

Bioassays of

Murphy Oil USA, Inc.

Tampa, Hillsborough County, Florida

NPDES #FL0032425

Sampled 12/15/97

January 1999

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

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Murphy Oil USA, Inc.

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NPDES #FL0032425

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Bureau of Laboratories
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Introduction

Murphy Oil USA, Inc., 1306 Ingram Avenue, Tampa, Hillsborough County, Florida, NPDES #FL0032425, tests performed on 16 to 18 December, 1997.

This facility is a bulk petroleum terminal which receives and stores petroleum products in bulk storage tanks before loading them in trucks for retail distribution. Contaminated wastewater is generated from storage tanks, product transfer areas, loading and unloading areas, boiler blowdown, and ground water clean-up processes. Contaminated wastewater is either removed and treated by a private company or treated on site. Wastewater treated on-site is disposed of by on-site land application.

Effluent composed of "non-contaminated" wastewater, stormwater, and hydrostatic test water is not treated prior to discharge to a ditch to Seddon Channel to Hillsborough Bay. Untreated effluent is released through five separate outfalls, but only NPDES outfall 005 was sampled for toxicity testing. The volume of the discharge is rainfall dependent (facility summary provided by Paula Noblitt and Andrea Grainger, FDEP, Tampa).

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 and Discussion

The FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays on a sample of effluent from this facility. The species used for these tests were the waterflea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not show toxicity (Table 1).

The total residual chlorine (TRC) concentration of the sample was <0.03 mg/L in the laboratory. TRC was not measured in the field. The total ammonia and unionized ammonia concentrations were 0.285 mg/L and 0.017 mg/L, respectively. Further chemical analyses were performed on the sample and several metals and an organic compound were identified (Table 2). The copper concentration (10 µg/L) exceeded the State of Florida Class III marine surface water criteria for copper (≤ 2.9 µg/L) (FAC 62-302.530).

Conclusion

The sample of effluent collected from this facility on December 15, 1997, did not show toxicity, but did exceed State of Florida Class III marine surface water criteria for copper.

Table 1. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of effluent from the Murphy Oil USA, Inc., bulk petroleum facility, Hillsborough County, Florida, NPDES# FL0032425, performed on 16 to 18 December, 1997.

Facility:	**Murphy Oil USA, Inc.**			**NPDES #**	**FL0032425**	Facility Type:	bulk petroleum
Location:	1306 Ingram Ave, Tampa			Contact/District:	Andrea Grainger/ Southwest		storage station
County:	Hillsborough			Test type:	static acute screen		
Sample Collection Date:	12/15/97	Time:	1010	# tests:	2	Receiving Water:	Hillsborough Bay via
Test Beginning Date:	12/16/97	Time:	1425	Chlorination Type:	Non-chlorinated		Seddon Channel
Test Ending Date:	12/18/97	Time:	1430				Page 1 of 1

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity 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	24 hour
Control A	0/20	5	5	5	8.2	-	8.2	23.3	-	23.3	7.9	-	6.4	185	195
Control B	0/20	5	5	5	-	-	8.3	-	-	23.3	-	-	6.4	-	190
Control C	0/20	5	5	5	-	-	8.3	-	-	23.3	-	-	6.4	-	190
Control D	0/20	5	5	5	-	-	8.3	-	-	23.3	-	-	6.5	-	205
100% A	20/0	5	5	5	8.1	-	8.3	23.3	-	23.4	7.8	-	6.5	160	175
100% B	20/0	5	5	5	-	-	8.3	-	-	23.4	-	-	6.5	-	175
100% C	20/0	5	5	5	-	-	8.2	-	-	23.4	-	-	6.4	-	175
100% D	20/0	5	5	5	-	-	8.2	-	-	23.3	-	-	6.5	-	195

[A] Temperature of test incubator # 1 and test room were continuously recorded on strip chart recorders.
Incubator temperature range for the test period was 23.9-25.0°C.
Test room temperature range for the test period was 24.0-25.0°C.

Organism: ***Cyprinella leedsi*** Age: 12 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity 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	7.8	8.3	8.5	23.7	25.2	24.4	8.0	7.8	6.2	250	265
Control B	0/500	5	5	5	7.8	8.3	8.5	23.8	24.3	24.1	8.0	7.9	6.3	250	260
Control C	0/500	5	5	5	7.8	8.4	8.5	23.7	26.4	24.5	8.0	7.8	6.3	250	280
Control D	0/500	5	5	5	7.8	8.4	8.5	23.8	26.0	24.4	8.0	7.8	6.2	250	270
100% A	500/0	5	5	5	8.0	8.2	8.1	23.8	24.6	24.4	8.0	7.5	6.2	160	175
100% B	500/0	5	5	5	8.0	8.1	8.1	23.8	26.7	23.8	8.0	7.4	6.3	160	175
100% C	500/0	5	4	4	8.0	8.0	8.1	23.8	25.8	24.1	7.9	7.5	6.3	160	170
100% D	500/0	5	5	5	8.0	8.0	8.1	23.9	25.6	24.0	7.9	7.5	6.2	160	170

[B] Temperature of test incubator # 3 and test room were continuously recorded on strip chart recorders.
Incubator temperature range for the test period was 25.5-27.0°C.
Test room temperature range for the test period was 24.0-25.0°C.

Total Residual CL2	mg/L	Method
Field:	not measured	
Lab:	0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	< 0.017
Control Water (20% DMW) (cladocerans):	< 0.017	< 0.017
100% Sample:	0.285	0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	130
Control Water (20% DMW) (cladocerans):	67	82
100% Sample:	52	66

Salinity	(ppt)
Control Water (fish):	0
Control Water (20% DMW) (cladocerans):	0
100% Sample:	0

Salinity is based on conductivity and temperature measurements.

Table 2. Results of chemical analyses on the effluent from the Murphy Oil USA, Inc., facility sampled on December 15, 1997.

Metals

Aluminum	40	µg/L[I]
Cadmium	0.1	µg/L[I]
Calcium	20.7	mg/L[A]
Copper	10	µg/L[A]
Iron	80	µg/L[J]
Lead	3.87	µg/L[A]
Magnesium	2.40	mg/L[A]
Zinc	40	µg/L[A]

Base, Neutral, & Acid Extractable Organics

Phenol	5.4	µg/L

Pesticides

None Detected

Oil and Grease

Oil and Grease	5	mg/L[K]

A Value reported is the mean of two or more determinations.

I Value reported is less than the minimum quantitation limit and greater than or equal to the minimum detection limit.

J Estimated Value.

K Actual value is known to be less than value given.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Murphy Oil
County: Hillsborough
Contact / District: Andrea Grainger / Southwest
NPDES Permit #: FL00 32425
LIMS Sample #: 204075 LIMS Job #: 97-DEC-16-17
sample log: 12/15/97 ow

Sample Collection: Date 12/15/97 Time 1010
Test Beginning: Date 12/16/97 Time 1425
Test Ending: Date 12-18-97 Time 1430
Organism Batch #: 49 Diluent Batch #: 56
Organism Age: <24 hr
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24.0 - 25.0 °C
incubator 23.9 - 25.0 °C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	24.1 @ 24.2	8.3 @ 24.6 °C	103.9 @ 103.6 986 @ 1005 @ 24.8 °C 9850 @ 10057
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.1 @ 21.1	8.2 @ 25.1 °C	1021 @ 1026 979 @ 1005 @ 24.7 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	21.4 @ 21.4	8.3 @ 25.0 °C	1032 @ 1036 986 @ 1005 @ 24.6 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) (µmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) (µmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) (µmhos/cm) 48 h
Ctr	A	5	5	5	8.2		8.2	23.3		23.3	7.9		6.4	185		195
Ctr	B	5	5	5			8.3			23.3			6.4			190
Ctr	C	5	5	5			8.3			23.3			6.4			190
Ctr	D	5	5	5			8.3			23.3			6.5			205
100%	A	5	5	5	8.1		8.3	23.3		23.4	7.8		6.5	160		175
100%	B	5	5	5			8.3			23.4			6.5			175
100%	C	5	5	5			8.2			23.4			6.4			175
100%	D	5	5	5			8.2			23.5			6.5			195
Measured/Loaded by		MF	MF	MF	JC		KJ	JC		KJ	JC		KJ	JC		KJ
Recorded by		KJ	MF	MF	OW		JC	OW		JC	OW		JC	OW		JC

Investigators' Signatures

John Carol Jr
Marshall Faircloth
Ken Johnson

Water Quality Parameters (verified by MF)	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L)			Not measured		
Lab Total Residual Cl2 (mg/L)	<0.03	<0.03	0.03	DR-100	MF/JC
Alkalinity (mg/L as $CaCO_3$)		67	52	Hach	KJ
Hardness (mg/L as $CaCO_3$)		82	66	Hach	KJ
Total ammonia (mg/L as N)		<0.017	0.285	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope -55.6 Ammonia Blank <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

reviewer

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Murphy 0:1
County: Hillsborough
Contact / District: Andrea Grainger / Southwest
NPDES Permit #: FL00 32425
LIMS Sample #: 204025 LIMS Job #: 97-DEC-16-17
sample log: 2/24/98 ow

Sample Collection: Date 12/15/97 Time 1010
Test Beginning: Date 12/16/97 Time 1540
Test Ending: Date 12-18-97 Time 1530
Organism Batch #: 96 Diluent Batch #: Well
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Temperature range: room 24.0-25.0°C
incubator 25.5-27.0°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	24.1 @ 24.2	8.3 @ 24.6 °C	103.9 @ 103.6
	9.0 @ 9.0			986 @ 1005 @ 24.8 °C (9850 @ 10057)
24 hr	7.0 @ 7.0	21.1 @ 21.1	8.2 @ 25.1 °C	102.6 @ 103.6
	9.0 @ 9.0			979 @ 1005 @ 24.7 °C
48 hr	7.0 @ 7.0	24.4 @ 24.4	8.3 @ 25.0 °C	1032 @ 103.6
	9.0 @ 9.0			986 @ 1005 @ 24.6 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctr A	F17	5	5	5	7.8	8.3	8.5	23.7	24.1 A	24.4	8.0	8.1 A	6.2	250	260	265
Ctr B	F14	5	5	5	7.8	8.3	8.5	23.8	23.9	24.1	8.0	8.1	6.3	250	260	260
Ctr C	F15	5	5	5	7.8	8.4	8.5	23.7	24.0	24.5	8.0	8.0	6.3	250	275	280
Ctr D	F16	5	5	5	7.8	8.4	8.5	23.8	24.7	24.4	8.0	8.0	6.2	250	270	270
100% A	F17	5	5	5	8.0	8.2	8.1	23.8	25.1	24.4	8.0	7.8	6.2	160	165	175
100% B	F18	5	5	5	8.0	8.1	8.1	23.8	25.1	23.8	8.0	7.8	6.3	160	180	175
100% C	F19	5	4	4	8.0	8.0	8.1	23.8	24.2	24.1	7.9	7.6	6.3	160	170	170
100% D	F20	5	5	5	8.0	8.0	8.1	23.9	25.9	24.0	7.9	7.5	6.2	160	170	170
									25.2			7.8				
									24.3			7.9				
									26.4			7.8				
									26.0			7.8				
									24.6			7.5				
									26.7			7.4				
									25.8			7.5				
									25.6			7.5				
								A. Recorded incorrect test. Correct readings are below incorrect readings mf 12/11/97								
Measured/Loaded by:		OW	MF	KS	DW	JC	KJ	DW	JC	KJ	DW	JC	KJ	DW	JC	KJ
Recorded by:		JC	MF	KS	JC	MF	JC	JC	MF	JC	JC	MF	JC	JC	MF	JC

Investigators' Signatures

John Couch Jr.
Marshall Faircloth
Ken Johnson

reviewer

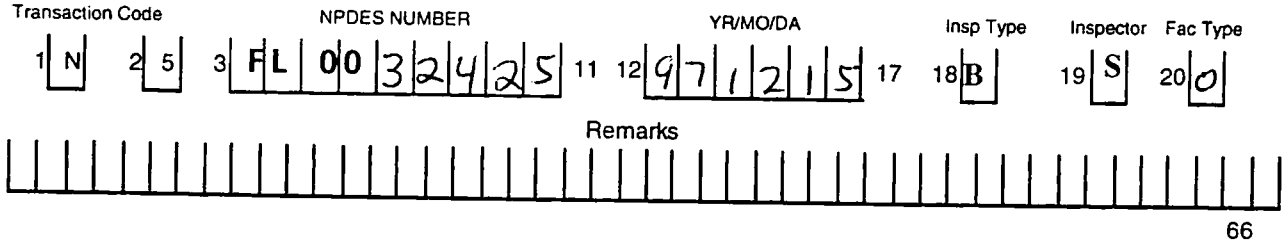
form updated 4/01/96

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample (verified by MF)	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	<0.03		0.03	DR-100	MF/JC
Alkalinity (mg/L as $CaCO_3$):	120		52	Hach	KJ
Hardness (mg/L as $CaCO_3$):	130		66	Hach	KJ
Total ammonia (mg/L as N):	<0.017		0.285	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -55.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Murphy Oil USA, Inc., effluent sampled on December 15, 1997, NPDES #FL0032425.

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)



The Priority Pollutants Analysis for the Bioassay of the Murphy Oil USA, Inc., effluent sampled on December 15, 1997, NPDES #FL0032425.

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

