Table 1 (continued)
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
Volatile Organic Compounds (continued)				
Hexachlorobutadiene	NA	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA
Isopropyltoluene	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA
Naphthalene	75-125	20	75-125	20
n-Butylbenzene	NA	NA	NA	NA
n-Propylbenzene	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA
Styrene	70-130	22	70-130	22
tert-Butylbenzene	NA	NA	NA	NA
Tetrachloroethene	78-131	25	39-154	22
Toluene	76-119	20	46-147	24
trans-1,2-Dichloroethene	70-130	20	70-130	20
trans-1,3-Dichloropropene	80-114	32	49-132	31
Trichloroethene	80-122	20	46-143	23
Trichlorofluoromethane	75-125	20	75-125	20
Vinyl chloride	53-134	25	29-150	20
Xylenes (total)	37-162	20	37-162	20
Semi-Volatile Organic Compounds				
2,4,5-Trichlorophenol	31-110	37	29-125	29
2,4,6-Tribromophenol	21-122	NA	NA	NA
2,4,6-Trichlorophenol	41-125	37	21-126	60
2,4-Dichlorophenol	42-115	44	42-115	44
2,4-Dimethylphenol	32-119	20	32-119	20
2,4-Dinitrophenol	1-191	53	1-191	53
2,4-Dinitrotoluene	1-191	53	1-162	56
2,6-Dinitrotoluene	5-158	20	42-115	44
2-Chloronaphthalene	60-118	20	60-118	20
2-Chlorophenol	19-124	43	17-116	54
2-Methylnaphthalene	40-110	50	40-110	50
2-Methylphenol	33-115	31	33-113	39
2-Nitroaniline	11-138	63	11-138	63
2-Nitrophenol	29-182	32	10-148	64
3,3'-Dichlorobenzidine	1-162	56	1-162	56
3-Methylphenol & 4-Methylphenol	45-118	49	45-118	49
3-Nitroaniline	1-120	45	1-120	45
4,6-Dinitro-2-methylphenol	NA	NA	1-181	43
4-Bromophenyl phenyl ether	53-127	20	53-127	20
4-Chloro-3-methylphenol	29-124	55	17-128	55
4-Chloroaniline	1-112	40	NA	NA

Table 1 (continued)
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
Semi-Volatile Organic Compounds (continued)				
4-Nitroaniline	1-127	49	1-127	49
4-Nitrophenol	19-144	34	10-148	64
Acenaphthene	33-145	23	13-133	44
Acenaphthylene	33-145	23	33-145	22
Anthracene	33-145	23	27-133	22
Benzo(a)anthracene	33-143	23	33-143	23
Benzo(a)pyrene	17-162	31	17-163	31
Benzo(b)fluoranthene	24-159	28	24-159	28
Benzo(ghi)perylene	1-219	50	1-219	50
Benzo(k)fluoranthene	11-162	31	11-162	31
bis(2-Chloroethoxy)methane	33-184	30	33-143	23
bis(2-Chloroethyl) ether	12-158	30	12-158	30
bis(2-Ethylhexyl) phthalate	8-158	30	8-158	31
Butyl benzyl phthalate	1-152	35	1-152	35
Carbazole	1-175	20	1-175	20
Chrysene	17-168	31	17-168	31
Dibenz(a,h)anthracene	1-227	55	1-227	55
Dibenzofuran	46-117	42	46-117	42
Diethyl phthalate	1-114	24	1-114	24
Dimethyl phthalate	1-112	22	1-112	22
Di-n-butyl phthalate	1-118	24	1-118	24
Di-n-octyl phthalate	4-146	29	4-146	29
Fluoranthene	26-137	23	26-137	23
Fluorene	59-121	20	26-137	23
Hexachlorobenzene	57-128	22	39-127	29
Hexachlorobutadiene	36-116	32	31-110	41
Hexachlorocyclopentadiene	1-138	54	1-138	54
Hexachloroethane	30-110	33	39-127	29
Indeno(1,2,3-cd)pyrene	1-171	37	1-171	37
Isophorone	21-196	37	21-196	38
Naphthalene	21-133	23	21-133	23
Nitrobenzene	45-130	50	33-112	36
N-Nitrosodi-n-propylamine	30-115	36	12-128	50
N-Nitrosodiphenylamine	5-138	68	5-138	68
Pentachlorophenol	10-140	56	10-144	87
Phenanthrene	54-120	20	54-120	20
Phenol	10-131	43	10-148	50
Pyrene	46-130	31	10-218	27

Table 1 (continued)
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
Metals				
Aluminum	75-125	20	75-125	35
Antimony	75-125	20	75-125	35
Arsenic	75-125	20	75-125	35
Barium	75-125	20	75-125	35
Beryllium	75-125	20	75-125	35
Cadmium	75-125	20	75-125	35
Chromium	75-125	20	75-125	35
Chromium VI	75-125	20	75-125	35
Cobalt	75-125	20	75-125	35
Copper	75-125	20	75-125	35
Iron	75-125	20	75-125	35
Lead	75-125	20	75-125	35
Manganese	75-125	20	75-125	35
Mercury	75-125	20	75-125	35
Nickel	75-125	20	75-125	35
Selenium	75-125	20	75-125	35
Silver	75-125	20	75-125	35
Thallium	75-125	20	75-125	35
Tin	75-125	20	75-125	35
Vanadium	75-125	20	75-125	35
Zinc	75-125	20	75-125	35

Table 2

Practical Quantitation Limits for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Practical Quantitation Limits			Soil Screening Criteria	
	Water (a) (ug/l)	Low Soil (a)(b)(c) (mg/kg)	Medium Soil (a)(b)(c) (mg/kg)	PA Act 2 Standards (d) (mg/kg)	US EPA Region III RBC (e) (mg/kg)
Volatile Organic Constituents					
Acetone	10	0.01	0.5	1,000	7,800
Carbon disulfide	5	0.005	0.25	410	7,800
2-Butanone (MEK)	10	0.01	0.5	580	47,000
2-Hexanone	10	0.01	0.5	NS	NS
Benzene	5	0.005	0.25	0.5	22
Bromobenzene	5	0.005	0.25	NS	NS
Bromochloromethane	5	0.005	0.25	NS	NS
Bromoform	5	0.005	0.25	NS	81
Bromomethane	10	0.01	0.5	1	110
n-Butylbenzene	5	0.005	0.25	NS	780
sec-Butylbenzene	5	0.005	0.25	NS	780
tert-Butylbenzene	5	0.005	0.25	NS	4.9
Carbon tetrachloride	5	0.005	0.25	0.5	1,600
Chlorobenzene	5	0.005	0.25	100	220
Chloroethane	10	0.01	0.5	5,800	100
Chloroform	5	0.005	0.25	10	49
Chloromethane	10	0.01	0.5	0.3	1,600
2-Chlorotoluene	5	0.005	0.25	NS	NS
4-Chlorotoluene	5	0.005	0.25	NS	7.6
Dibromochloromethane	5	0.005	0.25	10	46.0
1,2-Dibromo-3-chloropropane	5	0.005	0.25	0.02	NS
1,2-Dibromomethane	5	0.005	0.25	20	7,000
1,2-Dichlorobenzene	5	0.005	0.25	60	70
1,3-Dichlorobenzene	5	0.005	0.25	61	27
1,4-Dichlorobenzene	5	0.005	0.25	10	NS
Dichlorofluoromethane	5	0.005	0.25	NS	7,800
1,1-Dichloroethane	5	0.005	0.25	110	1.1
1,1-Dichloroethene	5	0.005	0.25	0.7	780
cis-1,2-Dichloroethene	5	0.005	0.25	7	1,600
trans-1,2-Dichloroethene	5	0.005	0.25	10	9.4
1,2-Dichloropropane	5	0.005	0.25	0.5	NS
1,3-Dichloropropane	5	0.005	0.25	NS	NS
2,2-Dichloropropane	5	0.005	0.25	NS	NS
1,1-Dichloropropene	5	0.005	0.25	NS	3.5
cis-1,3-Dichloropropene	5	0.005	0.25	NS	3.5
trans-1,3-Dichloropropene	5	0.005	0.25	70	7,800
Ethylbenzene	5	0.005	0.25		

Table 2 (continued)

Practical Quantitation Limits for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Practical Quantitation Limits				Soil Screening Criteria	
	Water (a) (ug/l)	Low Soil (a)(b)(c) (mg/kg)	Medium Soil (a)(b)(c) (mg/kg)		PA Act 2 Standards (d) (mg/kg)	US EPA Region III RBC (e) (mg/kg)
Volatile Organic Constituents						
Hexachlorobutadiene	5	0.005			1.2	8.2
Isopropylbenzene	5	0.005	0.25		NS	NS
Isopropyltoluene	5	0.005	0.25		NS	NS
Methylene chloride	5	0.005	0.25		0.5	85
Naphthalene	5	0.005	0.25		5	1,600
n-Propylbenzene	5	0.005	0.25		NS	NS
Styrene	5	0.005	0.25		NS	16,000
1,1,1,2-Tetrachloroethane	5	0.005	0.25		NS	25
1,1,2,2-Tetrachloroethane	5	0.005	0.25		0.32	3.2
Tetrachloroethene	5	0.005	0.25		0.5	12
Toluene	5	0.005	0.25		100	16,000
1,2,3-Trichlorobenzene	5	0.005	0.25		NS	NS
1,2,4-Trichlorobenzene	5	0.005	0.25		28	780
1,1,1-Trichloroethane	5	0.005	0.25		20	23,000
1,1,2-Trichloroethane	5	0.005	0.25		0.5	11
Trichloroethene	5	0.005	0.25		0.5	58
Trichlorofluoromethane	10	0.01	0.25		NS	23,000
1,2,3-Trichloropropane	5	0.005	0.5		4	0.091
1,2,4-Trimethylbenzene	5	0.005	0.25		NS	3,900
1,3,5-Trimethylbenzene	5	0.005	0.25		NS	3,900
Vinyl chloride	10	0.01	0.5		0.2	0.34
Xylenes (total)	5	0.005	0.25		1,000	160,000
Semi-Volatile Organic Compounds						
Phenol	10	0.33			400	47,000
bis(2-Chloroethyl) ether	10	0.33			0.055	0.58
2-Chlorophenol	10	0.33			4.4	390
2-Methylphenol	10	0.33			10	3,900
3-Methylphenol & 4-Methylphenol	10	0.33			10	390
N-Nitrosodi-n-propylamine	10	0.33			0.037	0.091
Hexachloroethane	10	0.33			0.56	46
Nitrobenzene	10	0.33			5.1	39
Isophorone	10	0.33			10	670
2-Nitrophenol	10	0.33			630	NS
2,4-Dimethylphenol	10	0.33			NS	1,600
bis(2-Chloroethoxy)methane	10	0.33			NS	NS
2,4-Dichlorophenol	10	0.33			5	230
Naphthalene	10	0.33			2	1,600
4-Chloroaniline	10	0.33			51	310
Hexachlorobutadiene	10	0.33			1.2	8.2
4-Chloro-3-methylphenol	10	0.33			100	NS

Table 2 (continued)

Practical Quantitation Limits for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Water (a) (ug/l)	Low Soil (a)(b)(c) (mg/kg)	Act 2 Standards (d) (mg/kg)	Region III RBC (e) (mg/kg)
Semi-Volatile Organic Constituents				
2-Methylnaphthalene	10	0.33	10,000	1,600
Hexachlorocyclopentadiene	10	0.33	91	550
2,4,6-Trichlorophenol	25	0.8	67	58
2,4,5-Trichlorophenol	25	0.8	6,100	7,800
2,4,6-Tribromophenol	25	0.8	NS	NS
2-Chloronaphthalene	10	0.33	14,000	6,300
2-Nitroaniline	25	0.8	0.58	NS
Dimethyl phthalate	10	0.33	NS	NS
Acenaphthylene	10	0.33	4,400	NS
3-Nitroaniline	25	0.8	0.58	NS
Acenaphthene	10	0.33	4,300	4,700
2,4-Dinitrophenol	25	0.8	4.1	160
4-Nitrophenol	25	0.8	6	630
Dibenzofuran	10	0.33	NS	310
2,4-Dinitrotoluene	10	0.33	0.84	160
2,6-Dinitrotoluene	10	0.33	10	78
Diethyl phthalate	10	0.33	500	63,000
Fluorene	10	0.33	380	3,100
4-Nitroaniline	25	0.8	0.58	NS
4,6-Dinitro-2-methylphenol	25	0.8	NS	7.8
N-Nitrosodiphenylamine	10	0.33	82	130
4-Bromophenyl phenyl ether	10	0.33	NS	NS
Hexachlorobenzene	10	0.33	0.96	0.4
Anthracene	10	0.33	230	23,000
Pentachlorophenol	25	0.8	5	63
Carbazole	10	0.33	NS	32
Phenanthrene	10	0.33	11,000	NS
Di-n-butyl phthalate	10	0.33	4,100	7,800
Fluoranthene	10	0.33	3,300	3,100
Pyrene	10	0.33	220	2,300
3,3'-Dichlorobenzidine	10	0.33	33	1.4
Butyl benzyl phthalate	10	0.33	10,000	16,000
Chrysene	10	0.33	220	87
bis(2-Ethylhexyl) phthalate	10	0.33	130	46
Di-n-octyl phthalate	10	0.33	10,000	1,600
Benzo(b)fluoranthene	10	0.33	160	0.87
Benzo(k)fluoranthene	10	0.33	600	8.7
Benzo(a)pyrene	10	0.33	46	0.087
Indeno(1,2,3-cd)pyrene	10	0.33	28,000	0.87
Benzo(a)anthracene	10	0.33	320	7.8

Table 2 (continued)

Practical Quantitation Limits for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Water (a) (ug/l)	Soil (b) (mg/kg)	PA Act 2 Standards (d) (mg/kg)	Region III RBC (e) (mg/kg)
Semi-Volatile Organic Constituents				
Dibenz(a.h)anthracene	10	0.33	160	0.087
Benzo(ghi)perylene	10	0.33	180	NS
Metals				
Aluminum	200	40	190,000	78,000
Antimony	60	12	11,000	31
Arsenic	10	2	53	0.43
Barium	200	40	19,000	5,500
Beryllium	5	1	18	160
Cadmium	5	1	1,400	39
Chromium	10	2	190,000	12,000
Chromium VI	5	1	14,000	230
Cobalt	50	10	170,000	4,700
Copper	25	5	190,000	3,100
Iron	100	20	190,000	23,000
Lead	3	0.5	1,000	NS
Manganese	15	3	130,000	1,600
Mercury	0.2	0.04	240	NS
Nickel	40	8	56,000	1,600
Selenium	5000	1000	14,000	390
Silver	5	1	14,000	390
Thallium	5000	1000	220	5.5
Tin			190,000	47,000
Vanadium	50	10	160	550
Zinc	20	4	190,000	23,000

a/ Detection limits are matrix dependent and may be higher.
b/ Detection limits for soils are reported on a dry-weight basis.
c/ Soils collected for VOCs in EnCore samplers:
Low concentration will be preserved with sodium bisulfite.
Medium concentration will be preserved with methanol.
d/ Pennsylvania Act 2 Medium Specific Concentrations for non-residential soils
e/ US EPA Region III Risk Based Concentrations for Residential Soils.
NS/ No standard available.

Table 3-1
Analytical Methods and Sample Handling Requirements (a)
Remedial Investigation
CK Witco Facility
Petrolia, Pennsylvania

Parameter	Matrix	Method (b)	Container	Preservative	Holding Time (c)
VOCs	Soil	5035/8260	3 EnCore® samplers; 1 125-ml glass (dry weight and effervescence test)	4°C	24 hours to preserve (d); 14 days from preservation to analysis.
SVOCs	Soil	3540/8270	1 250-ml glass	4°C	14 days to extraction; 40 days to analysis
Act 2 Metals	Soil	3020/6010/ 7471 3020A	1 250-ml glass	4°C	Mercury 28 days; All other metals 180 days
pH Specific Conductance Temperature	Groundwater	Field Parameters	NA	NA NA NA	NA NA NA
VOCs	Groundwater	5030/8260	2 40-ml VOA vials	4°C; HCl to pH<2	14 days
SVOCs	Groundwater	3520/8270	2 1000-ml amber glass	4°C	7 days to extraction; 40 days to analysis
Act 2 Metals (total)	Groundwater	3020/6010/ 7471	1 500-ml plastic 1 130-ml glass (mercury)	4°C; HNO3 to pH<2	Mercury 28 days; All other metals 180 days
Act 2 Metals (dissolved)	Groundwater	3020/6010/ 7471	1 500-ml plastic 1 130-ml glass (mercury)	4°C (e)	Mercury 28 days; All other metals 180 days

a/ VOCs - Volatile Organic Compounds.
SVOCs - Semi-Volatile Organic Compounds.
NA - not applicable.
b/ 3000 and 5000 series sample extraction or preparation methods; 6000, 7000 and 8000 series analytical methods.
c/ Holding times from time of sample collection.
d/ Samples collected in EnCore® samplers will be preserved with methanol within 24 hours of sample collection.
e/ Dissolved metals collected in an unpreserved container, filtered through 0.45 μ filter into a container preserved with HNO3 to pH<2.

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Witco Chemical Corporation
Facility Address: 100 Witco Lane, Petrolia, PA 16050
Facility EPA ID #: PAD004388500

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   __x___ If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

___x__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

_____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): Preliminary Remedial Investigation Report dated January 1999 indicate that Benzene was detected in a sample from well 904 at 690 ug/l which exceeded the ACT 2 MSC of 5 ug/l. Arsenic results from wells OW-1 (0.14 mg/l) and 904 (0.133 mg/l) exceed the ACT 2 MSC for arsenic of 0.05 mg/l. In addition, the ACT 2 MSC for lead (0.005 mg/l) was exceeded in five wells (OW-1, OW-3, MW-2, MW-4, and 904) at concentrations ranging from 0.007 mg/l to 0.047 mg/l.

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_____ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

___x__ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):_____

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_____ If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):_____

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):_____

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):_____

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):_____

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

___ __ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Col-Fin Speciality Steel facility, EPA ID # PAD000737031, located at 100, Front Street, Fallston, PA 15066 Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

__x___ IN - More information is needed to make a determination.

Completed by (signature)_____ Date _____
(print)
(title)

Supervisor (signature)_____ Date _____
(print)
(title)_____
(EPA Region or State)_____

Locations where References may be found:

PADEP Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4725

_____
_____
_____
_____
_____

Contact telephone and e-mail numbers

(name)_____
(phone #)_____
(e-mail)_____

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Witco Chemical Corporation
Facility Address: 100 Witco Lane, Petrolia, PA 16050
Facility EPA ID #: PAD004388500

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   __x_ If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of Current Human Exposures Under Control EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	_x_	___	___	Benzene, As and Pb concentration above Act 2 MSC
Air (indoors)[2]	___	_x__	___	
Surface Soil (e.g., <2 ft)	_x__	____	___	Ba conc in Wemco float sample exceed Act 2 MSC
Surface Water	_x__	____	___	toelune,chloroform and ethyl benzene found in creek
Sediment	_x__	____	___	toelune,chloroform and ethyl benzene found in creek
Subsurf. Soil (e.g., >2 ft)	___	____	_x_	no data for soil but GW exceed Act 2 MSC
Air (outdoors)	___	_x__	___	

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__x___ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Preliminary Remedial Investigation Report dated January 1999 indicate that Benzene was detected in a sample from well 904 at 690 ug/l which exceeded the ACT 2 MSC of 5 ug/l. Arsenic results from wells OW-1 (0.14 mg/l) and 904 (0.133 mg/l) exceed the ACT 2 MSC for arsenic of 0.05 mg/l. In addition, the ACT 2 MSC for lead (0.005 mg/l) was exceeded in five wells (OW-1, OW-3, MW-2, MW-4, and 904) at concentrations ranging from 0.007 mg/l to 0.047 mg/l.

Preliminary Remedial Investigation Report dated January 1999 indicate that sludge sample collected from former Wemco Float disposal area (SWMU 17) revealed the presence of arsenic (3 mg/kg), barium (11,700 mg/kg), chromium (9 mg/kg), lead (52.6 mg/kg), and mercury (0.2 mg/kg). Comparison of RCRA metals result to Act 2 soil-to-groundwater MSCs revealed that the barium concentration exceeds the use aquifer numeric value of 8,200 mg/kg, but does not exceed the non-use aquifer numeric value of 190,000 mg/kg. Additional investigation activities may be warranted to evaluate whether the presence of barium in the Witco Float disposal area poses a potential concern relative to groundwater quality.

1987 RCRA Facility Assessment Sampling Visit Work Plan by PRC mentions that 1983 sampling results indicated that the South Branch of Bear Creek is contaminated with several organic compounds, including toluene, chloroform, and ethyl benzene. No concentrations were mentioned.

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	Yes	No	No	No			Yes
Air (indoors)	No	No	No				
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	No	No	No
Surface Water	Yes	Yes			Yes	Yes	Yes
Sediment	Yes	Yes			Yes	Yes	Yes
Soil (subsurface e.g., >2 ft)				Yes			No
Air (outdoors)	No	No	No	No	No		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

__x___ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):
Preliminary Remedial Investigation Report dated January 1999 indicate that Benzene was detected in well 904 at 690 ug/l. Arsenic results from wells OW-1 (0.14 mg/l) and 904 (0.133 mg/l) exceed the ACT 2 MSC for arsenic of 0.05 mg/l. In addition, the ACT 2 MSC for lead (0.005 mg/l) was exceeded in five wells (OW-1, OW-3, MW-2, MW-4, and 904) at concentrations ranging from 0.007 mg/l to 0.047 mg/l. Some residences use groundwater. Groundwater may be used for watering gardens. Facility workers may be exposed to potentially contaminated soil. Construction workers may be exposed to contaminated soil during excavation. Surface water contaminated with several organic compounds, including toluene, chloroform, and ethyl benzene. Aquatic life may be affected.

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable" for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

__x___ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):_____

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):_____

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

___ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Col-Fin Speciality Steel facility, EPA ID # PAD000737031, located at 100, Front Street, Fallston, PA 15066 under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

__x__ IN - More information is needed to make a determination.

Completed by (signature)_____ Date _____
(print)
(title)

Supervisor (signature)_____ Date _____
(print)
(title)
(EPA Region or State)_____

Locations where References may be found:

PADEP Northwest Regional Office
230 Chestnut Drive
Meadville, PA 16335-3481

_____
_____

Contact telephone and e-mail numbers

(name)_____
(phone #)_____
(e-mail)_____

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

*SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No.	CK347										
	Dilution Factor	1.0										
	Location	Water Matrix Well 955										
L*	COMPOUND											
	Chloromethane											
	Bromomethane											
	*VINYL CHLORIDE											
	Chloroethane											
	Methylene Chloride	2	J									
	Acetone											
	Carbon Disulfide											
	*1,1-DICHLOROETHENE											
	1,1-Dichloroethane											
	*TOTAL-1,2-DICHLOROETHENE											
	Chloroform											
	*1,2-DICHLOROETHANE											
	*2-BUTANONE											
	*1,1,1-TRICHLOROETHANE											
	*CARBON TETRACHLORIDE											
	Vinyl Acetate											
	Bromodichloromethane											
	*1,2-DICHLOROPROPANE											
	Cis-1,3-Dichloropropene											
	Trichloroethene											
	Dibromochloromethane											
	1,1,2-Trichloroethane											
	*BENZENE											
	Trans-1,3-Dichloropropene											

* CRQL Contract Required Quantitation Limit

* Action Level Exceed

"Final Report Organic Data Validation" 05/16/88

DATA SUMMARY FORM: V O L A T I L E S

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

SEE GLOSSARY FOR CODE DEFINITIONS

Sample No. / Dilution Factor / Location	CK328 1.00 South Br. Bear Ck. upstream		CK329 1.00 South Br. Bear Ck. downstream		CK330 1.0 Well W-1		CK331 1.0 Well L-1		CK332 5.0 Well L-4		CK333 1.0 Well OW-3		CK334 1.0 Blank		CK 342 20.0 Trip/ Field Blank		CK343 20.0 Equip Blank		CK346 5.0 Water Dup Well 95	
COMPOUND																				
Chloromethane				UJ		UJ														
Bromomethane				UJ		UJ														
*VINYL CHLORIDE				UJ		UJ														
Chloroethane				UJ		UJ														
Methylene Chloride				UJ		UJ			210	UJ					2800		2100			
Acetone		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ
Carbon Disulfide				UJ		UJ														
*1,1-DICHLOROETHENE				UJ		UJ														
1,1-Dichloroethane				UJ		UJ														
*TOTAL-1,2-DICHLOROETHENE				UJ		UJ														
Chloroform				UJ		UJ														
*1,2-DICHLOROETHANE				UJ		UJ														
*2-BUTANONE		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		U
*1,1,1-TRICHLOROETHANE				UJ		UJ														
*CARBON TETRACHLORIDE				UJ		UJ														
Vinyl Acetate				UJ		UJ														
Bromodichloromethane				UJ		UJ														
*1,2-DICHLOROPROPANE				UJ		UJ														
Cis-1,3-Dichloropropene				UJ		UJ														
Trichloroethene				UJ		UJ														
Dibromochloromethane				UJ		UJ														
1,1,2-Trichloroethane		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		U
*BENZENE				UJ		UJ														
Trans-1,3-Dichloropropene				UJ		UJ														
*1,2-Dichloroethane																				

(CRQL = Contract Required Quantitation Limit)

* Action Level Pair

DATA SUMMARY FORM: VOLATILES AND BNAs

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CROL * Dilution Factor)

SEE GLOSSARY FOR CODE DEFINITIONS

ROL*	COMPOUND	Ck328		Ck329		Ck330		Ck331		Ck332		Ck333		Ck334		Ck342		Ck343		Ck346
	Sample No.	Ck328		Ck329		Ck330		Ck331		Ck332		Ck333		Ck334		Ck342		Ck343		Ck346
	Dilution Factor	I.0		I.0		I.0		I.0		5.0/I.0		I.0		--		20.0/I.0		20.0/I.0		--
	Location	South Br. Bear Ck. upstream		South Br. Bear Ck. downstream		Well W-1		Well L-1		Well L-4		Well OW-3		Blank		Trip/ Field Blank		Equip Blank		Water Dup Well 9
5	Bromoform		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ		UJ	
10	4-Methyl-2-pentanone																			
10	2-Hexanone																			
5	*TETRACHLOROETHENE																			
5	1,1,2,2-Tetrachloroethane																			
5	*TOLUENE																			
5	Chlorobenzene															39		49		
5	*ETHYLBENZENE																			
5	*STYRENE																			
5	*TOTAL XYLENES																			
10	Phenol								R		UJ				R			8	J	
10	bis(2-Chloroethyl)ether								R		R		UJ		UJ		UJ		UJ	R
10	2-Chlorophenol								R		UJ				R					
10	*1,3-DICHLOROBENZENE								R		R									R
10	*1,4-DICHLOROBENZENE								R		R									R
10	Benzyl Alcohol								R		R		UJ		UJ		UJ		UJ	R
10	1,2-Dichlorobenzene								R		R									R
10	2-Methylphenol								R		R									R
10	bis(2-Chloroisopropyl)ether		UJ		UJ		UJ		R		R									R
10	4-Methylphenol								R		R									R
10	N-Nitroso-di-n-propylamine								R		R									R
10	Hexachloroethane								R		R									R
10	Nitrobenzene								R		R									R
10	Isophorone								R		R									R
10	2-Nitrophenol								R		R									R
									R		UJ				R					

* CRQL = Contract Required Quantitation Limit

* Action Level Ex

DATA SUMMARY FORM: VOLATILES AND BNAs

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CROL * Dilution Factor)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No. / Dilution Factor	Ck347																			
	Location	Water Matrix Well 955																			
ROL*	COMPOUND																				
5	Bromoform																				
10	4-Methyl-2-pentanone																				
10	2-Hexanone																				
5	*TETRACHLOROETHENE																				
5	1,1,2,2-Tetrachloroethane																				
5	*TOLUENE																				
5	Chlorobenzene																				
5	*ETHYLBENZENE																				
5	*STYRENE																				
5	*TOTAL XYLENES																				
10	Phenol		UJ																		
10	bis(2-Chloroethyl)ether																				
10	2-Chlorophenol																				
10	*1,3-DICHLOROBENZENE																				
10	*1,4-DICHLOROBENZENE																				
10	Benzyl Alcohol		UJ																		
10	1,2-Dichlorobenzene																				
10	2-Methylphenol																				
10	bis(2-Chloroisopropyl)ether																				
10	4-Methylphenol																				
10	N-Nitroso-di-n-propylamine																				
10	Hexachloroethane																				
10	Nitrobenzene																				
10	Isophorone																				
10	2-Nitrophenol																				

*CROL = Contract Required Quantitation Limit

* Action Level Exists

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No. / Dilution Factor	Ck328		Ck329		Ck330		Ck331		Ck332		Ck333		Ck334		Ck342		Ck343		Ck346	
	Location	South Br. Bear Ck. upstream		South Br. Bear Ck. downstream		Well W-1		Well L-1		Well L-4		Well OW-3		Blank		Trip/ Field Blank		Equip Blank		Water Dup Well 955	
RQL*	COMPOUND																				
10	2,4-Dimethylphenol								R		UJ				R						
10	Benzoic Acid	4	J	2	J				R		R	7	J								R
10	bis(2-Chloroethoxy)methane								R		R										R
10	2,4-Dichlorophenol								R		UJ				R						
10	1,2,4-Trichlorobenzene								R		R										R
10	Naphthalene								R		R										R
10	4-Chloroaniline								R		R		UJ		UJ		UJ		UJ		R
10	Hexachlorobutadiene								R		R										R
10	4-Chloro-3-methylphenol								R		R										R
10	2-Methylnaphthalene								R		R										R
10	Hexachlorocyclopentadiene								R		R										R
10	2,4,6-Trichlorophenol								R		UJ				R						
50	2,4,5-Trichlorophenol								R		R										R
10	2-Chloronaphthalene								R		R										R
10	2-Nitroaniline								R		R										R
10	Dimethyl phthalate								R		R										R
10	Acenaphthylene								R		R										R
10	2,6-Dinitrotoluene								R		R										R
50	3-Nitroaniline								R		R										R
10	Acenaphthene								R		R										R
50	2,4-Dinitrophenol		UJ		UJ		UJ		R		UJ		UJ		R		UJ		UJ		
50	4-Nitrophenol								R		UJ				R						
10	Dibenzofuran								R		R										R
10	2,4-Dinitrotoluene								R		R										R
10	Diethylphthalate								R		[illegible]				R						

* CRQL = Contract Required Quantitation Limit

▼ Action Level Exists

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CROL * Dilution Factor)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No.	Ck347																					
	Dilution Factor																						
	Location	Water Matrix Well 955																					
PQL*	COMPOUND																						
10	2,4-Dimethylphenol																						
10	Benzoic Acid																						
10	bis(2-Chloroethoxy)methane																						
10	2,4-Dichlorophenol																						
10	1,2,4-Trichlorobenzene																						
10	Naphthalene																						
10	4-Chloroaniline		UJ																				
10	Hexachlorobutadiene																						
10	4-Chloro-3-methylphenol																						
10	2-Methylnaphthalene																						
10	Hexachlorocyclopentadiene																						
10	2,4,6-Trichlorophenol																						
50	2,4,5-Trichlorophenol																						
10	2-Chloronaphthalene																						
10	2-Nitroaniline																						
10	Dimethyl phthalate																						
10	Acenaphthylene																						
10	2,6-Dinitrotoluene																						
50	3-Nitroaniline																						
10	Acenaphthene																						
50	2,4-Dinitrophenol		UJ																				
50	4-Nitrophenol																						
10	Dibenzofuran																						
10	2,4-Dinitrotoluene																						
10	Diethylphthalate																						

* CRQL = Contract Required Quantitation Limit

* Action Level Exists

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

SEE GLOSSARY FOR DEFINITIONS

	Sample No.	Ck328		Ck329		Ck330		Ck331		Ck332		Ck333		Ck334		Ck342		Ck343		Ck346	
	Dilution Factor									1.0		1.0		1.0		1.0		1.0		1.0	
	Location	South Br. Bear Ck. upstream		South Br. Bear Ck. downstream		Well W-1		Well L-1		Well L-4		Well OW-3		Blank		Trip/ Field Blank		Equip Blank		Water Dup Well 95	
PQL	COMPOUND																				
10	4-Chlorophenyl-phenylether								R		R										R
10	Fluorene								R		R										R
50	4-Nitroaniline								R		R										R
50	4,6-Dinitro-2-methylphenol								R		R										R
10	N-Nitrosodiphenylamine	6	B	5	B	6	B	5	B		R	5	B	5	B	4	B	4	B	4	B
10	4-Bromophenyl-phenylether								R		R				UJ		UJ		UJ		R
10	Hexachlorobenzene								R		R										R
50	*PENTACHLOROPHENOL								R		UJ				R						
10	Phenanthrene								R		R										R
10	Anthracene		B		B		B		B		R										R
10	Di-n-butylphthalate	8	B	7	B	8	B	7	B		R	5	B	4	B	3	B	7	B		6B
10	Fluoranthene								R		R										R
10	Pyrene								R		R										R
10	Butylbenzylphthalate	6	B	5	B	6	B	4	B		R	3	B	4	B		UJ	3	B	4B	
10	3,3-Dichlorobenzidine								R		R		UJ		UJ		UJ		UJ		R
10	Benzo(a)anthracene								R		R										R
10	Chrysene								R		RJ										R
10	bis(2-Ethylhexyl)phthalate			4	J	37		15	J	310	JR	15		7	J	5	J	29		10	J
10	Di-n-octyl phthalate								R		R										R
10	Benzo(b)fluoranthene								R		R										R
10	Benzo(k)fluoranthene								R		R										R
10	Benzo(a)pyrene								R		R										R
10	Indeno(1,2,3-cd)pyrene								R		R										R
10	Dibenz(a,h)anthracene								R		R										R
10	Benzo(g,h,i)perylene								R												R

* CRQL = Contract Required Quantitation Limit

* Action Level Exists

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

SEE GLOSSARY FOR DEFINITIONS

	Sample No.	Ck347										
	Dilution Factor	1.0										
	Location	Water Matrix Well 955										
RQL*	COMPOUND											
10	4-Chlorophenyl-phenylether											
10	Fluorene											
50	4-Nitroaniline											
50	4,6-Dinitro-2-methylphenol											
10	N-Nitrosodiphenylamine											
10	4-Bromophenyl-phenylether											
10	Hexachlorobenzene		UJ									
50	*PENTACHLOROPHENOL											
10	Phenanthrene											
10	Anthracene											
10	Di-n-butylphthalate	6	B									
10	Fluoranthene											
10	Pyrene											
10	Butylbenzylphthalate		UJ									
10	3,3-Dichlorobenzidine		UJ									
10	Benzo(a)anthracene											
10	Chrysene											
10	bis(2-Ethylhexyl)phthalate											
10	Di-n-octyl phthalate											
10	Benzo(b)fluoranthene											
10	Benzo(k)fluoranthene											
10	Benzo(a)pyrene											
10	Indeno(1,2,3-cd)pyrene											
10	Dibenz(a,h)anthracene											
10	Benzo(g,h,i)perylene											

* CRQL - Contract Required Quantitation Limit

DATA SUMMARY FORM: V O L A T I L E S

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling:

SOIL SAMPLES
(ug/kg)

To calculate sample quantitation limits
(CRUL * Dilution Factor) / ((100 - % Moisture)/100)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No.	CK326		CK327		CK344		CK345											
	Dilution Factor	.88		1.0		1.0		.98											
	% Moisture	48		23.9		33.1		32.2											
	Location	South Br. Bear Ck. Upstream		South Br. Bear Ck. Downstream		Sedimet Dup. Downstream		Sed Matrix Spike Downstream											
OL	COMPOUND																		
0	Chloromethane		UJ		UJ		UJ												
0	Bromomethane		UJ																
0	*VINYL CHLORIDE		UJ																
0	Chloroethane		UJ																
5	Methylene Chloride	231	J	210	J	165	J	100											
0	Acetone		UJ	33	J	37	J	47											
5	Carbon Disulfide		UJ		UJ		UJ												
5	*1,1-DICHLOROETHENE		UJ		UJ		UJ												
5	1,1-Dichloroethane		UJ		UJ		UJ												
5	*TOTAL-1,2-DICHLOROETHENE		UJ		UJ		UJ												
5	Chloroform		UJ		UJ		UJ												
5	*1,2-DICHLOROETHANE		UJ		UJ		UJ												
0	*2-BUTANONE		UJ		UJ		UJ												
5	*1,1,1-TRICHLOROETHANE		UJ		UJ		UJ												
5	*CARBON TETRACHLORIDE		UJ		UJ		UJ												
0	Vinyl Acetate		UJ		UJ		UJ		UJ										
5	Bromodichloromethane		UJ		UJ		UJ												
5	*1,2-DICHLOROPROPANE		UJ		UJ		UJ												
5	Cis-1,3-Dichloropropene		UJ		UJ		UJ												
5	Trichloroethene		UJ		UJ		UJ												
5	Dibromochloromethane		UJ		UJ		UJ												
5	1,1,2-Trichloroethane		UJ		UJ		UJ												
5	*BENZENE		UJ		UJ		UJ												
5	Trans-1,3-Dichloropropene		UJ		UJ		UJ												

DATA SUMMARY FORM: VOLATILES AND BNAs

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

SOIL SAMPLES (ug/kg)

To calculate sample quantitation limits (CRQL * Dilution Factor) / ((100 - % Moisture)/100)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No.	Ck326		Ck327		Ck344		Ck345	
	Dilution Factor							9872	
	% Moisture							32.2	
	Location	South Br. Bear Ck. upstream		South Br. Bear Ck. downstream		Sediment Dup. downstream		Sediment Matrix Spike downstream	
QL	COMPOUND								
5	Bromoform		UJ		UJ		UJ		
0	4-Methyl-2-pentanone		UJ		UJ		UJ		
0	2-Hexanone		UJ		UJ		UJ		
5	*TETRACHLOROETHENE		UJ		UJ		UJ		
5	1,1,2,2-Tetrachloroethane		UJ		UJ		UJ		
5	*TOLUENE		UJ		UJ		UJ		
5	Chlorobenzene		UJ		UJ		UJ		
5	*ETHYLBENZENE		UJ		UJ		UJ		
5	*STYRENE		UJ		UJ		UJ		
5	*TOTAL XYLENES	19	J	12	J		J		
30	Phenol								
30	bis(2-Chloroethyl)ether		UJ		UJ		UJ		UJ
30	2-Chlorophenol								
30	*1,3-DICHLOROBENZENE								
30	*1,4-DICHLOROBENZENE								
30	Benzyl Alcohol		UJ		UJ		UJ		UJ
30	1,2-Dichlorobenzene								
30	2-Methylphenol								
30	bis(2-Chloroisopropyl)ether		UJ		UJ		UJ		UJ
30	4-Methylphenol	500	J						
30	N-Nitroso-di-n-propylamine								
30	Hexachloroethane								
30	Nitrobenzene								
30	Isophorone								
30	2-Nitrophenol								

DATA SUMMARY FORM: B N A s

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limits
(CROL * Dilution Factor) / ((100 - % Moisture)/100)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No.	CK326		CK 327		CK 344		Ck345									
	Dilution Factor																
	% Moisture																
	Location	South Br. Bear Ck. upstream		South Br. Bear Ck. downstream		Sediment Dup. downstream		Sediment Matrix Spike downstream									
QL*	COMPOUND																
0	2,4-Dimethylphenol																
0	Benzoic Acid																
0	bis(2-Chloroethoxy)methane																
0	2,4-Dichlorophenol																
0	1,2,4-Trichlorobenzene																
0	Naphthalene							826	J								
0	4-Chloroaniline		UJ		UJ		UJ		UJ								
0	Hexachlorobutadiene																
0	4-Chloro-3-methylphenol																
0	2-Methylnaphthalene																
0	Hexachlorocyclopentadiene																
0	2,4,6-Trichlorophenol																
00	2,4,5-Trichlorophenol																
0	2-Chloronaphthalene																
0	2-Nitroaniline																
0	Dimethyl phthalate																
0	Acenaphthylene																
0	2,6-Dinitrotoluene																
00	3-Nitroaniline																
0	Acenaphthene			210	J												
00	2,4-Dinitrophenol		UJ		UJ		UJ		UJ								
00	4-Nitrophenol																
0	Dibenzofuran			223	J	600	J										
0	2,4-Dinitrotoluene																
0	Diethylphthalate																

Case Number: 7602

Site Name: Witco Chemical

Date of Sampling: 7/15/87

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % Moisture)/100)

SEE GLOSSARY FOR CODE DEFINITIONS

	Sample No.	Ck326		Ck327		Ck344		Ck345											
	Dilution Factor																		
	% Moisture																		
	Location	South Br. Bear Ck. upstream		South Br. Bear Ck. downstream		Sediment Dup. downstream		Sediment Matrix Spike downstream											
CRQL*	COMPOUND																		
30	4-Chlorophenyl-phenylether																		
30	Fluorene																		
30	4-Nitroaniline																		
30	4,6-Dinitro-2-methylphenol		UJ		UJ		UJ		UJ										
30	N-Nitrosodiphenylamine			263	J														
30	4-Bromophenyl-phenylether																		
30	Hexachlorobenzene																		
30	*PENTACHLOROPHENOL																		
30	Phenanthrene	423	J	2234		5247		7965											
30	Anthracene																		
30	Di-n-butylphthalate					390	JB	339	JB										
30	Fluoranthene			2365		5397		8260											
30	Pyrene			2628		4348		6342											
30	Butylbenzylphthalate																		
30	3,3-Dichlorobenzidine																		
30	Benzo(a)anthracene			1301		2399		3540											
30	Chrysene			1288		2399		3392											
30	bis(2-Ethylhexyl)phthalate																		
30	Di-n-octyl phthalate																		
30	Benzo(b)fluoranthene			631	J	3148		5015											
30	Benzo(k)fluoranthene																		
30	Benzo(a)pyrene					1334		2065											
30	Indeno(1,2,3-cd)pyrene																		
30	Dibenz(a,h)anthracene																		
30	Benzo(g,h,i)perylene																		

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATING TO IDENTIFICATION
(confidence concerning presence or absence of compounds):

U = NOT DETECTED. THE ASSOCIATED NUMBER INDICATES APPROXIMATE SAMPLE CONCENTRATION NECESSARY TO BE DETECTED.

(NO CODE) = CONFIRMED IDENTIFICATION.

B = NOT DETECTED, SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

CODES RELATED TO QUANTITATION
(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

K = ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED HIGH. ACTUAL VALUE IS EXPECTED TO BE LOWER.

L = ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED LOW. ACTUAL VALUE IS EXPECTED TO BE HIGHER.

UJ= NOT DETECTED, QUANTITATION LIMIT MAY BE INACCURATE OR IMPRECISE.

UL= NOT DETECTED, QUANTITATION LIMIT IS PROBABLY HIGHER.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ESC

ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West ▪ Suite 315 ▪ Pittsburgh, Pennsylvania 15276 ▪ (412) 787-5100 ▪ Fax (412) 787-8065

January 18, 2002

Darius Ostrauskas
United States Environmental Protection Agency, Region III (3WC22)
1650 Arch Street
Philadelphia PA 19103-2029

RECEIVED
JAN 22 2002
PA Operations Branch
WCMD, EPA Region III

Re: Soil Boring Logs
Crompton Corporation – Petrolia, Pennsylvania

Dear Darius:

Per your request, enclosed are copies of the soil boring logs prepared by Environmental Strategies Corporation (ESC) during remedial investigation activities completed from May 2000 through March 2001 at the Crompton Corporation – Petrolia, Pennsylvania facility. The logs are arranged in numerical order by area(s) of investigation.

We look forward to meeting with you in Petrolia on January 30, 2002. Please do not hesitate to contact me if you have any questions at (412) 787-5100.

Sincerely yours,

Jeffrey A. Hassen, P.G.
Senior Project Director

JAH:rgq

Enclosure

cc: Mr. Al Nesheiwat, Crompton Corporation (w/o enclosure)
Mr. Marc Gold, Manko, Gold & Katcher (w/o enclosure)
Mr. John Simon, Environmental Strategies Corporation (w/o enclosure)

Docs/Crompton/139435/USEPAltr1.doc

Boring Log: 8-SB-1

Project: C. K. Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: Mary Lynn Yurko

Completion Date: 6/2/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 12
Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0					***Topsoil***
1, 2, 3	1		0		***FL- Sandy FILL*** Some silt; medium to coarse rock fragments; dry.
4, 5, 6, 7	2		0		***W- Black WASTE*** Silty; petroleum-like odor; damp.
7, 8					***CH-Reddish brown CLAY*** Moist; very plastic.
8, 9, 10	3		0		***CL-Reddish brown CLAY*** Decaying organic matter (leaves).
11					***ML-Yellow brown SANDY SILT*** Saturated.
12					Boring Terminated
13, 14, 15, 16, 17, 18, 19, 20					

Subcontractor: Vaportech Services Inc.
Driller/Operator: Art Carion

Method: Geoprobe

Boring Log: 8-SB2

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 6/2/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 8

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1					***FL-FILL*** Weathered sandstone; some gray sandy silt; dry.
2	1		0		
3					
4					***ML-Dark brown SANDY SILT*** Medium to coarse rock fragments; some Fe mottling; black siltstone and shale present.
5	2		0		
6					
7	3		25		***CL- Dark brown SANDY CLAY*** Medium to cobble sandstone rock fragments; some black shale present; black staining at 7 ft bgs.
8					Boring Terminated
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 8-SB3

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 8

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–4	1		0		***FL- Rock FILL*** Cobble to gravel size with sand, silt and clay; dry.
4–8	2		0		***W-Black WASTE***
8					Boring Terminated

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 8-SB4

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 6/22/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 8

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–1	1		26		***FL- Silty FILL*** Highly weathered rock fragments.
1–2					***W- Black WASTE*** Silty; no odor.
2–4	2		30		***SM- Yellowish- brown SANDY SILT*** Dry; low to medium plasticity; no odor; cobble sized weathered sandstone.
4–5	3		48		
5–8	4		24		***SC- Gray SANDY CLAY*** Wet; soft; plastic; some cobble sized rock fragments; iron staining in center; groundwater at 8' bgs.
8					Boring Terminated

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 8-SB5

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 6/2/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 11

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		46		***FL- FILL*** Weathered sandstone fragments.
2					
3					***CL- Dark Brown SILTY CLAY*** Well graded rock fragments; medium plasticity; soft to stiff
4					
5					
6	2		0		
7					***CL- Dark to Yellowish Brown SANDY CLAY*** Very moist to wet. Well graded sandstone fragments below 5' bgs.
8					
9	3		17		
10					
11					Boring Terminated
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 8-SB6

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 8

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1				***FL- FILL*** Weathered sandstone fragments.
2					
3					
4					***W- WASTE*** Poorly sorted gravel; wet; strong petrol odor
5					
6	2				
7					***CH- Yellowish-red CLAY*** Stiff; plastic; wet.
8					Boring Terminated
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 8-SB7

Project: C. K. Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: Mary Lynn Yurko

Completion Date: 8/25/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 8
Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–4	1				***FL- FILL*** Gravel, sand and silty clay.
4–5					***W- Black Waste*** Silt and clay; strong petrol odor.
5–8	2				***CL- Yellowish-red SILTY CLAY*** Some highly weathered sandstone fragments; medium plasticity; stiff.
8					Boring Terminated

Boring Log: 9-SB1

Project: C.K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/31/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 20

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–1	1		0		***FL-FILL*** Yellowish red CLAY; Medium to fine rock fragments; stiff; medium plasticity.
2–4			0		
4–8	2		0		
8–12	3		8.4		***W- Coke fines.*** Silty; some rock fragments.
12–16	4		3.7		
16–20	5				

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 9-SB2

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/31/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0	1		0.3		***FL-FILL*** Light Brown SILT; highly weathered sandstone; dry.
1–4			0		***FL-FILL*** Yellowish Red CLAYEY SILT; stiff; low plasticity.
4–5					***FL-FILL*** Orange CLAY; very plastic; some Fe staining.
6	2		0		
8	3		1.4		
9–16					***W- Black Coke Fines*** Silty; some clay/ silty clay layers.
16					Boring Terminated

Boring Log: 9-SB3

Project: C. K. Witco Corporation

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M. L. Yurko / D. Oberdorf

Completion Date: 8/23/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 19

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–2					*FL-FILL*
2–4	1		0		
4–6	2		0		
6–8					
8–10	3		0		*W- COKE FINES* Clay and sandy-silty waste layers; wet at 11 feet bgs; saturated at 16 feet.
10–12					
12–14	4		0		
14–16					
16–18	5		0		
18–19					*CH- Brown CLAY* Stiff; plastic; gray mottling. Refusal at 19 feet bgs.
19–20					Boring Terminated

Subcontractor: Vaportech Services Inc.

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 9-SB4

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/23/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1–4	1		5		***FL-FILL*** Brownish-yellow SILTY CLAY;Dry; low plasticity; coarse to medium rock fragments.
4–5	2		0		***FL- FILL*** Brownish- yellow SILTY CLAY; wet; plastic.
5–8					
8–12	3		6		***W- Coke Fines*** Silty black material; damp; petrol-like odor; saturated at 8 feet bgs.
12–15	4				
15–16					***CL-Gray Silty CLAY*** Wet. Boring collapsed.
16–20					Boring Terminated

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 9-SB5

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/23/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 20

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		6		***FL-FILL*** Brownish-yellow SILTY CLAY; Dry; fine rock fragments; some Fe streaks and gray mottlling.
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					***W- Coke Fines*** Black; silty; dry; no odor; wet at 12 feet bgs.
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 10-SB1

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: D. Oberdorf / M.L. Yurko

Completion Date: 5/24/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 7.5

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–3	1				***FL-FILL*** Dark Brown CLAY; fine to medium-sized rock fragments; some Fe staining; high plasticity.
3–5.5	2				***W-Gray CLAYLIKE WASTE*** Wet; plastic; odor.
5.5–6.5	2				***W-Brown CLAYLIKE WASTE*** Moist; plastic.
6.5–7.5	2				***SS-Weathered SANDSTONE*** Cobble rock fragments; interspersed silty-sand; dry. Refusal at 7.5 feet.
					Boring Terminated

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB2

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: D. Oberdorf / M. L. Yurko

Completion Date: 5/24/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 2.3

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1				*SS-Weathered SANDSTONE* Interspersed silt. Refusal at 2.3 feet.
2					
3					Boring Terminated
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB3

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: D. Oberdorf / M. L. Yurko

Completion Date: 5/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 10

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		0.9		***FL-FILL*** Topsoil. Brown CLAY; medium sandstone fragments; moist; high plasticity.
2			0.6		
3			0.3		***Rock fragments*** Some light brown sandy clay; low plasticity.
4			0.3		
5	2		0.9		***CL-Brown SILTY CLAY*** Cobble-sized weathered sandstone; very moist; medium to high plasticity.
6					***CH-Brown CLAY*** Stiff; moist; high plasticity.
7			0.3		
8					***SS-Weathered SANDSTONE*** Medium to Cobble-sized fragments; dry.
9	3				***SS-Weathered SANDSTONE*** Refusal at 10 feet.
10					Boring Terminated
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB4

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: D. Oberdorf / M.L. Yurko

Completion Date: 5/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 15.5

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1, 2, 3	1		0		***CL-Brownish Yellow SILTY CLAY*** Medium rock fragments; moist; low to medium plasticity.
4, 5, 6	2		0		***CH-Brownish Yellow CLAY*** Fine to medium-sized rock fragments; moist; soft; high plasticity.
6, 7					***ML-Brownish Yellow SANDY SILT*** Medium to cobble-sized sandstone fragments; low moisture content; low plasticity.
7, 8					***MH-Light Brown SILT*** Highly weathered sandstone fragments.
8, 9					***CH-Dark Brown CLAY*** Moist; soft; medium to high plasticity.
9, 10, 11, 12	3		0		***ML-Light Brown SANDY SILT*** Medium to cobble-sized sandstone fragments; dry; non-plastic.
12, 13					***CL-Light Brown CLAYEY SILT*** Fine rock fragments; dry; nonplastic.
13, 14, 15	4				***SM-Light Gray SILTY SAND*** Medium to coarse weathered sandstone; dry; nonplastic. Refusal at 15.5 ft.
16, 17, 18, 19, 20					Boring Terminated

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB5

Project: C. K. Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/25/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 14.5
Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		0		***CL-Brown SILTY CLAY*** Moist; stiff; high plasticity.
2					***ML-Yellow Brown SANDY SILT*** Medium to cobble sized sandstone fragments; moist; medium plasticity.
3					***CH-Brown CLAY*** Very moist; very plastic.
4					***CL-Brownish Yellow CLAY*** Stiff; moist; medium plasticity.
5	2		0		***CL-Light Brown CLAY*** Very moist; medium plasticity.
6					***ML-Brownish Yellow SANDY SILT*** Medium to cobble-sized sandstone fragments; Fe staining.
7					***SP-Light Brown SAND*** Weathered sandstone fragments; dry.
8					
9					
10	3		0		***SM-Brownish Yellow SILTY SAND*** Cobble-sized weathered sandstone; some Fe staining.
11					
12					***SS-Weathered SANDSTONE*** Fissile; micaceous; silty sand interspersed.
13	4		0		
14					***SS-Weathered SANDSTONE*** Refusal at 14.5 ft.
15					Boring Terminated
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.
Driller/Operator: Art Carion

Method: Geoprobe

Boring Log: 10-SB6

Project: C. K. Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: D. Oberdorf / M.L. Yurko

Completion Date: 5/25/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 4
Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0	1		0.9		
1			0.6		
2					***CL-Light Brown SILTY CLAY*** Medium-sized rock fragments; low moisture content; no plasticity.
3			0.3		
4					Boring Terminated
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.
Driller/Operator: Art Carion

Method: Geoprobe

Boring Log: 10-SB7

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: D. Oberdorf / M. L. Yurko

Completion Date: 5/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 2.5

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		1.4		***Rock fragments*** Sandstone; some light brown sandy clay; low plasticity.
2					***CL- Light Brown SILTY CLAY*** Medium plasticity; dry; rock fragments. Refusal at 2.5 ft. bgs.
3					Boring Terminated
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB8

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 2.3

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
	1		1.2		***CL-Brownish Red SILTY CLAY*** Medium-sized rock fragments; moist; low plasticity.
1			1.0		***ST-Light Brown Weathered SILTSTONE*** Refusal at 2.3 feet.
2					Boring Terminated
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB9

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 4.5

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
					Topsoil
1					
2	1				***MH-Brown SILT*** Medium to coarse sandstone fragments; low moisture content; low plasticity.
3					
4	2				***SP-Light Gray SAND*** Medium to cobble-sized weathered sandstone; micaceous; Fe rich.
5					Boring Terminated
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 10-SB10

Project: C. K. Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: D. Oberdorf / M.L. Yurko

Completion Date: 5/25/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 10.5
Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–4	1		0.4 0.3		***ML-Brown SANDY SILT*** Topsoil Cobble-sized weathered sandstone; low moisture content.
4–8	2		0.1 0.1 0.1 0.1		***SS-Light Brown Weathered SANDSTONE*** Medium to cobble-sized rock fragments; some sandy silt; dry; non-plastic. Refusal at 10.5 ft.
8–10	3				
11–20					Boring Terminated

Subcontractor: Vaportech Services, Inc.
Driller/Operator: Art Carion
Method: Geoprobe

Boring Log: 10-SB11

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M. L. Yurko / D. Oberdorf

Completion Date: 5/25/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 4

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1					***CL-Yellow Brown CLAY*** Medium-sized rock fragments; moist.
2	1				***CH-Dark Brown CLAY*** Moist; very plastic; organic rich; some Fe staining.
3					***Decaying Organic Layer*** Tree Stump
4					***CH-Orangish-Red CLAY*** Soft; very plastic.
5					***CL-Brown CLAY*** Some coarse rock fragments; wet.
6					Boring Terminated
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 11-SB1

Project: C.K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 8/24/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 20

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–4	1, 2				***FL- FILL*** Brownish Yellow SILTY CLAY; dry.
8–17	4, 5				***W- Black WASTE*** Silty; plastic; some sandstone cobbles
17–20	6				***CL-Brownish Yellow SILTY CLAY*** Fine rock fragments; hard; dry

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 11-SB2

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/31/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 23

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1–2	1		0		***FL-FILL*** Yellowish Brown CLAY; medium to cobble weathered rock fragments; stiff; plastic.
2–4	1		0		***W- Black WASTE*** Silty micaceous waste material.
4–7	2				***FL-Yellowish Brown FILL*** Clay; weathered rock fragments; dry.
7–11	3		14		
11–13	4		121		
13–15	5		242		***W- Black WASTE*** Silty waste material; petroleum like odor.
15–19	6		7.4		
19–20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 11-SB2

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/31/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 23

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
21	7		25		
22					*CH-Olive Gray CLAY* Very moist; very plastic; soft. Bedrock was not encountered.
23					
24					Boring Terminated
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

Boring Log: 11-SB3

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/31/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 20

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
	1		0		***Topsoil*** Some Yellowish Red CLAY; medium to fine rock fragments; stiff; medium plasticity.
					FL-FILL Yellowish Brown CLAY
					FL- Rock FILL Cobble size.
					Black WASTE Silty.
4	2		0		
5					
6					
7			9.4		
8	3		1.2		
9					
10					
11					***W- Black COKE FINES*** Silty; some clay and sand fill layers.
12	4				
13					
14					
15					
16	5				
17					
18					
19					***CL- Light Brown Silty CLAY***
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 11-SB4

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko / D. Oberdorf

Completion Date: 5/31/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		0		***FL-FILL*** Brownish Yellow CLAY; medium to cobble rock fragments; damp; stiff; medium plasticity.
2					
3					***FL-FILL*** Gray CLAY; medium to fine rock fragments; soft; moist; high plasticity.
4	2		0		***FL-FILL*** Brownish Yellow CLAY; medium to fine rock fragments; soft; plastic.
5					
6					***FL- Rock FILL***
7					***W- Black WASTE*** Silty; some clay layers; saturated at 7 feet bgs.
8	3		0		
9					
10					
11					
12	4		0		
13					
14					
15					
16					Boring Terminated
17					
18					
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Art Carion

Boring Log: 11-SB5

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/23/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 20

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1, 2, 3, 4	1		0		***FL-FILL*** Brownish-yellow to gray SILTY CLAY; large cobbles of sandstone and limestone; some Fe streaking and gray mottling.
5, 6, 7	2				***W- Black WASTE*** Silty waste material interspersed with gray clay; soft plastic; petrol-like odor.
8, 9, 10	3				***FL-FILL*** Gray CLAY; soft; plastic.
11, 12, 13, 14, 15, 16	4				***W- Black WASTE*** Greasy silty-clay waste material; petrol-like odor.
17, 18	5				***W- Black SILT*** Black silty waste material and gray clay.
19, 20					***CL-Brownish-yellow SILTY CLAY*** Stiff; plastic; dry. Refusal at 20 feet bgs.

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 11-SB6

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/24/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 13

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–4	1				***FL-FILL*** Brownish-yellow SILTY CLAY; dry; nonplastic; large cobbles of sandstone and limestone.
4–6	2				***FL-FILL*** Reddish-brown CLAY; plastic; cmf rock fragments; some organic debris (decayed plants).
6–8	2				***FL-FILL*** Brownish-yellow to Yellow-red CLAY; high plasticity; few medium to fine rock fragments.
8–10	3				***W- Black WASTE*** Stiff; medium plasticity; interspersed with yellow-red-brown clay.
10–12	3				***CL-Brownish-yellow SILTY CLAY*** Dry; large cobbles. Refusal at 13 feet bgs.
12–13	4				
13					Boring Terminated

Boring Log: 11-SB7

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/24/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0					*FL-FILL*
1					
2	1				
3					
4					*W- COKE FINES or WASTE* Interspersed with native fill.
5					
6	2				
7					
8					
9					
10	3				
11					
12					
13					
14	4				
15					
16					*W- Black WASTE* Silty clay; interspersed with native fill; strong petroleum odor; moist/wet at 14 feet bgs; saturated at 16 feet bgs.
17					
18	5				
19					
20					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 11-SB7

Project: C. K. Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: Mary Lynn Yurko

Completion Date: 8/24/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
21					
22	6				
23					
24					
25					Boring Terminated
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

Subcontractor: Vaportech Services, Inc.

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 12-SB1

Project: CK Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: M.L. Yurko

Completion Date: 9/5/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 16
Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
0–1					***FL-Fill*** Asphalt
1–5.5	1		2.5		***FL- Sandy FILL*** Some silt; weathered cobbles.
5.5–8	2		0		***W- Black WASTE*** Silty; becomming slightly plastic and with a slight petrol odor at 12' bgs
8–12	3		0		
12–16	4		0		
16					Boring Terminated

Subcontractor: Vaportech
Driller/Operator: Brian Novak
Method: Geoprobe

Boring Log: 12-SB2

Project: CK Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: M.L. Yurko

Completion Date: 9/5/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 16
Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1					***FL-Fill*** Asphalt
2	1		70		***W- Black WASTE*** Silty gravel, large cobbles with greasy waste material, petrol odor
3			0		
4					
5					
6	2		0		***ML- Light Brown SANDY SILT*** Large cobbles of weathered sandstone, rock fragments, dry Saturated from 8 to 9.5' bgs
7					
8					
9					
10	3		0		
11					
12					
13			0.7		***CL- Light Gray and Black CLAYEY SILT*** Fill material intermixed, cobbles
14	4				
15			0		***CH- Brownish-yellow CLAY*** Stiff, plastic with gray mottling and iron streaks
16					Boring Terminated
17					
18					
19					
20					

Subcontractor: Vaportech

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 12-SB3

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1					
2	1				
3					
4					***FL- Sandy FILL*** Silt and clay; coarse-medium-fine rock fragments; dry.
5					
6	2				
7					
8					
9					
10	3				
11					***W- Black WASTE*** Silty.
12					
13					
14	4				
15					
16					Boring Terminated
17					
18					
19					
20					

Boring Log: 12-SB4

Project: CK Witco
Project No.: 138093-03
Location: Petrolia, PA
Geologist: M.L. Yurko

Completion Date: 9/5/00
Surface Elevation (ft. MSL):
Total Depth (ft. bgs): 32
Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–4	1		0		***FL-FILL*** Light Brown and Gray SILTY CLAY; large weathered sandstone cobbles.
4–8	2		0		***W- COKE FINES***
8–12	3		0		
12–16	4		1.7		
16–20	5		1.7		

Subcontractor: Vaportech
Driller/Operator: Brian Novak
Method: Geoprobe

Boring Log: 12-SB4

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 32

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
21					
22	6		0		
23					
24					
25			0.9		
26	7				*W- Black WASTE* Silty, sandy at 27 feet bgs; dry
27			0		
28					
29					
30					
31					
32					Boring Terminated
33					
34					
35					
36					
37					
38					
39					
40					

Subcontractor: Vaportech

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 12-SB5

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 16

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–2	1		35		*FL- Silty Gravel Fill*
2–4	1		35		*W- Black WASTE* Silty; interspersed with native and rock fill
4–6	2		7		
6–8	2		7		
8–10	3		3		
10–12	3		3		
12–14	4		35		
14–16	4		35		
16					Boring Terminated

Subcontractor: Vaportech

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 12-SB6

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 23

Borehole Diameter (in.): 2-inch

ESC

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
0					Ground Surface
1	1		0		***FL- FILL*** Light Brown SILTY CLAY, coarse, medium and fine rock fragments.
2					
3	2		0		
4					
5					
6	3		0		
7					
8					
9	4		0.8		***W- Black WASTE*** Silt. Wet at 10' bgs Petrol odor from 14' to 16' bgs Stiff and damp at 14' bgs Saturated at 18'
10					
11	5		2.8		
12					
13	6		3.5		
14					
15	7		2.8		
16					
17					
18	8		--		***CL- Gray CLAY*** Soft; becoming reddish brown and stiff at 22' bgs
19					
20					

Subcontractor: Vaportech

Method: Geoprobe

Driller/Operator: Brian Novak

Boring Log: 12-SB6

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 23

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
			25		*CL- Gray CLAY*
21	9		35		Soft; becoming reddish brown and stiff at 22' bgs
22	10		17		
23					Boring Terminated
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

Boring Log: 12-SB7

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 8

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–3	1		0		*FL-Fill*
3			60		*W- Gray-Black WASTE* Brown silt; petroleum odor.
4–8	2				*CL- Brown SILTY CLAY* Coarse-medium-fine rock fragments
8					Boring Terminated

Boring Log: 12-SB7

Project: CK Witco

Project No.: 138093-03

Location: Petrolia, PA

Geologist: M.L. Yurko

Completion Date: 9/5/00

Surface Elevation (ft. MSL):

Total Depth (ft. bgs): 8

Borehole Diameter (in.): 2-inch

Depth	Sample Interval	% Recovery	PID (ppm)	Symbol	Description
					Ground Surface
0–3	1		0		*FL-Fill*
3–4			60		*W- Gray-Black WASTE* Brown silt; petroleum odor.
4–8	2				*CL- Brown SILTY CLAY* Coarse-medium-fine rock fragments
8					Boring Terminated

Subcontractor: Vaportech

Driller/Operator: Brian Novak

Method: Geoprobe

Table 1
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	56-133	20	56-133	20
1,1,1-Trichloroethane	70-130	22	70-130	24
1,1,2,2-Tetrachloroethane	70-130	20	70-130	20
1,1,2-Trichloroethane	70-130	23	70-130	23
1,1-Dichloroethane	80-113	22	44-145	41
1,1-Dichloroethene	55-142	27	43-142	27
1,1-Dichloropropene	NA	NA	NA	NA
1,2,3-Trichlorobenzene	NA	NA	NA	NA
1,2,3-Trichloropropane	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	70-130	20	70-130	20
1,2-Dibromomethane	NA	NA	NA	NA
1,2-Dichlorobenzene	70-130	20	70-130	20
1,2-Dichloropropane	70-130	20	70-130	20
1,3,5-Trimethylbenzene	NA	NA	NA	NA
1,3-Dichlorobenzene	70-130	20	70-130	20
1,3-Dichloropropane	NA	NA	NA	NA
1,4-Dichlorobenzene	70-130	20	70-130	20
2,2-Dichloropropane	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA
2-Chlorotoluene	NA	NA	NA	NA
2-Hexanone	60-130	24	NA	NA
4-Chlorotoluene	NA	NA	NA	NA
Acetone	60-134	32	40-145	37
Benzene	79-116	20	60-140	20
Bromobenzene	NA	NA	55-138	20
Bromochloromethane	70-130	20	70-130	20
Bromoform	70-130	20	70-130	23
Bromomethane	70-130	20	70-130	20
Carbon disulfide	80-116	20	36-130	36
Carbon tetrachloride	72-133	25	36-130	36
Chlorobenzene	81-115	20	49-139	22
Chloroethane	70-130	24	70-130	24
Chloroform	61-122	25	20-110	36
Chloromethane	70-130	24	52-140	20
cis-1,2-Dichloroethene	70-130	20	70-130	20
cis-1,3-Dichloropropene	80-110	20	60-134	40
Dibromochloromethane	70-130	20	70-130	20
Dichlorofluoromethane	NA	NA	70-130	20
Ethylbenzene	70-130	25	70-130	25