

Bioassays of

Air Products and Chemicals, Inc.

Santa Rosa County, Florida

No NPDES Number

Sampled 1/29/02

December 2002

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Bureau of Laboratories
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Introduction

Air Products and Chemicals, Inc., Highway 90, Santa Rosa County, Florida, tests performed on 30 January to 1 February 2002.

This facility is a chemical manufacturing plant producing agricultural, industrial, and specialty intermediate chemicals from natural gas, as well as other raw materials. The plant is divided into Area A and Area B, which form a complex of eight separate operating units. Dinitrotoluene (DNT) has previously been produced in Area B, but currently Area B is limited to fertilizer production. Dridglers Creek runs along the west side of Plant Area B, and empties into Escambia Bay (facility information provided by Victor Hultstrand, FDEP, Pensacola).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1993, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027F.

Results

The FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays on each of three samples of groundwater run-off collected from Air Products and Chemicals, Inc. property and the surrounding area. The freshwater organisms used in these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi* (Table 1). Aliquots of pH-adjusted sample were prepared for the two samples from Dridglers Creek collected at Floridatown Road and upstream of Floridatown Road, due to an initial pH measurement of 5.9 S.U. in both samples. The actual pH of the samples and the pH-adjusted aliquots increased prior to test initiation.

Ceriodaphnia dubia mortality occurred in each of the three samples, however no *C. leedsi* mortality occurred in any of the samples. In the Dridglers Creek at Floridatown Road sample, 60% mortality of *C. dubia* test organisms occurred in the 100% sample, with 55% mortality in the pH-adjusted aliquot of sample. In the Dridglers Creek upstream of Floridatown Road sample there was 20% mortality in the 100% sample, but there was 60% mortality of *C. dubia* in the pH-adjusted aliquot. In the sample collected from the APCI stormwater ditch, 30% mortality of *C. dubia* test organisms occurred.

Ammonia was detected in the bioassay sample from the APCI stormwater ditch at a concentration of 5.86 mg/L total ammonia and 0.047 mg/L unionized ammonia. Ammonia was not detected in either of the bioassay samples from Dridglers Creek. Total residual chlorine (TRC) was detected in all three bioassays; 0.05 mg/L was detected in both the Dridglers Creek samples, and 0.13 mg/L was detected in the APCI stormwater ditch sample. The concentration of residual chlorine found in all three samples is above the $\leq$ 0.01 mg/L surface water quality criteria for Class III fresh-waters (FAC 62-302.530, Criteria for Surface Water Quality Classifications). The source of TRC is not known; therefore it is possible that the detection of TRC in each sample may have been interference from an unknown constituent of the sample.

Additional samples of effluent were collected from this facility and analyzed for nutrients, metals, organic compounds, herbicides, and pesticides. The Dridglers Creek upstream of Floridatown Road chemistry sample detected cadmium at a concentration of 0.56 ug/L and copper at 5.5 ug/L. When using water hardness to determine the surface water quality criteria (FAC 62-302.530, Criteria for Surface Water Quality Classifications), both these metals are above the criteria, which is ≤ 0.1861ug/L and ≤ 1.6544 ug/L, respectively. The Dridglers Creek at Floridatown Road chemistry sample detected copper at a concentration of 4 ug/L, which is above the water quality criteria of ≤ 1.6315 ug/L as calculated by the hardness of the sample. The APCI storm water ditch chemistry sample detected cadmium at a concentration of 0.98 ug/L, which is above the ≤ 0.345 ug/L criteria standard; copper at 13 ug/L, which is above the ≤ 3.2384 ug/L criteria standard; and Zinc at 51 ug/L, which is above the ≤ 29.3486 criteria standard.

In the Dridglers Creek samples, metal toxicity most likely caused mortality in the *C. dubia* test organisms. Total residual chlorine may have attributed to the toxicity, however since *C. leedsi* have a greater sensitivity to chlorine, the 100% survival of *C. leedsi* test organisms suggests that chlorine was not the primary cause of toxicity. In the APCI storm water ditch, metal toxicity is also suspected. The concentrations of total residual chlorine and ammonia may have attributed to the *C. dubia* toxicity, however the 100% survival of *C. leedsi* in this bioassay again suggests that chlorine and ammonia were not the primary causes of toxicity.

The 30% *C. dubia* mortality observed in the APCI stormwater ditch bioassay, as opposed to the 20-80% mortality observed in the Dridglers Creek bioassays, can be explained by the concentration of dissolved and suspended solids in the samples. It might be expected that higher concentrations of contaminants would cause higher rates of mortality, however the presence of suspended and dissolved solids causes the contaminants to bind to these surfaces making them less bio-available. The APCI stormwater ditch bioassay contained 539 mg/L dissolved solids and 17 mg/L suspended solids as opposed to 82-86 mg/L dissolved solids and 6-7 mg/L suspended solids in the Dridglers Creek samples.

Conclusion

The three samples of effluent collected from this facility on January 29, 2002 were acutely toxic *C. dubia*. The cause of this toxicity is attributed to high concentrations of metals in the effluent. Total residual chlorine and total ammonia may have contributed to the toxicity, however due to 100% survival of *C. leedsi* organisms, which have a higher sensitivity to these contaminants, chlorine and ammonia are not considered the primary causes of toxicity. The mortality rates observed in the three bioassay samples are influenced not only by the level of contamination present but also by the concentrations of dissolved and suspended solids present, which can decreasing the bioavailablity of the contaminants to the test organisms.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from Dridglers Creek at Floridatown Road, Air Products and Chemicals, Inc., Highway 90, Santa Rosa County, Florida, performed from 30 Januray to 1 February 2002.

Facility:	**Air Products and Chemicals, Inc.**			Facility Type:	**Chemical**	**Analysts:**	Della Parker-Hanson
Location:	Highway 90	Contact/District:	Glenn Butts/HWR		**Manufacturer**		Joshua Ayres
County:	Santa Rosa	Test type:	static acute screen				Gary Hardie
Sample Collection Date:	1/29/2002 Time: 1250	# tests:	2	Receiving Water:	ground water		Marshall Faircloth
Test Beginning Date:	1/30/2002 Time: 1345	Chlorination Type:	non-chlorinated				
Test Ending Date:	2/1/2002 Time: 1415				**Page 1 of 3**	**Reviewer:**	David Whiting

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/20	5	5	5	8.3	-	8.3	25.3	-	23.4	7.6	-	8.1	155	210
Control B	0/20	5	5	5	-	-	8.3	-	-	23.5	-	-	8.2	-	200
Control C	0/20	5	5	5	-	-	8.3	-	-	23.6	-	-	8.1	-	200
Control D	0/20	5	5	5	-	-	8.3	-	-	24.4	-	-	8.3	-	195
100% A	20/0	5	2	2	6.4	-	7.2	24.9	-	23.7	8.6	-	8.1	110	140
100% B	20/0	5	1	1	-	-	7.1	-	-	23.8	-	-	8.1	-	130
100% C	20/0	5	0	0	-	-	7.0	-	-	23.8	-	-	8.1	-	130
100% D	20/0	5	5	5	-	-	6.9	-	-	24.5	-	-	8.1	-	125
pH 100% A[B]	20/0	5	3	3	6.6	-	7.0	24.8	-	23.8	8.6	-	8.0	115	140
pH 100% B	20/0	5	3	3	-	-	7.1	-	-	23.9	-	-	8.1	-	130
pH 100% C	20/0	5	3	2	-	-	7.1	-	-	24.0	-	-	8.0	-	135
pH 100% D	20/0	5	1	1	-	-	7.1	-	-	24.2	-	-	8.1	-	140

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24-25°C.
Incubator temperature range for the test period was 26-27°C.

[B] An aliquoit of sample was pH adjusted from 5.9 SU to ~6.2 SU using NaOH.
The pH of the sample and the pH-adjusted sample increased prior to test initiation.

Organism: ***Cyprinella leedsi*** Life stage: 12 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[C]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/500	5	5	5	8.0	8.2	8.3	24.4	24.0	24.5	7.8	7.4	6.6	245	285
Control B	0/500	5	5	5	8.0	8.3	8.4	24.2	24.0	24.0	7.8	7.4	6.7	255	295
Control C	0/500	5	5	5	8.0	8.4	8.4	24.2	24.0	23.9	7.9	7.4	7.1	255	285
Control D	0/500	5	5	5	8.0	8.4	8.4	24.2	24.0	23.8	8.0	7.4	7.2	255	285
100% A	500/0	5	5	5	6.3	7.1	7.2	24.3	24.0	23.8	8.4	7.5	7.4	125	150
100% B	500/0	5	5	5	6.3	7.1	7.3	24.3	24.1	23.9	8.4	7.5	7.4	110	130
100 % C	500/0	5	5	5	6.3	7.1	7.2	24.1	24.1	23.9	8.4	7.4	7.4	110	125
100% D	500/0	5	5	5	6.3	7.1	7.2	23.9	24.1	23.9	8.4	7.4	7.4	105	125
pH 100% A[D]	500/0	5	5	5	6.4	7.1	7.2	23.9	24.0	24.2	8.5	7.5	7.7	110	130
pH 100% B	500/0	5	5	5	6.4	7.1	7.2	24.0	24.1	23.8	8.4	7.5	7.7	110	130
pH 100% C	500/0	5	5	5	6.4	7.1	7.1	23.9	24.1	24.1	8.4	7.4	7.8	110	125
pH 100% D	500/0	5	5	5	6.4	7.1	7.1	24.0	24.1	24.1	8.4	7.5	7.8	110	130

[C] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24-25°C.
Incubator temperature range for the test period was 26-27°C.

[D] An aliquoit of sample was pH adjusted from 5.9 SU to ~6.2 SU using NaOH.
The pH of the sample and the pH-adjusted sample increased prior to test initiation.

LIMS	
Job number:	TLH-2002-01-30-15-01
sample number:	573632

Data Transcription Verification	
date:	10/31/2002
by:	Joshua Ayres
	James Daniels

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	0.05	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (fish):	<0.017	<0.017
Control water (water flea):	<0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (fish):	141	128
Control water (water flea):	78	78
100% Sample:	18	13

Continued

Table 1.(cont) Data recorded during the 48-hour acute screening bioassays of a sample of effluent from Dridglers Creek Upstream of Flordiatown Road, Air Products and Chemicals, Inc., Highway 90, Santa Rosa County, Florida, performed from 30 Januray to 1 February 2002.

Facility:	**Air Products and Chemicals, Inc.**			Facility Type:	**Chemical Manufacturer**	**Analysts:**	Della Parker-Hanson
Location:	Highway 90	Contact/District:	Glenn Butts/HWR				Joshua Ayres
County:	Santa Rosa	Test type:	static acute screen				Gary Hardie
Sample Collection Date:	1/29/2002 Time: 1200	# tests:	2	Receiving Water:	ground water		Marshall Faircloth
Test Beginning Date:	1/30/2002 Time: 1345	Chlorination Type:	non-chlorinated				
Test Ending Date:	2/1/2002 Time: 1415				**Page 2 of 3**	**Reviewer:**	David Whiting

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[A] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/20	5	5	5	8.3	-	8.2	25.3	-	23.5	7.1	-	8.1	160	210
Control B	0/20	5	5	5	-	-	8.2	-	-	23.9	-	-	8.2	-	195
Control C	0/20	5	5	5	-	-	8.2	-	-	23.9	-	-	8.1	-	200
Control D	0/20	5	5	5	-	-	8.2	-	-	24.1	-	-	8.1	-	200
100% A	20/0	5	3	3	6.1	-	7.5	25.0	-	23.6	7.9	-	8.1	125	170
100% B	20/0	5	5	5	-	-	7.5	-	-	23.6	-	-	8.1	-	155
100% C	20/0	5	5	5	-	-	7.5	-	-	23.6	-	-	8.1	-	150
100% D	20/0	5	4	3	-	-	7.5	-	-	24.1	-	-	8.1	-	145
pH 100% A[B]	20/0	5	2	2	6.4	-	7.5	24.2	-	23.7	7.9	-	8.0	130	180
pH 100% B	20/0	5	1	1	-	-	7.5	-	-	23.6	-	-	8.0	-	180
pH 100% C	20/0	5	3	3	-	-	7.5	-	-	24.1	-	-	7.9	-	165
pH 100% D	20/0	5	2	2	-	-	7.5	-	-	24.2	-	-	7.9	-	155

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24-25°C.
Incubator temperature range for the test period was 26-27°C.

[B] An aliquoit of sample was pH adjusted from 5.9 SU to ~6.2 SU using NaOH.
The pH of the sample and the pH-adjusted sample increased prior to test initiation.

Organism: ***Cyprinella leedsi*** Life stage: 12 days

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[C] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/500	5	5	5	7.9	8.2	8.2	24.0	24.1	24.2	8.1	7.6	7.2	255	275
Control B	0/500	5	5	5	7.9	8.3	8.2	24.1	24.1	24.0	8.1	7.5	7.2	255	270
Control C	0/500	5	5	5	7.9	8.4	8.3	24.1	24.1	24.0	8.1	7.5	7.2	255	290
Control D	0/500	5	5	5	7.9	8.4	8.3	24.1	24.1	23.9	8.2	7.5	7.3	255	290
100% A	500/0	5	5	5	6.1	7.1	7.5	24.1	24.2	24.1	7.4	7.5	7.5	120	140
100% B	500/0	5	5	5	6.1	7.1	7.5	24.1	24.2	24.1	7.4	7.4	7.4	120	140
100 % C	500/0	5	5	5	6.1	7.1	7.4	24.0	24.2	24.1	7.4	7.4	7.3	120	140
100% D	500/0	5	5	5	6.1	7.1	7.3	23.9	24.2	24.2	7.5	7.4	7.2	120	145
pH 100% A[D]	500/0	5	5	5	6.3	7.1	7.4	23.9	24.1	24.2	7.5	7.4	7.3	130	145
pH 100% B	500/0	5	5	5	6.3	7.1	7.4	23.9	24.2	24.2	7.5	7.4	7.3	130	145
pH 100% C	500/0	5	5	5	6.3	7.2	7.3	23.9	24.2	24.1	7.5	7.3	7.4	130	150
pH 100% D	500/0	5	5	5	6.3	7.2	7.3	24.0	24.2	24.2	7.5	7.3	7.5	130	155

[C] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24-25°C.
Incubator temperature range for the test period was 26-27°C.

[D] An aliquoit of sample was pH adjusted from 5.9 SU to ~6.2 SU using NaOH.
The pH of the sample and the pH-adjusted sample increased prior to test initiation.

LIMS	
Job number:	TLH-2002-01-30-15-02
sample number:	573633

Data Transcription Verification	
date:	10/31/2002
by:	Joshua Ayres
	James Daniels

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	0.05	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (fish):	<0.017	<0.017
Control water (water flea):	<0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (fish):	141	128
Control water (water flea):	78	78
100% Sample:	18	10

Continued

Table 1. (Concluded) Data recorded during the 48-hour acute screening bioassays of a sample of effluent from APCI stormwater ditch, Air Products and Chemicals, Inc., Highway 90, Santa Rosa County, Florida, performed from 30 Januray to 1 February 2002.

Facility:	**Air Products and Chemicals, Inc.**			Facility Type:	**Chemical**	**Analysts:**	Della Parker-Hanson
Location:	Highway 90	Contact/District:	Glenn Butts/HWR		**Manufacturer**		Joshua Ayres
County:	Santa Rosa	Test type:	static acute screen				Gary Hardie
Sample Collection Date:	1/29/2002 Time: 1025	# tests:	2	Receiving Water:	groundwater		Marshall Faircloth
Test Beginning Date:	1/30/2002 Time: 1345	Chlorination Type:	non-chlorinated				
Test Ending Date:	2/1/2002 Time: 1415				**Page 3 of 3**	**Reviewer:**	David Whiting

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/20	5	5	5	8.4	-	8.1	25.3	-	24.6	7.8	-	7.8	155	185
Control B	0/20	5	5	5	-	-	8.2	-	-	24.3	-	-	7.8	-	195
Control C	0/20	5	5	5	-	-	8.2	-	-	24.3	-	-	7.8	-	195
Control D	0/20	5	5	5	-	-	8.2	-	-	24.4	-	-	7.9	-	190
100% A	20/0	5	3	3	7.1	-	8.2	24.1	-	24.8	6.1	-	7.6	460	530
100% B	20/0	5	3	3	-	-	8.2	-	-	24.7	-	-	7.5	-	590
100% C	20/0	5	5	4	-	-	8.2	-	-	24.4	-	-	7.6	-	595
100% D	20/0	5	5	4	-	-	8.2	-	-	24.3	-	-	7.6	-	595

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24-25°C.
Incubator temperature range for the test period was 26-27°C.

Organism: ***Cyprinella leedsi*** Life stage: 12 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/500	5	5	5	7.9	8.4	8.3	24.1	24.6	24.1	8.2	7.5	7.1	250	280
Control B	0/500	5	5	5	7.9	8.4	8.3	24.3	24.4	23.9	8.2	7.3	7.1	260	280
Control C	0/500	5	5	5	7.9	8.4	8.3	24.3	24.2	23.9	8.2	7.2	7.2	250	290
Control D	0/500	5	5	5	7.9	8.4	8.3	24.3	24.1	24.0	8.2	7.2	7.3	255	280
100% A	500/0	5	5	5	7.3	7.9	7.9	24.9	24.4	24.0	6.0	6.8	6.0	520	570
100% B	500/0	5	5	5	7.3	7.9	7.9	25.0	24.3	24.0	6.0	6.8	6.0	540	570
100 % C	500/0	5	5	5	7.3	7.9	7.9	25.0	24.2	24.2	6.0	6.9	5.5	540	565
100% D	500/0	5	5	5	7.3	7.9	7.8	25.0	24.2	24.1	6.0	7.0	5.4	545	560

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24-25°C.
Incubator temperature range for the test period was 26-27°C.

LIMS	
Job number:	TLH-2002-01-30-15-03
sample number:	573634

Data Transcription Verification	
date:	10/31/2002
by:	Joshua Ayres
	James Daniels

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	0.13	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (fish):	<0.017	<0.017
Control water (water flea):	<0.017	<0.017
100% Sample:	5.86	0.047

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (fish):	141	128
Control water (water flea):	78	78
100% Sample:	118	24

Table 2. Results of chemical analyses on the effluent from Air Products and Chemicals, Inc., Dridglers Creek at Floridatown Road, sampled on January 29, 2002.

Metals			
Aluminum	808	ug/L	
Barium	22.3	ug/L	
Calcium	1.8	mg/L	
Chromium	1.1	ug/L	I
Copper	4	ug/L	I
Iron	627	ug/L	
Magnesium	1.3	mg/L	
Manganese	59.2	ug/L	
Potassium	0.48	mg/L	
Sodium	17	mg/L	
Vanadium	2	ug/L	I
Zinc	19	ug/L	
Pesticides and Herbicides			
None detected			
Nutrients			
Ammonia-N	0.032	mg N/L	
Chloride	13	mg Cl/L	
Nitrates and Nitrites	1.4	mg N/L	
Total Kjeldahl Nitrogen	0.89	mg N/L	
Total Phosphorous	0.047	mg P/L	
Total Organic Carbon	17	mg C/L	
Sulfate	14	mg SO4/L	
Base, Neutral, & Acid Extractable Organics			
2,4-Dinitrotoluene	1.1	ug/L	I
2,6-Dinitrotoluene	19	ug/L	
Total Solids			
Total Dissolved Solids	82	mg/L	
Total Suspended Solids	7	mg/L	I

[I] The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Table 3. Results of chemical analyses on the effluent from Air Products and Chemicals, Inc., Dridglers Creek upstream of Floridatown Road, sampled on January 29, 2002.

Metals

Aluminum	2,520	ug/L	
Barium	35.1	ug/L	
Beryllium	0.16	ug/L	I
Cadmium	0.56	ug/L	I
Calcium	1.7	mg/L	
Chromium	3.5	ug/L	I
Copper	5.5	ug/L	I
Iron	1,680	ug/L	
Magnesium	1.4	mg/L	
Manganese	65.1	ug/L	
Nickel	2.7	ug/L	I
Potassium	0.64	mg/L	
Sodium	20.2	mg/L	
Vanadium	3.5	ug/L	I
Zinc	58	ug/L	

Pesticides and Herbicides

None detected

Nutrients

Ammonia-N	0.051	mg N/L	
Chloride	13	mg Cl/L	
Nitrates and Nitrites	2	mg N/L	
Sulfate	16	mg SO4/L	
Total Kjeldahl Nitrogen	1	mg N/L	
Total Organic Carbon	15	mg C/L	
Total Phosphorous	0.036	mg P/L	I

Base, Neutral, & Acid Extractable Organics

2,4-Dinitrotoluene	7.1	ug/L	
2,6-Dinitrotoluene	82	ug/L	
2-Methyl-4,6-dinitrophenol	5	ug/L	I

Table 3 continued.

Total Solids

Total Dissolved Solids	86	mg/L	
Total Suspended Solids	6	mg/L	I

[I] The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Table 4. Results of chemical analyses on the effluent from Air Products and Chemicals, Inc., APCI stormwater ditch sampled on January 29, 2002.

Metals

Aluminum	5,260	ug/L	
Barium	23.9	ug/L	
Beryllium	0.16	ug/L	I
Cadmium	0.98	ug/L	I
Calcium	5.5	mg/L	
Chromium	52.5	ug/L	
Copper	13	ug/L	I
Iron	1,750	ug/L	
Magnesium	2	mg/L	
Manganese	46.9	ug/L	
Nickel	9.2	ug/L	
Potassium	2.5	mg/L	
Sodium	107	mg/L	
Vanadium	20.7	ug/L	
Zinc	51	ug/L	

Pesticides and Herbicides

None detected

Nutrients

Ammonia-N	6	mg N/L
Chloride	41	mg Cl/L
Nitrates and Nitrites	2.6	mg N/L
Sulfate	61	mg SO4/L
Total Kjeldahl Nitrogen	10	mg N/L
Total Organic Carbon	36	mg C/L
Total Phosphorous	0.6	mg P/L

Base, Neutral, & Acid Extractable Organics

2,4-Dinitrotoluene	1	ug/L	I
2,6-Dinitrotoluene	19	ug/L	

Total Solids

Total Dissolved Solids	539	mg/L
Total Suspended Solids	17	mg/L

[I] The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.