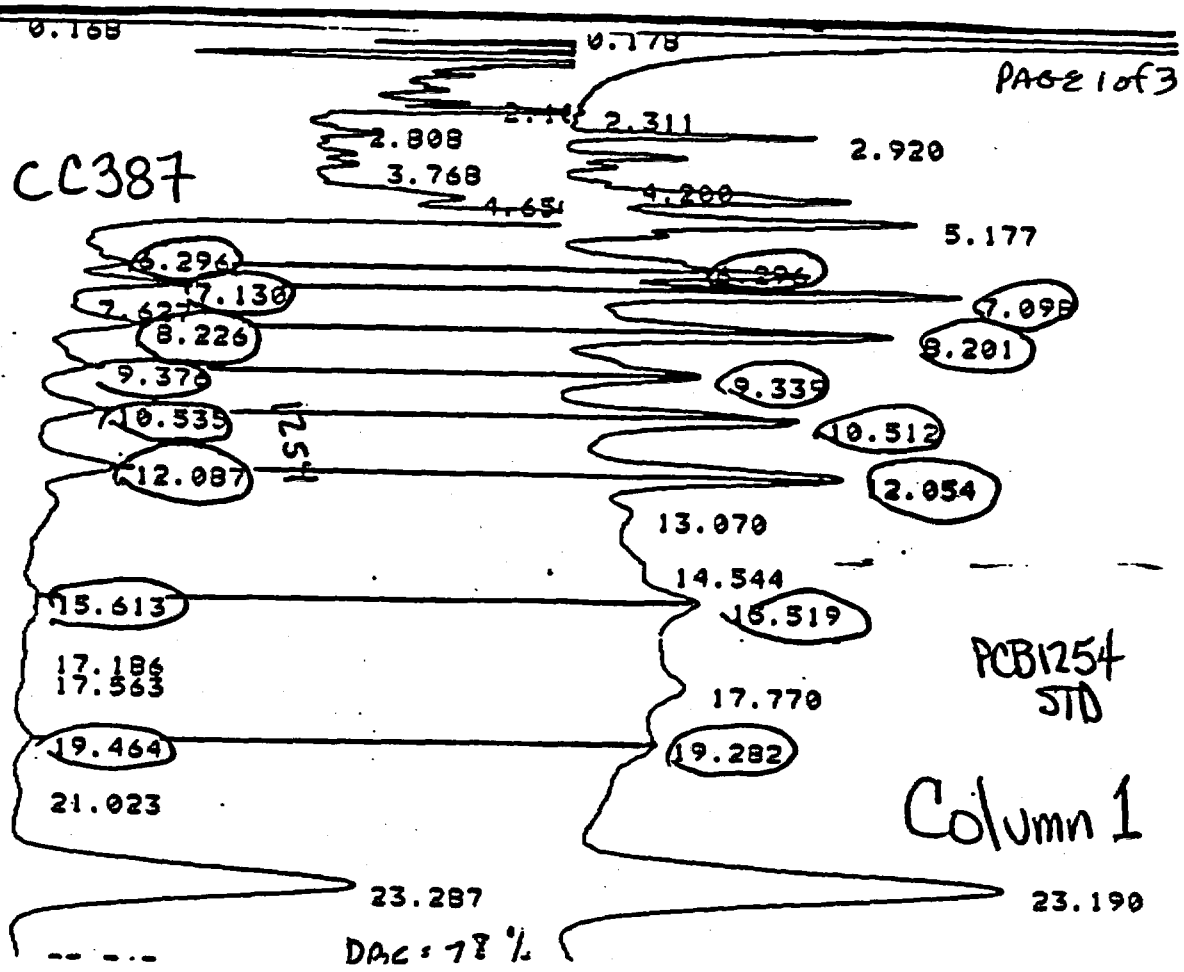
300599

300600

COMMENTS:

PAGE 1 of 3

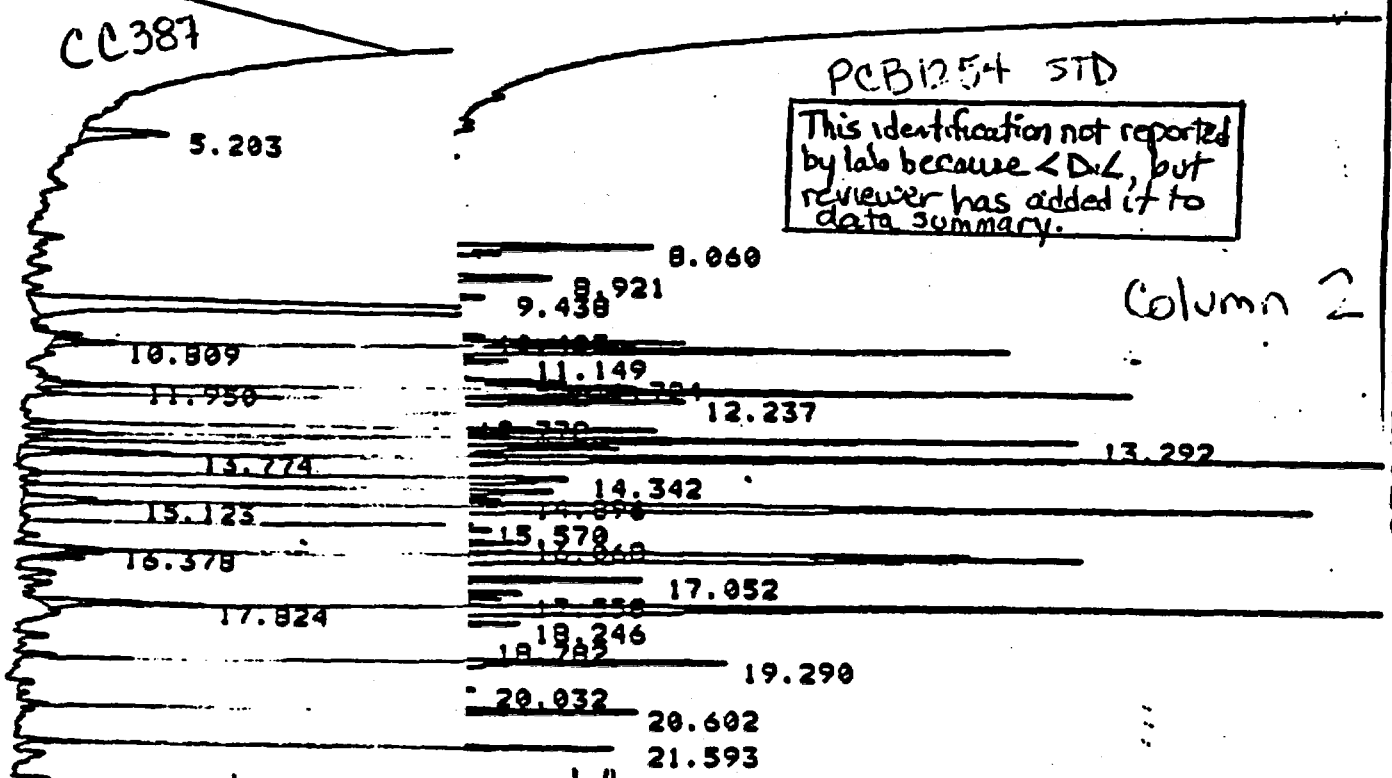
CC387



PCB1254 STD

Column 1

CC387



PCB1254 STD

This identification not reported by lab because < D.L, but reviewer has added it to data summary.

Column 2

TI:ON/II:OFF 1

Calculated off of Low Std.

Factor = $\frac{0.5\ \mu g/ml}{2.16\ Ht} = .231\ \mu g/ml\ Ht.$

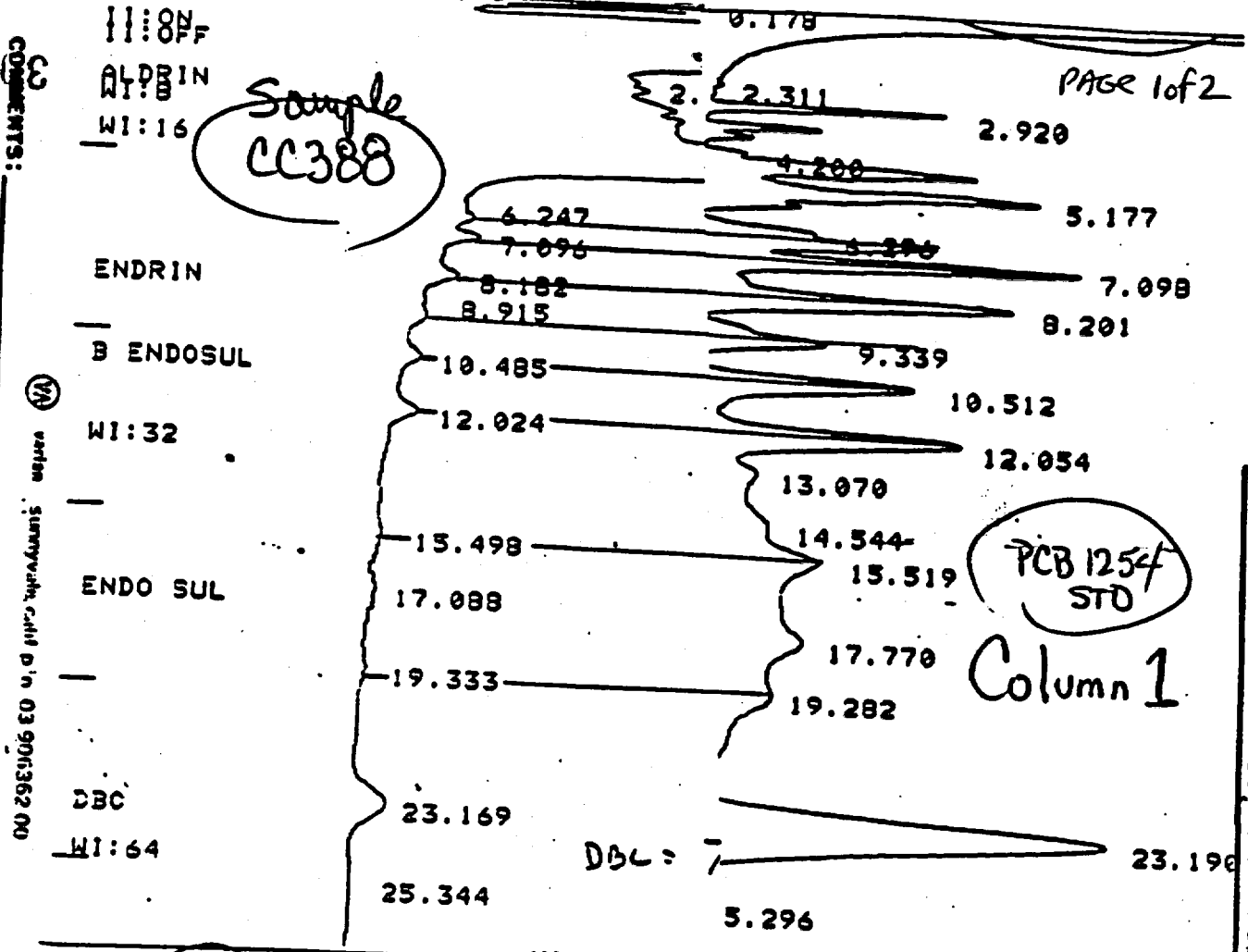
reviewer agrees w. th Quantitate

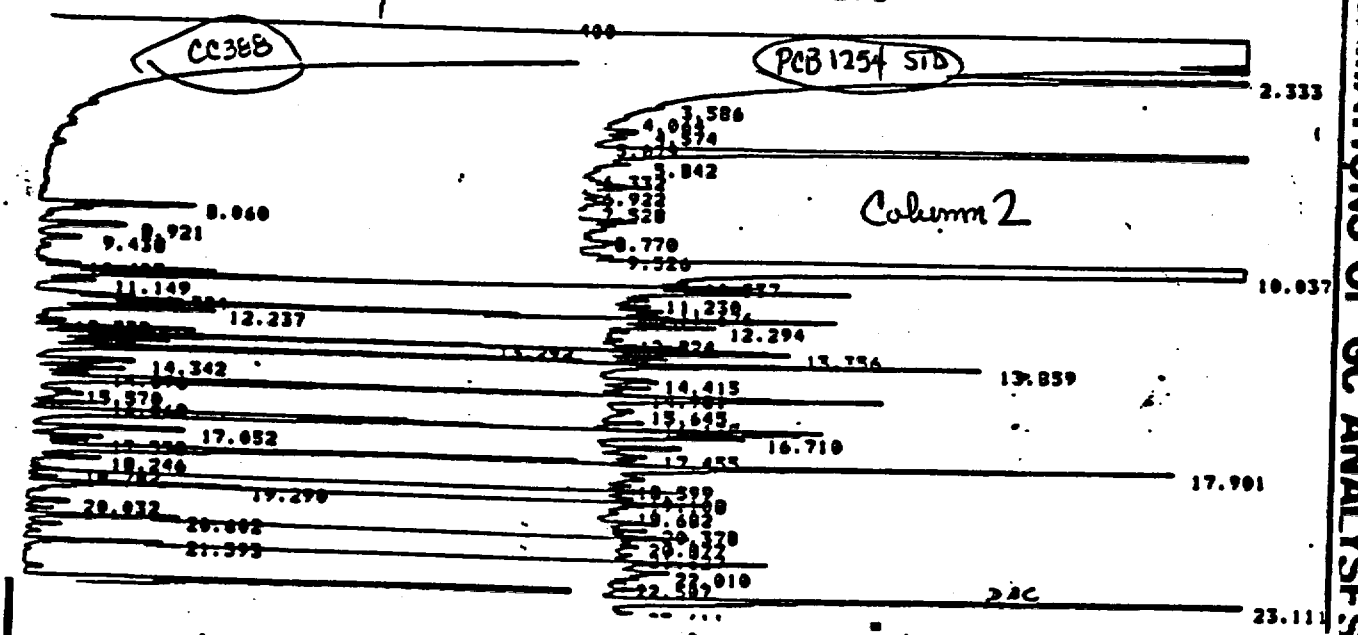
1254 = $0.51\ Ht. \times 0.231\ \mu g/ml\ Ht. \times 10\ ml \times \frac{1}{0.73\ g} \times \frac{1000\ g}{Kg} = 1{,}600\ \mu g/Kg$

EVALUATION OF CONFIRMATIONS OF GC ANALYSES

EVALUATION OF CONFIRMATIONS OF GC ANALYSES

PAGE 1 of 2





resume agrees with quantitation

$0.331 \times 1.66 \times 10\,ml \times \frac{1}{0.29\,g} \times \frac{1000\,g}{1\,kg} = 19{,}000\ \mu g/kg$

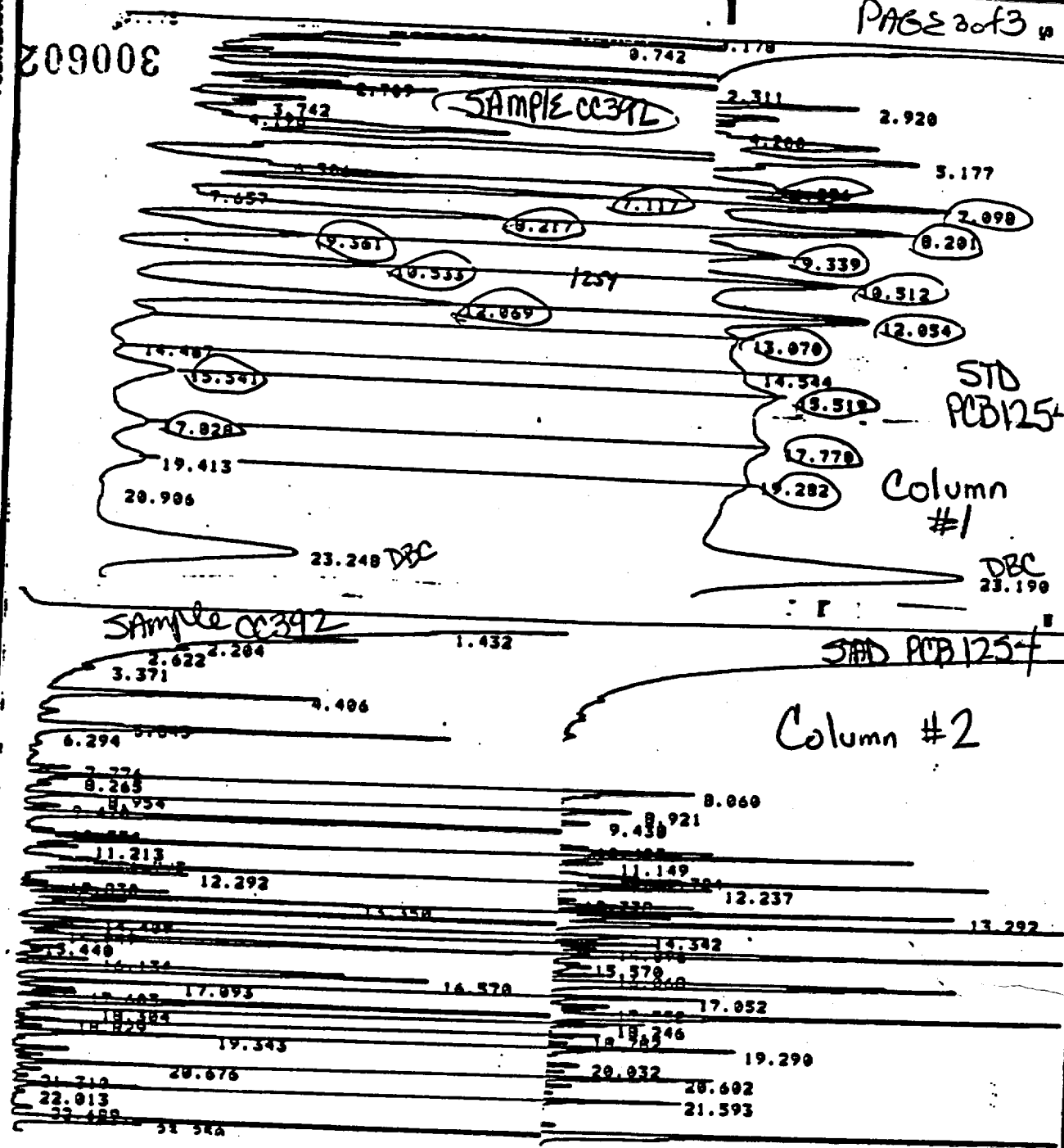
2 Columns Yes	TYPE OF CONFIRMATION (2 COL / GC/MS)
	REVIEWER CONFIDENT

COMMENTS:

300602

PAGE 3 of 3

EVALUATION OF CONFIRMATIONS OF GC ANALYSES



reviewer agrees with quantitation

30.791

Factor = $\frac{\text{[illegible] µg/ml}}{4.57 \text{ Ht.}}$ = .219 µg/ml Ht.

1254 = 4.41 Ht. x 0.219 µg/ml Ht. x 20 ml x $\frac{1}{26.3 g}$ x $\frac{1000 g}{1 Kg}$ = 730 µg/Kg

2 columns	TYPE OF CONFIRMATION (2 COL / GC/MS)
yes –	REVIEWER CONFIDENT

PESTICIDE/PCB STANDARDS SUMMARY

Case No. 5027 Laboratory NUS

Contract No. 68-01-7022 GC Column 1.95% SP2401 / 1.55% SP2250 GC Instrument ID GC#2 3700

	DATE OF ANALYSIS 10/14/85				DATE OF ANALYSIS 10-15-85			
	TIME OF ANALYSIS 21:31				TIME OF ANALYSIS 7:01			
	LABORATORY ID 5-29-85-10A				LABORATORY ID 5-29-85-10A			
COMPOUND	RT	RETENTION TIME WINDOW	CALIBRATION FACTOR	CONF. OR QUANT.	RT	CALIBRATION FACTOR	CONF. OR QUANT.	PERCENT DIFF.**
alpha-BHC	1.54	.03	26		1.54	28		7.7
beta-BHC	2.33	.02	6.1		2.34	6.9		13
delta-BHC	2.72	.03	11		2.73	13		18
gamma-BHC	1.98	.03	18		1.99	20		11
Heptachlor	2.45	.03	14					
Aldrin	2.99	.05	12		2.99	13		8.3
Heptachlor Epoxide	4.67	.08	7.7 ~~14~~ KS					
Endosulfan I	5.95	.08	6.0		5.97	6.3		5.0
Dieldrin	7.38	.11	4.5		7.41	5.1		13
4,4'-DDE	7.05	.13	5.0 ~~3.5~~ KS					
Endrin	9.01	.12	3.5		9.04	3.7		5.7
Endosulfan II	11.16	.15	2.7		11.20	3.1		15
4,4'-DDD	11.15	.20	2.6					
Endrin Aldehyde	15.00	.20	1.0		15.05	1.3		30
Endosulfan Sulfate	18.55	.24	1.2		18.60	1.5		25
4,4'-DDT	13.51	.24	1.4					
Methoxychlor	27.29	.51	0.33					
Endrin Ketone								
Tech. Chlordane		.08						
alpha-Chlordane*								
gamma-Chlordane*								
Toxaphene		.18						
Aroclor - 1016		.03						
Aroclor - 1221		.01						
Aroclor - 1232		.03						
Aroclor - 1242		.05						
Aroclor - 1248		.02						
Aroclor - 1254		.02						

out of criteria however since no positives does not affect data.

00603

DATA EVALUATION SCORE CATEGORIES

ACCEPTABLE: Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.

ACCEPTABLE WITH EXCEPTION(S): Data is not completely within established control limits. The deficiences are identified and specific data is still valid, given certain qualifications which are listed below.

QUESTIONABLE: Data is not within established control limits. The deficiences bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.

UNACCEPTABLE: Data is not within established control limits. The deficiences imply the results are not meaningful.

DATA COMPLETENESS	CONC./MATRIX	Hi/Soil	med/Soil	med/Soil								
CTION	TRAFFIC REPORT # C5	758-11	758-12	5626-12								
	LAB I.D. # 07-	01	02	03								
VOA :	RUN DATE/TIME	✓	✓	✓								
	TARGET COMPOUND TAB.	✓	✓	✓								
	TARGET COMPOUND D.L.	✓	✓	✓								
	TENT. I.D. COMPOUND TAB.	✓	✓	✓								
	SURROGATE RECOVERY	✓	✓	✓								
	GC SCREEN TABULATION	✓	✓	✓								
	GC/MS CHROMATOGRAMS	✓	✓	✓								
	TARGET CMPD. QUAN. LIST	✓	✓	✓								
	TARGET CMPD. SPECTRA	✓	✓	✓								
	TENT. I.D. CMPD. Q.L.	✓	✓	✓								
	TENT. CMPD. LIB. SRCH.	✓	✓	✓								
	CHRO./SENS. CHECKS	✓	✓	✓								
	BFB/DFTPP TUNE DATA	✓	✓	✓								
	I.S AREAS CHARTS	N/R	N/R	N/R								
	I.S. REL. RESP. FORM	N/R	N/R	N/R								
	RF & AMTS.: CALIB. CHK.	✓	✓	✓								
	RF & AMTS.: 3-PT CALIB.	✓	✓	✓								
	Chromatograms: Calib. Chk.	✓	✓	✓								
	Chromatograms: 3-Pt. Calib.	✓	✓	✓								
	LINEARITY: 3-PT. CALIB	N/R	N/R	N/R								
	RF COMPARISON	✓	✓	✓								
	SAMPLE/FIELD BLANK											
	METHOD/INSTR. BLANK											
	LAB DUPLICATE											
	FIELD DUP/REP	✓	✓									
	MAT. SPK./M. STD.	✓	✓									

COMMENTS :-

300605

DATA COMPLETENESS	CONC./MATRIX	[illegible]	[illegible]	[illegible]
FRACTION	TRAFFIC REPORT # C5	758-11	758-12	826-12
	LAB I.D. # 02	01	02	03
BNA :	RUN DATE [illegible]	✓	✓	✓
	TARGET COMPOUND TAB.	✓	✓	✓
	TARGET COMPOUND D.L.	✓	✓	✓
	TENT. I.D. COMPOUND TAB.	✓	✓	✓
	SURROGATE RECOVERY	✓	✓	✓
	GC SCREEN TABULATION	✓	✓	✓
	GC/MS CHROMATOGRAMS	✓	✓	✓
	TARGET CMPD. QUAN. LIST	✓	✓	✓
	TARGET CMPD. SPECTRA	✓	✓	✓
	TENT. I.D. CMPD. Q.L.	✓	✓	✓
	TENT. CMPD. LIB. SRCH.	✓	✓	✓
	CHRO./SENS. CHECKS	✓	✓	✓
	BFB/DFTPP TUNE DATA	✓	✓	✓
	I.S AREAS CHARTS	N/R →	→	→
	I.S. REL. RESP. FORM	N/R →	→	→
	RF & AMTS.: CALIB. CHK.	✓	✓	✓
	RF & AMTS.: 3-PT CALIB.	✓	✓	✓
	Chromatograms: Calib. Chk.	✓	✓	✓
	Chromatograms: 3-Pt. Calib.	✓	✓	✓
	LINEARITY: 3-PT. CALIB	N/R →	→	→
	RF COMPARISON	✓	✓	✓
	SAMPLE/FIELD BLANK			
	METHOD/INSTR. BLANK			
	LAB DUPLICATE			
	FIELD DUP/REP	✓	✓	
	MAT. SPK./M. STD.	✓	✓	
PEST. :	PESTICIDE TABULATION	✓	✓	✓
	PEST. D.L. TABULATION	✓	✓	✓
	PESTICIDE CHRO.	N/R	N/R	N/R
	PESTICIDE [illegible] CHRO.	↓	↓	↓
	PESTICIDE [illegible] I.D.	↓	↓	↓
	2nd COLUMN CONF.	✓	✓	✓
	GC/MS CONFIRMATION	✓	✓	✓
	PESTICIDE DUPLICATE	✓	✓	
	PESTICIDE SPIKE	✓	✓	
	PESTICIDE BLANK			
	STD SUMMARY	N/R	N/R	N/R
	LINEARITY CHK.	↓	↓	↓
	DEGRAD. CHK.	↓	↓	↓
	DBC RT SHIFT	✓	✓	✓

KEY TO DATA COMPLETENESS FORM

Abbreviation Used on Form	Description of Checklist Item
Conc./Matrix	Concentration category submitted in analysis request (low, med, hi); and matrix (sol., aq.)
Fraction	Fill in acid, base/neutral, acid/base/neutral, or volatiles analysis
Run Date/Time	Instrument run date (to be used for correlating calibration)
Target Cmpd. Tab.	Tabulated results for target compounds
Target Cmpd. D.L.	Detection limits for target compounds (actual/level indicated by screen
Tent. I.D. Cmpd. Tab.	Tabulated results for tentatively identified compounds
Surr. Rec.	Surrogate recoveries results
GC Screen Tab.	Tabulated GC screen results indicating required level of followup
GC/MS Chromatograms	Chromatograms of GC/MS analysis runs
Target Cmpd. Quan. List	Target compounds quantitation list, showing areas, ret. times
Target Cmpd. Spectra	Enhanced and unenhanced spectra of target compound hits
Tent. I.D. Cmpd. Q.L.	Quantitation list for tentatively identified compounds
Tent. Cmpd. Lib. Srch.	Spectra and library match spectra of tentatively identified compounds
Chro./Sens. Checks	EICP's and R.R.F.'s for chromatographic sensitivity checks
BFB/DFTPP Tune Data	Spectra intensity lists, and criteria comparison forms for BFB, DFTPP
I.S. Areas Charts	Internal standards area control charts and description of remedial action
I.S. Rel. Resp. Form	Internal standards relative response listings for each sample run
RF and amts.: Calib. Chk.	Tabulated response factors and amount injected for all cmpds. in calibration check
RF and amts.: 3-Pt. Calib.	Tabulated response factors and amount injected for all cmpds. in 3-point calibration
Chromatograms: Calib. Chk.	Chromatograms for calibration check standard
Chromatograms: 3-Pt. Calib.	Chromatograms for 3-point multilevel calibration standards.
Linearity: 3-Pt. Calib.	Tabulated correlation coefficient or relative standard deviation for calibration
RF Comparison	Tabulated comparison of calibration Response Factor with check standard
Sample/Field Blank	Equipment rinse or reagent water blank shipped with samples from field
Method/Instr. Blank	Method or instrument blank which is prepared at lab
Lab Duplicate	Sample which was split by lab for duplicate analysis
Field Dup/Rep	Sample which was split or collected twice in the field
Mat. Spk./M. Std.	Matrix spike or method standard (blind, or done by lab)
Pest. Tab.	Tabulated results for pesticides
Pest. D.L. Tab.	Tabulated detection limits for pesticides
Pest. Chro.	Chromatograms for pesticide screening
2nd Col. Conf.	Confirmation of pesticide results by using a second GC column and temperature
GC/MS Conf.	Confirmation of pesticide results by GC/MS analysis
Pest. Dup., Spk. Blk.	Pesticide duplicate, spike, and blank
Pest. Std. Chro.	Chromatogram of pesticide standard
Pest. Std. I.D.	Pesticide standard identification form
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TCDD Tab., D.L., EICP, Blk.	TCDD tabulated results, detection limits, extracted ion current profile, blank

KEY TO SYMBOLS USED IN DATA COMPLETENESS TABLE

Symbol	Meaning	Symbol	Meaning
✓	Data item present	I	Incomplete data item
NA	Data item not applicable or not required	NC	Data item not clearly explained (units of conc., etc)
P	Data item within established control limits		
F	Data item outside established control limits	* or [number]	See footnote
MS	Missing item	XX/XX/XX XX:XX	Date/Time of run (calibration, etc.)

BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
VOA	lab/med/Sol			BLK #1	GSRI	MeCl2 (2,800 ug/kg / 2500) #1 * Acetone (29,000 ug/kg / 5000) #1 * Toluene (3,000 ug/kg / 2500) #1
BNA & Pest	lab/med/Sol			BLK #	GSRI	ND.

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN TH SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FO

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

* Multiply by 20 to be comperable with the the dilutions for C5758-
= 56,000 ug/kg - MeCl2
580,000 ug/kg - Acetone.
60,000 ug/kg - toluene

BLANK ANALYSIS RESULTS FOR TENTATIVELY IDENTIFIED COMPOUNDS

ALL TENTATIVELY IDENTIFIED COMPOUNDS FOUND IN BLANK ANALYSES ARE LISTED BELOW:

SAMPLE #	FRACTION	SCAN #(S)	SPECTRUM MATCH INDICES				ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
			TYPE	SCORE	TYPE	SCORE			
BLK#1	VOA	1660					18,000	Unknown.	
	BNA						N.D		

300609

Case No. 5027 / SAS 1761 I Contract Laboratory Gulf South Research Institute Contract No. 68-01-6959

HIGH ✓ Medium _____

	VOLATILE								SEMI-VOLATILE			PESTICIDE
SMO TRAFFIC NO.	TOLUENE-D8 (50-160)	B/B (50-160)	1,2 DICHLORO-ETHANE-D4 (50-160)	NITRO-BENZENE-D5 (20-140)	2-FLUORO-BIPHENYL (20-140)	TERPHENYL-D14 (20-150)			PHENOL-D5 (20-140)	2-FLUORO-PHENOL (20-140)	2,4,6 TRIBROMO-PHENOL (10-140)	~~DIBUTYL-CHLORENDATE (20-150)~~ **
C5758-11	108	96	78	83	82	83			69	88	90	
C5758-12	104	95	97	74	74	84			64	75	73	
C-5624-12 ~~C5758-12~~	101	96	90	74	74	93			66	75	70	
CMS11	112	105	104	108	66	83			76	80	76	
CMS12	100	93	97	84	80	91			75	86	81	
BLANK 1	112	104	106	85	82	91			80	91	78	

300610

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS

~~** ADVISORY LIMITS ONLY~~

Volatiles: 0 out of 18 ; outside of QC limits

Semi-Volatiles: 0 out of 36 ; outside of QC limits

Pesticides: NR out of NR ; outside of QC limits

Comments: All acceptable.

300611

CONTROL MATRIX SPIKE RECOVERY

Case No. 5027/SAS 1761I Contractor Gulf South Research Inst. Contract No. 68-01-6957

HIGH Level ✓ Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. CMS11	1,1-Dicholorethene	26050		36107	139				22	60-170
	Trichloroethene			29784	114				24	60-140
	Chlorobenzene			28719	110				21	60-130
	Toluene			32837	126				21	60-140
	Benzene			28231	105				21	60-140
B/N SMO SAMPLE NO. CMS11	1,2,4-Trichlorobenzene	10,000		85414	85				23	40-110
	Acenaphthene			94367	84				19	30-140
	2,4 Dinitrotoluene			103238	103*				47	30-90
	Di-n-Butylphthalate	0		NO	NO				47	30-140
	Pyrene			98953	99				36	30-140
	N-Nitrosodi-n-Propylamine			69926	70				38	40-130
	1,4-Dichlorobenzene			76995	77				27	30-100
ACID SMO SAMPLE NO. CMS11	Pentachlorophenol	20,000		154508	77				47	20-110
	Phenol			136985	68				35	20-90
	2-Chlorophenol			158849	79				50	20-100
	4-Chloro-3-Methylphenol			150836	75				33	30-100
	4-Nitrophenol			173401	86				50	10-120
PEST SMO SAMPLE NO. CMS11	Lindane	10,000		80768	81				50	40-130
	Heptachlor			75254	75				31	30-130
	Aldrin			83792	84				43	30-130
	Dieldrin			63525	81959	82			38	30-140
	Endrin			63352	63				45	40-140
	4,4'-DDT			78020	78				50	20-130

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: ~~VOAs _____ out of _____; outside QC limits~~
~~B/N _____ out of _____; outside QC limits~~
~~ACID _____ out of _____; outside QC limits~~
~~PEST _____ out of _____; outside QC limits~~

RECOVERY: VOAs 0 out of 5; outside QC limits
B/N 1 out of 4 64 outside QC limits
ACID 0 out of 5; outside QC limits
PEST 0 out of 6; outside QC limits

Comments: Get acceptable.

CONTROL MATRIX SPIKE RECOVERY

Case No. 5027 / SAS 1761 F Contractor Gulf South Research Inst. Contract No. 68-01-6959

HIGH Level ✓ Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. CMS12	1,1-Dicholorethene	24500		31228	127				22	60-170
	Trichloroethene	↓		25471	104				24	60-140
	Chlorobenzene			24759	101				21	60-130
	Toluene			26666	109				21	60-140
	Benzene			23825	97				21	60-140
B/N SMO SAMPLE NO. CMS12	1,2,4-Trichlorobenzene	10,000		11714	92				23	40-110
	Acenaphthene		810512	10725	88				19	30-140
	2,4 Dinitrotoluene			10725	107				47	30-90
	Di-n-Butylphthalate	0		NA	NA				47	30-140
	Pyrene			10972	110				36	30-140
	N-Nitrosodi-n-Propylamine			7491.4	75				38	40-130
	1,4-Dichlorobenzene			8197.1	82				27	30-100
ACID SMO SAMPLE NO. CMS12	Pentachlorophenol	20,000		16160.7	81				47	20-110
	Phenol			14950	75				35	20-90
	2-Chlorophenol			17881.1	89				50	20-100
	4-Chloro-3-Methylphenol			16961.9	85				33	30-100
	4-Nitrophenol			17470	87				50	10-120
PEST SMO SAMPLE NO. CMS12	Lindane	10,000		8611.5	86				50	40-130
	Heptachlor			8199.7	82				31	30-130
	Aldrin			9034.6	91				43	30-130
	Dieldrin			8596.3	89				38	30-140
	Endrin			3647.3	36				45	40-140
	4,4'-DDT			8015.9	80				50	20-130

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

RECOVERY: VOAs 0 out of 5 ; outside QC limits
B/N 1 out of 6 ; outside QC limits
ACID 0 out of 5 ; outside QC limits
PEST 0 out of 6 ; outside QC limits

Comments: All acceptable.

300612

CALIBRATION CHECK - SEMIVOLATILE HSL COMPOUNDS

CASE NO. 5037 SAS 174 LI CONTRACT LAB: GSRI

CONTRACT NO. 68-01-6959 INSTRUMENT IDENTIFIER: FINN-02

CALIBRATION DATE: 01/02/86

STANDARD FILE: SS010986A

DATE: 01/09/86 TIME: 7:17

MINIMUM RF FOR SPCC IS 0.0500

MAXIMUM % D FOR CCC IS 30%

	COMPOUND	MEAN RF(I)	RF(O)	% D
C315	PHENOL*	2.080	2.221	-6.811
C325	BIS(2 CHLOROETHYL)ETHE	1.500	1.750	-16.683
C330	2-CHLOROPHENOL	1.605	1.689	-5.206
C335	1,3-DICHLOROBENZENE	1.708	1.726	-1.030
C340	14DICHLOROBENZENE*	1.729	1.907	-10.319
C345	BENZYL ALCOHOL	0.947	0.936	1.128
C350	1,2-DICHLOROBENZENE	1.644	1.821	-10.784
C355	2-METHYLPHENOL	1.506	1.509	-0.221
C360	BIS(2-CHLOROISOPROPYL)	1.905	2.008	-5.387
C365	4-METHYLPHENOL	1.756	1.811	-3.159
C370	NITROSOPROPYLAMINE**	0.256	0.282	-10.044
C375	HEXACHLOROETHANE	0.693	0.722	-4.196
C410	NITROBENZENE	0.381	0.421	-10.373
C415	ISOPHORONE	0.712	0.779	-9.430
C420	2-NITROPHENOL*	0.251	0.259	-2.961
C425	2,4-DIMETHYLPHENOL	0.288	0.273	5.063
C430	BENZOIC ACID	0.280	0.246	12.086
C435	BIS(2-CHLOROETHOXY)MET	0.514	0.545	-6.110
C440	2,4-DICHLOROPHENOL*	0.343	0.343	-0.040
C445	1,2,4-TRICHLOROBENZENE	0.335	0.343	-2.193
C450	NAPHTHALENE	0.941	1.148	-21.889
C455	4-CHLOROANILINE	0.062	0.027	55.551
C460	CL6BUTADIENE*	0.152	0.149	2.379
C465	4CHLORO3METHYLPHENOL*	0.346	0.350	-0.993
C470	2-METHYLNAPHTHALENE	0.625	0.666	-6.427
C510	CL6CYCLOPENTADIENE**	0.256	0.280	-9.480
C515	246TRICHLOROPHENOL*	0.462	0.457	1.059
C520	2,4,5-TRICHLOROPHENOL	0.467	0.483	-3.417
C525	2-CHLORONAPHTHALENE	1.276	1.439	-12.746
C530	2-NITROANILINE	0.405	0.395	2.572
C535	DIMETHYL PHTHALATE	1.393	1.374	1.375
C540	ACENAPHTHYLENE	1.860	2.240	-20.439
C545	3-NITROANILINE	0.048	0.037	23.261
C550	ACENAPTHENE*	1.255	1.418	-12.959
C555	24DINITROPHENOL**	0.187	0.180	3.557
C560	4NITROPHENOL**	0.132	0.120	8.917
C565	DIBENZOFURAN	1.666	1.972	-18.359

D.L 4-chloroaniline & 3-NO_2-aniline in 5758-11+12 and 5826 unrelial

FORM VII

300613

DATA EVALUATION SCORE CATEGORIES

ACCEPTABLE: Data is within established control limits, or the data which is outside established control limits does not affect the validity of the analytical results.

ACCEPTABLE WITH EXCEPTION(S): Data is not completely within established control limits. The deficiences are identified and specific data is still valid, given certain qualifications which are listed below.

QUESTIONABLE: Data is not within established control limits. The deficiences bring the validity of the entire data set into question. However, the data validity is neither proved nor disproved by the available information.

UNACCEPTABLE: Data is not within established control limits. The deficiences imply the results are not meaningful.

PROJECT NAME: Osborne Disposal
TDD NO: F3-8508-37

EPA SITE NO.: PA681
REGION: Fr III

QUALITY ASSURANCE REVIEW OF INORGANIC ANALYTICAL DATA PACKAGE

Case No.: 5027.
Contract No.: SOW 784.
Contract Laboratory: Chemtech
Applicable IFB No.:
Reviewer: Rock J. Vitale
Review Date: 2/25/86

Applicable Sample No's.:
MCD140 thru MCD153.
MCD086 thru MCD095
MCD131 thru MCD139,
MCD154 thru MCD159, MCD096
MCD100, MCD080 thru MCD085, MCD13

The inorganic analytical data for this case has been reviewed. The quality assurance evaluation is summarized in the following table:

Reviewer's Evaluation*	Fraction			
	TASK I ICP or AA METALS	TASK II FURNACE AA METALS	TASK II COLD VAPOR AA MERCURY	TASK III CYANIDE
Acceptable				
Acceptable with exception(s)	✓#1, #2, #3, #6	✓#1, #2, #3, #4, #5, #6	✓#3, #6	✓#3, #6.
Questionable				
Unacceptable				

*Definitions of the evaluation score categories are listed on next page.

This evaluation was based upon an analysis of the review items indicated below:

- ● DATA COMPLETENESS
- ● BLANK ANALYSIS RESULTS
- ● MATRIX SPIKE RESULTS
- ● DUPLICATE ANALYSIS RESULTS
- ● STANDARD ADDITIONS RESULTS
- ‡ ● QUANTITATIVE CALCULATIONS
- ‡ ● INITIAL CALIBRATION VERIFICATION
- ‡ ● CONTINUING CALIBRATION VERIFICATION
- ‡ ● INTERFERENCE QC RESULTS
- ‡ ● DETECTION LIMITS RESULTS
- ‡ ● INSTRUMENT SENSITIVITY REPORTS
- ‡ ● HOLDING TIMES

Data review forms are attached for each of the review items indicated above.

‡ No errors noted, no form attached.

◒ Spot Check performed.

Comments: #1 Please see blank analysis documentation
#2 Please see matrix spike recoveries
#3 Please see field &/or laboratory duplicate analysis
#4 Please see standard addition results.
#5 Can't verify qualitative or quantitative presence - lab has the capability of supplying strip charts yet they send hand written final concentrations & call these "Raw Data". - All furnace work!
#6. Several samples were matrix spiked but different samples for lab duplicate - Makes differentiating accuracy from precision impossible

300615

DATA COMPLETENESS	CONC./ MATRIX	40/50														
	TRAFFIC REPORT # MD1	40	41	42	43	44	45	46	47	48	49	51	52	53	086	08
	LAB I.D. # G2556	37	38	39	40	41	42	43	44	45	46	47	48	49	19	20
FIELD QC	BLANK															
	DUPLICATE		✓				✓				✓					
	SPIKE		✓						✓							
TASK I: ICAP OR AA: METALS	RAW DATA	✓														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM	✓														
	ICAP INTER. QC	✓														
	INSTR. SENS.	✓														
TASK II: FURNACE AA: METALS	RAW DATA	*														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM	✓														
	INSTR. SENS.	✓														
TASK II: COLD VAPOR AA: MERCURY	RAW DATA	✓														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM	✓														
	INSTR. SENS.	✓														
TASK III: CYANIDE	RAW DATA	✓														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM.	✓														
	INSTR. SENS.	✓														
OTHER (SPECIFY):	RAW DATA															
	TAB. RESULTS															
	TAB. D.L.'s															
	QA FORM															
	INSTR. SENS.															
OTHER (SPECIFY):	RAW DATA															
	TAB. RUSULTS															
	TAB. D.L.'s															
	QA FORM															
	INSTR. SENS.															

COMMENTS: * Lab does have the capability of hard copy raw data yet all they submitt is handwritten final conc. This is Not raw data.

300616

DATA COMPLETENESS	CONC./ MATRIX	w/sol													
	TRAFFIC REPORT # MCDO	88	89	90	92	93	94	95	131	132	133	134	135	136	137
	LAB I.D. #62550	21	22	23	24	25	26	27	28	29	30	31	32	33	34
FIELD QC	BLANK														
	DUPLICATE														✓
	SPIKE														
TASK I: ICAP OR AA: METALS	RAW DATA	✓													
	TAB. RESULTS	✓													
	TAB. D.L.'s	✓													
	QA FORM	✓													
	ICAP INTER. QC	✓													
	INSTR. SENS.	✓													
TASK II: FURNACE AA: METALS	RAW DATA	NO													
	TAB. RESULTS	✓													
	TAB. D.L.'s	✓													
	QA FORM	✓													
	INSTR. SENS.	✓													
TASK II: COLD VAPOR AA: MERCURY	RAW DATA	✓													
	TAB. RESULTS	✓													
	TAB. D.L.'s	✓													
	QA FORM	✓													
	INSTR. SENS.	✓													
TASK III: CYANIDE	RAW DATA	✓													
	TAB. RESULTS	✓													
	TAB. D.L.'s	✓													
	QA FORM.	✓													
	INSTR. SENS.	✓													
OTHER (SPECIFY):	RAW DATA														
	TAB. RESULTS														
	TAB. D.L.'s														
	QA FORM														
	INSTR. SENS.														
OTHER (SPECIFY):	RAW DATA														
	TAB. RUSULTS														
	TAB. D.L.'s														
	QA FORM														
	INSTR. SENS.														

COMMENTS:

300617

DATA COMPLETENESS	CONC./ MATRIX	L/Sol	L/AQ												L/Sol	
	TRAFFIC REPORT # MCD	139	154	155	156	157	158	159	096	097	098	099	100	130	080	0
	LAB I.D. # 62550	36	01	02	03	04	05	06	07	08	09	10	11	12	13	1
FIELD QC	BLANK						✓	✓					✓	✓		
	DUPLICATE								✓	✓	✓	✓			✓	
	SPIKE								✓			✓				✓
TASK I: ICAP OR AA: METALS	RAW DATA	✓														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM	✓														✓
	ICAP INTER. QC	✓														
	INSTR. SENS.	✓														
TASK II: FURNACE AA: METALS	RAW DATA	ND														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM	✓														
	INSTR. SENS.	✓														
TASK II: COLD VAPOR AA: MERCURY	RAW DATA	✓														
	TAB. RESULTS	✓														
	TAB. D.L.'s	✓														
	QA FORM	✓														✓
	INSTR. SENS.	✓														
TASK III: CYANIDE	RAW DATA	✓	NR	NR	NR	NR	NR	NR	✓							✓
	TAB. RESULTS	✓							✓							✓
	TAB. D.L.'s	✓							✓							✓
	QA FORM.	✓							✓							✓
	INSTR. SENS.	✓	✓	✓	✓	✓	✓	✓	✓							
OTHER (SPECIFY):	RAW DATA															
	TAB. RESULTS															
	TAB. D.L.'s															
	QA FORM															
	INSTR. SENS.															
OTHER (SPECIFY):	RAW DATA															
	TAB. RUSULTS															
	TAB. D.L.'s															
	QA FORM															
	INSTR. SENS.															

COMMENTS:

300618

DATA COMPLETENESS	CONC./ MATRIX	4/SP			
	TRAFFIC REPORT # MCDO	82	83	84	85
	LAB I.D. # G2-550	15	16	17	18
FIELD QC	BLANK				
	DUPLICATE	✓			
	SPIKE	✓			
TASK I: ICAP OR AA: METALS	RAW DATA	✓			✓
	TAB. RESULTS	✓			✓
	TAB. D.L.'s	✓			✓
	QA FORM	✓			✓
	ICAP INTER. QC	✓			✓
	INSTR. SENS.	✓			✓
TASK II: FURNACE AA: METALS	RAW DATA	NO			✓
	TAB. RESULTS	✓			✓
	TAB. D.L.'s	✓			✓
	QA FORM	✓			✓
	INSTR. SENS.	✓			✓
TASK II: COLD VAPOR AA: MERCURY	RAW DATA	✓			✓
	TAB. RESULTS	✓			✓
	TAB. D.L.'s	✓			✓
	QA FORM	✓			✓
	INSTR. SENS.	✓			✓
TASK III: CYANIDE	RAW DATA	✓			✓
	TAB. RESULTS	✓			✓
	TAB. D.L.'s	✓			✓
	QA FORM.	✓			✓
	INSTR. SENS.	✓			✓
OTHER (SPECIFY):	RAW DATA				
	TAB. RESULTS				
	TAB. D.L.'s				
	QA FORM				
	INSTR. SENS.				
OTHER (SPECIFY):	RAW DATA				
	TAB. RUSULTS				
	TAB. D.L.'s				
	QA FORM				
	INSTR. SENS.				

COMMENTS:

300613

BLANK ANALYSIS RESULTS

TASK	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIM
All	* filtered field		LW AQ	MCD158 G2-550-05	NUS	Al (233 ug/L / 200) #1 1165 Cr (6.1 ug/L / 10) #2 Cu (28 ug/L / 50) #2 140 Fe (257 ug/L / 50) #1 1285 Mn (49 ug/L / 15) #1 245 Zn (14.1 ug/L / 10) #1 Ca (147 ug/L / 5000) #2 735 Mg (407 ug/L / 5000) #1 2035 Na (3050 ug/L / 5000) #2 15,250 K (380 ug/L / 5000) #1
All	* filtered bailer		LW AQ	MCD159 G2-550-06	NUS.	Al (175 ug/L / 200) #1 Fe (75 ug/L / 100) #1 Mn (12 ug/L / 15) #2 Zn (26 ug/L / 10) #1 130 Mg (156 ug/L / 5000) #2 Na (3000 ug/L / 5000) #2 K (499 ug/L / 5000) #1 2499
All	reagent		LW AQ	RBLK,	Chemtech	Al (59 ug/L / 200) #2 Fe (92 ug/L / 100) #1 Zn (7.9 ug/L / 10) #2
All	field		LW AQ	MCD100 G2-550-11	NUS	Ag (6.1 ug/L / 10) #2 Al (184 ug/L / 200) #1 Fe (55.1 ug/L / 50) #1 Mn (13 ug/L / 15) #1 65 / 325 Na (2,880 ug/L / 5000) #2

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHI SAMPLE ANALYTICAL DATA SUMMARY.

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM RAW DATA

*-Only used to question filtered sample results.

300620

BLANK ANALYSIS RESULTS

TASK	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LIM
All (Cont)	Field	Low	AQ	MCD100 G2-550-11	NUS	K (402 ug/L / 5000) #1
All	Bailer BLK	Low	AQ	MCD 130 G2-550-12	NUS.	Ag (6.1 ug/L / 10) #2 Al (110 ug/L / 200) #1 Cr (6.4 ug/L / 10) #2 Mn (8.3 ug/L / 15) #2 Zn (11 ug/L / 10) #1 55 / 22.5
All	reagent	Low	AQ	$RBLK_2$	Chentech	Ag (6.8 ug/L / 10) #1
All	reagent	Low	AQ	$R.BLK_3$	Chentech	Al (120 ug/L / 200) #1 Cr (7.3 ug/L / 10) #2 36.5 / 18.3
All	MCD 131 field	Low	Soil	G2-550-28	NUS	Al (116 ug/L / 200) #1 Fe (113 ug/L / 100) #1 565 / 283 K (442 ug/L / 5000) #1 1110 / 1105
All	D	Low	Soil	D.BLK Soil	Chentech	Al (100 ug/L / 200) #1 Cr (7.0 ug/L / 10) #1 Fe (51.9 ug/L / 100) #2

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN SAMPLE ANALYTICAL DATA SUMMARY.

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM RAW DATA

BLANK ANALYSIS RESULTS

TASK	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H_2O	CONTAMINANTS (CONCENTRATION / DETECTION LI
All	field/low/gal			MCD148 G2-550-45	NUS	Al (128ug w/ 200) #1 Mn (8.2ug / 15) #2 Ni (30 ug w/40) #1 150/75 Cd (6.0 ug w/5) #1 Sn (21.4ug w/20) #1 107/54
All	lab/low/AQ			R. Bck	Chentech	Al (145ug w/ 200) #1 725/363 Mn (9.1ug w/15) #2 Ni (24.4ug w/40) #1 122/61

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN SAMPLE ANALYTICAL DATA SUMMARY.

COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM RAW DATA

Form V

Q. C. Report No. 550

SPIKE SAMPLE RECOVERY

LAB NAME CHEMTECH

DATE 10-25-85 EH

CASE NO. 5027
EPA Sample No. MCD 081
Lab Sample ID No. G2-550-14
Units ug/L

Matrix Low SOIL

Compound	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spiked Added (SA)	%R[1]	
Metals:						
1. Aluminum	75-125					
2. Antimony	"	123	50U	500	25	R[1]
3. Arsenic	"	95	53	40	105	
4. Barium	"	2017	[125]	2000	95	
5. Beryllium	"	47	3U	50	94	
6. Cadmium	"	42	5U	50	84	
7. Calcium	"					
8. Chromium	"	214	17	200	99	
9. Cobalt	"	496	20U	500	99	
10. Copper	"	243	[22]	250	88	
11. Iron	"					
12. Lead	"	102	98	20	20	[2]
13. Magnesium	"					
14. Manganese	"	1043	677	500	73	R[3]
15. Mercury	"	2.21	1.0	1.0	121	
16. Nickel	"	499	20U	500	100	
17. Potassium	"					
18. Selenium	"	3U	10	10	0	R[4]
19. Silver	"	59	6U	50	118	
20. Sodium	"					
21. Thallium	"	84	10	50	148	R[5]
22. Tin	"	176	17U	200	88	
23. Vanadium	"	512	[42]	500	94	
24. Zinc	"	537	63	500	95	
Other:						
Cyanide	G2-550-15 MCD 082	100	10U	100	100	

[1] %R = [(SSR - SR)/SA] x 100

"R" - out of control

Comments:

[1] Actual D.L Sb in MCD081 may be slightly higher
[2] Not added at a high enough conc to be good indicator of accuracy
[3] Not substantially out of criteria
[4] The actual concentration of Se may be higher than reported.
[5] Actual concentration of Tl may be different. with

300623

Form V

Q. C. Report No. 550

SPIKE SAMPLE RECOVERY

LAB NAME CHEMTECH

DATE 10-25-85 EM

CASE NO. 5027
EPA Sample No. MCD147
Lab Sample ID No. G2550-44
Units ug/L

Matrix LOW SOIL

Compound	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spiked Added (SA)	%R[1]	
Metals:						
1. Aluminum	75-125					
2. Antimony	-	277	50U	500	55 R	[1]
3. Arsenic	-	45	[7]	40	95	
4. Barium	-	1949	[164]	2000	89	
5. Beryllium	-	43	3U	50	86	
6. Cadmium	-	46	5U	50	92	
7. Calcium	-					
8. Chromium	-	456	245	200	106	
9. Cobalt	-	483	20U	500	97	
10. Copper	-	400	208	250	77	
11. Iron	-					
12. Lead	-	987	513	~~20~~ 500	95	
13. Magnesium	-					
14. Manganese	-	1014	411	500	121	
15. Mercury	-	1.60	0.72	1.0	88	
16. Nickel	-	572	133	500	88	
17. Potassium	-					
18. Selenium	-	11	3U	10	110	
19. Silver	-	47	6U	50	94	
20. Sodium	-					
21. Thallium	-	77	6U	50	154	R[2]
22. Tin	-	523	197	200	163	R[3]
23. Vanadium	-	465	[28]	500	87	
24. Zinc	-	1341	957	500	77	
Other:						
					300624	
Cyanide	G2-550-38 MCD 141	109	12	100	97	

[1] %R = [(SSR - SR)/SA] x 100

"R" - out of control

Comments:

[1] Actual d.l for Sb may be slightly higher
[2] High recovery has no effect - no positive.
[3] Actual conc may be different - without a lab dup can't determine accuracy from

Form V

Q. C. Report No. 550

SPIKE SAMPLE RECOVERY

CASE NO. 5027

LAB NAME CHEMTECH

EPA Sample No. MCD 096

DATE 10-25-85 EH

Lab Sample ID No. G2-550-07

Units ug/L

Matrix LOW WATER

Compound	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spiked Added (SA)	%R[1]	
Metals:						
1. Aluminum	75-125	3023	1109	2000	96	
2. Antimony	-	468	50U	500	94	
3. Arsenic	-	102	92	20	50	[1]
4. Barium	-	2290	430	2000	93	
5. Beryllium	-	45	3U	50	113	
6. Cadmium	-	44	5U	50	88	
7. Calcium	-	140900	46170	100000	95	
8. Chromium	-	198	9U	200	99	
9. Cobalt	-	471	20U	500	94	
10. Copper	-	247	35	250	85	
11. Iron	-	36510	35410	1000	110	
12. Lead	-	461	50U	500 ~~20~~	92	
13. Magnesium	-	71140	24890	50000	93	
14. Manganese	-	695	503	200	96	
15. Mercury	-	1.36	0.18	1.0	118	
16. Nickel	-	392	[36]	400	89	
17. Potassium	-	59510	[4690]	50000	110	
18. Selenium	-	3U	3U	10	0R	[2]
19. Silver	-	28	6U	50	56R	[3]
20. Sodium	-	121500	24280	100000	97	
21. Thallium	-	52	6U	50	104	
22. Tin	-	17U	17U	200	0R	[2]
23. Vanadium	-	467	20U	500	93	
24. Zinc	-	304	93	200	106	
Other:						
Cyanide	-	98	10U	100	98	

[1] %R = [(SSR - SR)/SA] x 100

"R" - out of control

[1] Not spiked high enough to give a good indication of accuracy
[2] Actual D.L for Se & Sn may be substantially higher in MCD099.
[3] " " " Ag may be slightly higher in MCD099.

Comments: For As, Hg, K, Se, Tl and Sn, sample MCD 099 was spike

300625

Form VI

Q. C. Report No. 550

DUPLICATES

LAB NAME CHEMTECH

DATE 10-25-95 EM

CASE NO. 5027
EPA Sample No. MCD 098
Lab Sample ID No. G2-550-09
Units ug/L

Matrix Low Water

Compound	Control Limit[1]	Sample(S)	Duplicate(D)	RPD[2]
Metals:				
1. Aluminum		91190	99650	8.9 ✓
2. Antimony		50U	250U	NC ✓
3. Arsenic		25	22	13 ✓
4. Barium		724	772	6.4 ✓
5. Beryllium		5.8	15U	NC ✓
6. Cadmium		5U	25U	NC
7. Calcium		201100	205850	2.3 ✓
8. Chromium		141	170	19 ✓
9. Cobalt		94	100U	NC ✓
10. Copper		272	269	1.1 ✓
11. Iron		251300	266400	5.8 ✓
12. Lead		105	88	18 ✓
13. Magnesium		72530	74050	2.1 ✓
14. Manganese		5093	5215	2.4 ✓
15. Mercury		0.16U	0.16U	NC ✓
16. Nickel		235	227	3.5 ✓
17. Potassium		5383	5710	5.9 ✓
18. Selenium		3U	3U	NC ✓
19. Silver		6U	30U	NC ✓
20. Sodium		9515	9335	1.9 ✓
21. Thallium		6U	6U	NC ✓
22. Tin		170U	170U	N.C. ✓
23. Vanadium		182	202	10 ✓
24. Zinc		817	814	0.4 ✓
Other:				
Cyanide	G2-560-07 MCD 096	10U	10U	NC ✓

* Out of Control

[1] To be added at a later date.

[2] RPD = [|S - D|/((S + D)/2)] x 100

NC - Non calculable RPD due to value(s) less than CRDL

All OK ✓

300626

Form VI

Q. C. Report No. 550

DUPLICATES

CASE NO. 5027
EPA Sample No. MCD 080
Lab Sample ID No. G2-550-13
Units ug/L

LAB NAME CHEMTECH
DATE 10-25-85 CH

Matrix Low Soil

Compound	Control Limit[1]	Sample(S)	Duplicate(D)	RPD[2]
Metals:				
1. Aluminum		13830	15410	11 ✓
2. Antimony		50U	50U	NC ✓
3. Arsenic		24	22	8.7 ✓
4. Barium		[102]	[103]	1.0 ✓
5. Beryllium		3U	3U	NC ✓
6. Cadmium		5U	5U	NC ✓
7. Calcium		702U	702U	NC ✓
8. Chromium		18	22	20 ✓
9. Cobalt		20U	20U	NC ✓
10. Copper		[24]	28	15
11. Iron		44860	52300	15 ✓
12. Lead		38	40	5.1 ✓
13. Magnesium		[2586]	[2836]	9.2 ✓
14. Manganese		510	640	23 * [1]
15. Mercury		0.16U	0.16U	NC ✓
16. Nickel		[28]	[29]	3.5 ✓
17. Potassium		340U	340U	NC ✓
18. Selenium		3U	3U	NC ✓
19. Silver		6U	6U	NC ✓
20. Sodium		4015U	4015U	NC ✓
21. Thallium		6U	6U	NC ✓
22. Tin		17U	17U	N.C. ✓
23. Vanadium		[37]	[39]	5.3 ✓
24. Zinc		82	79	3.7 ✓
Other:				
Cyanide	G2-550-15 MCD 082	10U	10U	NC

[1] Not published out of Criteria for soils

* Out of Control

1 To be added at a later date.

NC - Non calculable RPD due to value(s) less than CRDL

2 RPD = [|S - D|/((S + D)/2)] x 100

300627

Q. C. Report No. 550

DUPLICATES

LAB NAME CHEMTECH CONSULTING GROUP

DATE 10-25-95 GH

CASE NO. 5027
EPA Sample No. MCD 149
Lab Sample ID No. G2-550-46
Units ug/L

Matrix LOW SOIL

Compound	Control Limit[1]	Sample(S)	Duplicate(D)	RPD[2]
Metals:				
1. Aluminum		3592	3638	1.3 ✓
2. Antimony		50U	50U	NC ✓
3. Arsenic		5U	5U	NC ✓
4. Barium		80U	80U	NC ✓
5. Beryllium		3U	3U	NC ✓
6. Cadmium		5U	5U	NC ✓
7. Calcium		[1535]	[1567]	2.1 ✓
8. Chromium		20	22	9.5 ✓
9. Cobalt		20U	20U	NC ✓
10. Copper		22U	22U	NC ✓
11. Iron		19520	20740	6.1 ✓
12. Lead		144	155	7.4 ✓
13. Magnesium		[1176]	[1217]	3.4 ✓
14. Manganese		365	385	5.3 ✓
15. Mercury		0.16U	0.16U	NC ✓
16. Nickel		[40]	[29]	32 [1]
17. Potassium		340U	340U	NC ✓
18. Selenium		3U	3U	NC ✓
19. Silver		6U	6U	NC ✓
20. Sodium		4015U	4015U	NC ✓
21. Thallium	—	6U	6U	NC ✓
22. Tin		40	[27]	39 [1]
23. Vanadium		20U	20U	NC ✓
24. Zinc		334	372	11 ✓
Other:				
Cyanide	MCD 141 G2-550-38	12	11	8.7

* Out of Control

[1] No effect - both qualified by blank.

1 To be added at a later date.

2 RPD = [|S - D|/((S + D)/2)] x 100

NC - Non calculable RPD due to value(s) less than CRDL

300628

Duplicate/Triplicate Analysis of Non-Matrix Spiked (Indigenous) Compounds

Outliers are tabulated below for three types of multiple analyses:

(1) Field duplicates MCD097 & MCD099

(2) Un-spiked laboratory duplicates

(3) Matrix spike duplicate plus corresponding unspiked sample evaluated for non-matrix spiked (Indigenous) compounds. (Spike recoveries are evaluated on a separate form.)

	Outlier Criteria (for tabulation purposes only)			
	Relative standard deviation		Equivalent Relative Percent Difference	
	solid	aqueous	solid	aqueous
				30%

CONSTITUENT	CONCENTRATIONS						relative standard deviation or relative percent difference	concentration units	footnotes
	Analysis No. 1		Analysis No. 2		Analysis No. 3				
	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.			
Aluminum	MCD097	149,900	MCD099	161,900			8%	ug/L	#1
Arsenic		190		92			70%		#2
Barium		953		951			0%		#1
Beryllium		11		13			17%		#1
Calcium		94,690		90,860			4%		#1
Chromium		277		299			8%		#1
Cobalt		185		202			9%		#1
Copper		568		568			0%		#1
Iron		426,300		454,300			6.2%		#1
lead		282		280			0%		#1
magnesium		62546		64230			3%		#1
manganese		11810		11490			3%		#1
mercury		ND		0.18			200%		#2
nickel		446		448			0%		#1
potassium		3150		4690			40%		#2
sodium		7289		8058			10%		#1
Vanadium		309		328			<5%		#1
Zinc		1207		1226			<5%		#1

COMMENTS: #1 Within acceptable criteria
#2 Consider estimated.

300629

Duplicate/Triplicate Analysis of Non-Matrix Spiked (Indigenous) Compounds

Outliers are tabulated below for three types of multiple analyses:

(1) Field duplicates MCD145 & MCD137.

(2) Un-spiked laboratory duplicates

(3) Matrix spike duplicate plus corresponding unspiked sample, evaluated for non-matrix spiked (indigenous) compounds. (Spike recoveries are evaluated on a separate form.)

	Outlier Criteria (for tabulation purposes only)			
	Relative standard deviation		Equivalent Relative Percent Difference	
	solid	aqueous	solid	aqueous
			40%	

CONSTITUENT	CONCENTRATIONS						relative standard deviation or relative percent difference	common units	footnotes
	Analysis No. 1		Analysis No. 2		Analysis No. 3				
	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.	SAMPLE I.D.	CONC.			
Aluminum	MCD145	7219	MCD137	5117			34%	mg/kg	#1
Arsenic		ND		6.6			200%		#2
Calcium		5663		5939			5%		#1
Chromium		28		ND.			200%		#2 ✓
Iron		27,331		20608			28%		#1
Lead		24		12			67%		#2 ✓
Magnesium		3010		2159			33%		#1
Manganese		360		409			13%		#1
Nickel		33		16			69%		#3
Vanadium		18		12			40%		#1
Zinc		77		47			48%		#2 ✓
Potassium		345		ND			200%		#3
Tin		59		ND.			200%		#3
Cyanide		0.28		ND.			200%	✓	#2 ✓
	✓		✓						

COMMENTS: #1 Within acceptable criteria
#2 Consider estimates
#3 One or both questionable - not commented on.

300630

Duplicate/Triplicate Analysis of Non-Matrix Spiked (Indigenous) Compounds

Outliers are tabulated below for three types of multiple analyses:

(1) Field duplicates MCD155 & MCD157

(2) Un-spiked laboratory duplicates

(3) Matrix spike duplicate plus corresponding unspiked sample evaluated for non-matrix spiked (indigenous) compounds. (Spike recoveries are evaluated on a separate form.)

	Outlier Criteria (for tabulation purposes only)			
	Relative standard deviation		Equivalent Relative Percent Difference	
	solid	aqueous	solid	aqueous
				30%

CONSTITUENT	CONCENTRATIONS								relative standard deviation or relative percent difference	concentration limits	footnotes
	Analysis No. 1			Analysis No. 2			Analysis No. 3				
	SAMPLE I.D.		CONC.	SAMPLE I.D.		CONC.	SAMPLE I.D.	CONC.			
Aluminum	MCD155		256	MCD157		187			31%	✓	#3
Calcium			52,950			52970			<5%		#1
Iron			286			438			42%		#3
lead			ND			6.2			100%		#2
magnesium			15,100			15260			<5		#1
manganese			3059			3312			8%		#1
Sodium			8127			6990			15%		#1
Zinc			48			14.			109%	✓	#3
	✓			✓							

COMMENTS: #1 Within acceptable criteria
#2 Consider estimate.
#3 One or both questioned by blanks.

300631

Form VIII

Q.C. Report No. 550

STANDARD ADDITION RESULTS

LAB NAME CHEMTECH CONSULTING GROUP CASE NO. 5027

DATE 10-25-95 EH UNITS ug/L

Sample #	Element	0 ADD ABS.	1 ADD CON./ABS[1]	2 ADD CON./ABS.[1]	3 ADD CON./ABS.[1]	FINAL CON.[2]	r*
550-37	Sn	0.027	80/0.232	160/0.498	240/0.808	<17	0.996
-38		0.246	80/0.483	160/0.750	240/1.046	119	0.999
-40		0.168	80/0.393	160/0.686	240/1.031	68	0.996
-44		0.270	80/0.480	160/0.678	240/0.904	197	1.00
550-16	Pb	0.193	10/0.274	20/0.353	30/0.438	47	1.00
21		0.148	10/0.241	20/0.304	30/0.389	38	0.998
26		0.165	10/0.246	20/0.324	30/0.398	43	1.00
29		0.087	10/0.171	20/0.253	30/0.347	20	1.00
32		0.120	10/0.196	20/0.279	30/0.349	30	1.00
37		0.107	10/0.184	20/0.261	30/0.337	27	1.00
38		0.248	10/0.320	20/0.399	30/0.475	64	1.00
41		0.128	10/0.225	20/0.266	30/0.349	37 [1]	0.989
41		0.123	10/0.224	20/0.278	30/0.339	35 [1]	0.989
42		0.178	10/0.259	20/0.331	30/0.417	43	1.00
550-10	As	0.193	20/0.233	40/0.276	60/0.321	92	0.999
13DUP		0.103	20/0.226	40/0.374	60/0.525	22	0.999
16		0.093	20/0.199	40/0.328	60/0.492	52	0.995
25		0.110	20/0.233	40/0.351	60/0.486	30	0.999
30		0.080	20/0.176	40/0.283	60/0.419	24	0.996

[1] CON is the concentration added, ABS. is the instrument readout in absorbance or concentration.

[1] Consider estimated - < 0.995 -

[2] Concentration as determined by MSA

r* is the correlation coefficient.

+ - correlation coefficient is outside of control window of 0.995.

300632