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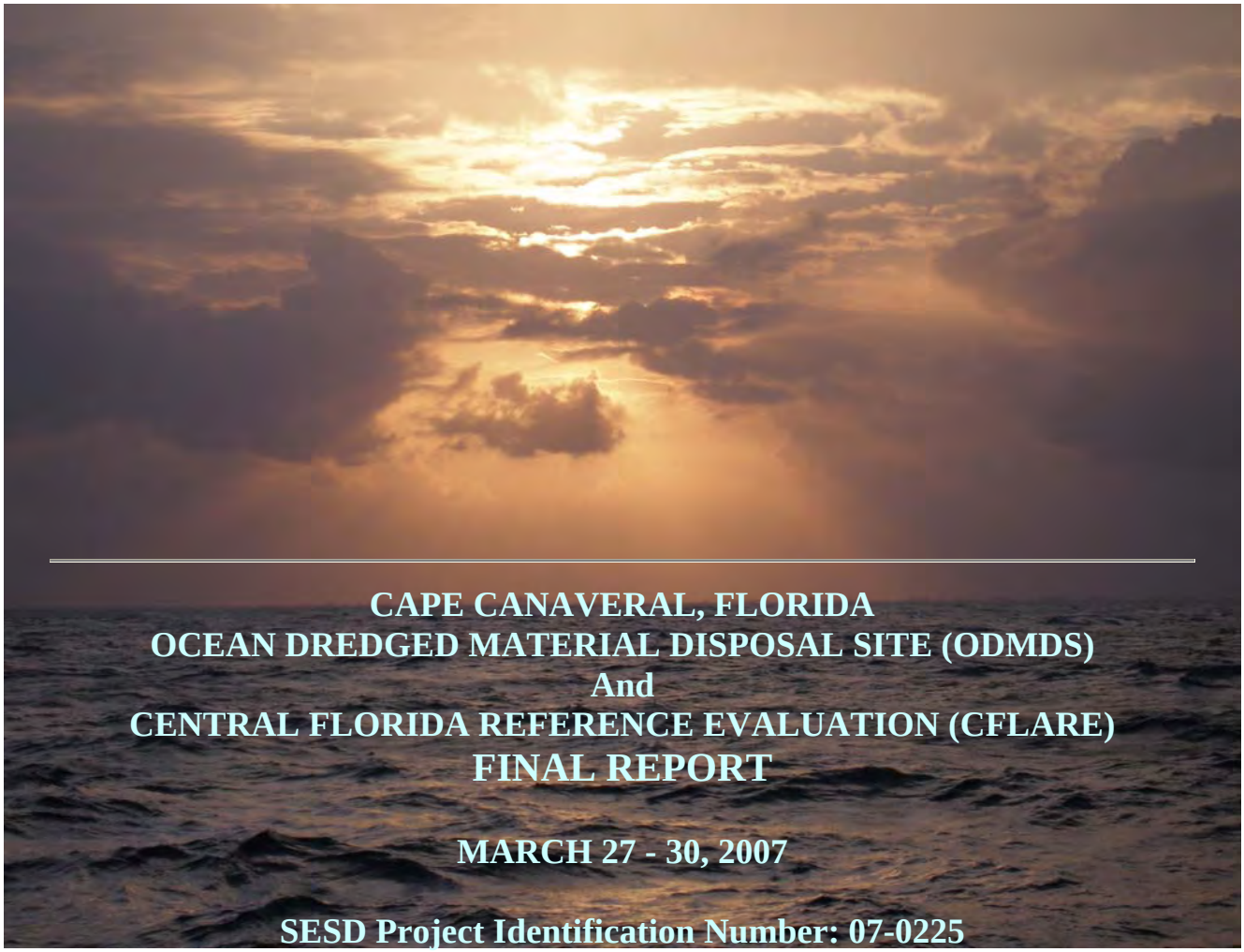

# CAPE CANAVERAL, FLORIDA
# OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)
# And
# CENTRAL FLORIDA REFERENCE EVALUATION (CFLARE)
# FINAL REPORT

**MARCH 27 - 30, 2007**

**SESD Project Identification Number: 07-0225**

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## Title and Approval Sheet

Title: **Cape Canaveral Ocean Dredged Material Disposal Site (ODMDS) And Central Florida Reference Evaluation (CFLARE) Report**

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## 1.0 INTRODUCTION

At the request of the US-EPA R4, Wetlands and Marine Regulatory Section (WMRS), the R4 Science and Ecosystem Support Division (SESD), Ecological Assessment Branch (EAB), in collaboration with R4 WMRS personnel conducted a status and trends study of the Cape Canaveral Ocean Dredged Material Disposal Site (ODMDS) in order to characterize the chemical, physical and biological characteristics within and surrounding the disposal site.

In addition to the Canaveral ODMDS status and trends survey, the Central Florida Reference Evaluation (CFLARE) survey was conducted during the same survey. The purpose of the CFLARE survey was to collect tissue samples of bivalves and polychaetes in the proximity of the Canaveral ODMDS, the Ft. Pierce ODMDS and at one location in between the two sites, in order to determine background levels of chemicals of concern.

## 2.0 BACKGROUND INFORMATION

### 2.1 Cape Canaveral ODMDS Status and Trends

EPA designated the Canaveral ODMDS in 1991. The ODMDS is used for the disposal of new work and maintenance material from the Canaveral Harbor Civil Works Navigation Project, the U.S. Navy Trident Submarine Facilities and the Canaveral Port Authority berthing areas. A Site Management and Monitoring Plan was developed for the site at designation and reviewed and revised in 2001. The SMMP includes a long term monitoring plan. A component of all EPA Region 4 monitoring strategies is the routine (approximately 10 year) assessment of the status and trends at the ODMDS. This includes monitoring for any changes in the physical, chemical and biological characteristics of the seafloor in and around the ODMDS as well as any changes in the properties of the water column. The last status and trends survey at the Canaveral ODMDS was completed in 1990. Continental Shelf Associates conducted a baseline survey in 1986.

### 2.2 Central Florida Reference Evaluation (CFLARE)

Under Sections 102 & 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA), the EPA and the U.S. Corps of Engineers (USACE) have developed a guidance document, the *Green Book*, for the evaluation of dredged material proposed for ocean disposal. One section of the *Green Book* is pertinent to this study:

> Factor 8 in assessing bioaccumulation by benthos (Section 6.3): "Magnitude by which contaminants whose bioaccumulation from the dredged material exceeds that from the reference material also exceed the concentrations found in comparable species living in the vicinity of the proposed disposal site."

Contaminant concentrations in comparable species living in the vicinity of the regional ODMDSs need to be determined in order to address factor 8 referenced above. Existing databases of tissue concentrations do not provide adequate geographic scope to cover the large number of contaminants of concern near the vicinity of the regional ODMDSs. EPA Region 4 has designed a number of regional studies (e.g. GOMRE- T, SABRE-T) to deal with these issues.

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## 3.0 OBJECTIVES

### 3.1 Canaveral ODMDS Status and Trends

The objective of the Canaveral ODMDS Status and Trends project was to characterize the grain size, chemistry and biology of the benthos within and outside of the Canaveral ODMDS, as well as identification of any anomalies which may be present within the water column. Over time, the individual surveys will allow for observation of status and trends.

### 3.2 Central Florida Reference Evaluation (CFLARE)

The C-FLARE project is part of ongoing effort by Region 4 EPA to develop a database of background tissue values in polychaetes and bivalves within Southeastern coastal waters.

## 4.0 SURVEY/SAMPLING METHODOLOGIES

The Cape Canaveral ODMDS and CFLARE projects were essentially two separate projects that were completed sequentially on this survey. Because Cape Canaveral ODMDS was a smaller more defined sampling area (Figure 1), this portion of the survey was completed first. For the Canaveral ODMDS effort, sampling personnel were divided into two teams; a dive team to collect sediment chemistry samples and a deck team to collect benthic macroinvertebrate samples. Due to limited holding times for water samples, the water quality samples for Cape Canaveral were collected at the very end of the survey after the CFLARE project.

### 4.1 Station Naming Convention and Locations

#### 4.1.1 Cape Canaveral ODMDS

Twelve sampling locations were established for the Cape Canaveral ODMDS survey. The naming convention consisted of sequential station numbers, i.e., CC01-CC12, followed by a two digit year (07), followed by the media, i.e., Sediment (SD), Surface Water (SW) or Macroinvertebrates (MI). For surface water samples, an additional letter was added, (S, M and B for Surface, Mid Depth and Bottom respectively) indicating the depth that the sample was taken. For example, station 4 would be called CC04-07 and the bottom water sample would be CC04-07-SWB.

For simplification purposes in this report, stations will be referred to as CC1...CC12.

Station locations CC1-CC12 were established based upon actual dredged material dump locations, as well as previous study sampling locations in an effort to target areas of dredged material disposal as well as ambient background within and surrounding the disposal area (Figure 1).

Actual sampling station locations were determined by Differential Global Positioning System (DGPS) on board the OSV BOLD and the Ship's small boats. Samples were collected



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within a 100 meter radius of the Ship's bridge GPS location for the listed station coordinates. A GPS unit was installed on the stern of the Ship in order to determine, as accurately as possible the exact location where a sample was collected. Latitude and longitude for the sample location obtained from the stern mounted GPS aboard the Ship was relayed to the dive boat. This latitude and longitude was then utilized as the location for the sediment chemistry sampling conducted by the divers.

### 4.1.2 CFLARE

Three sampling areas were selected for CFLARE. The naming convention for CFLARE was CF-01...03. Samples were distinguished as either bivalve (BI) or polychaete (Poly)

For simplification purposes in this report, stations will be referred to as CF1…CF3.

These three locations were selected in an attempt to collect background tissue samples for the Cape Canaveral ODMDS, the Ft. Pierce ODMDS and at one point in between. Multiple collection tows were required in order to collect enough tissue sample for analysis (Table 3, Figures 2-5). Samples were a composite of specimens collected from the multiple tows at each area. Transects were given a sequential alphabetic designation as well as a "B" for begin and an "E" for end.

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**Figure 1**

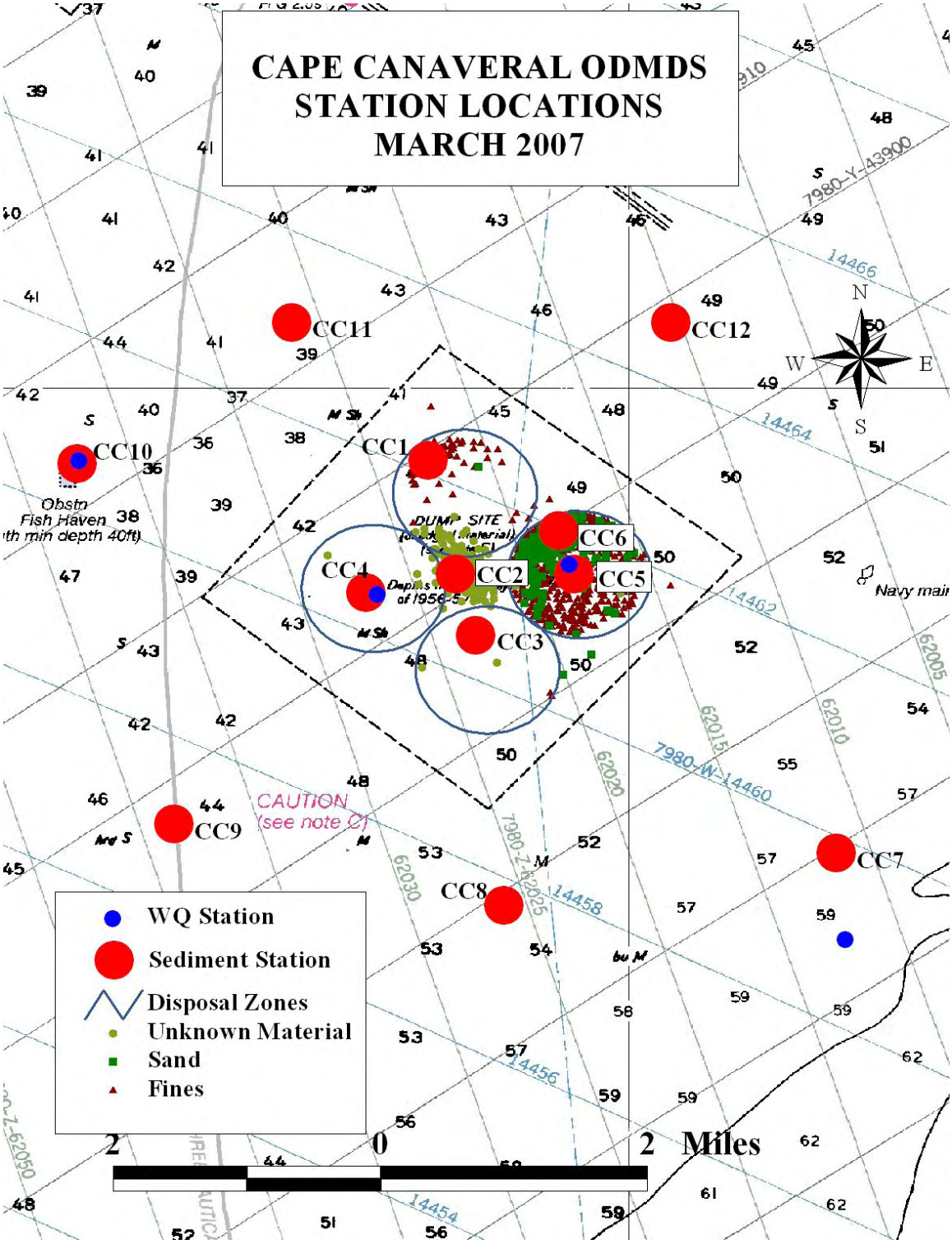


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**Figure 2**

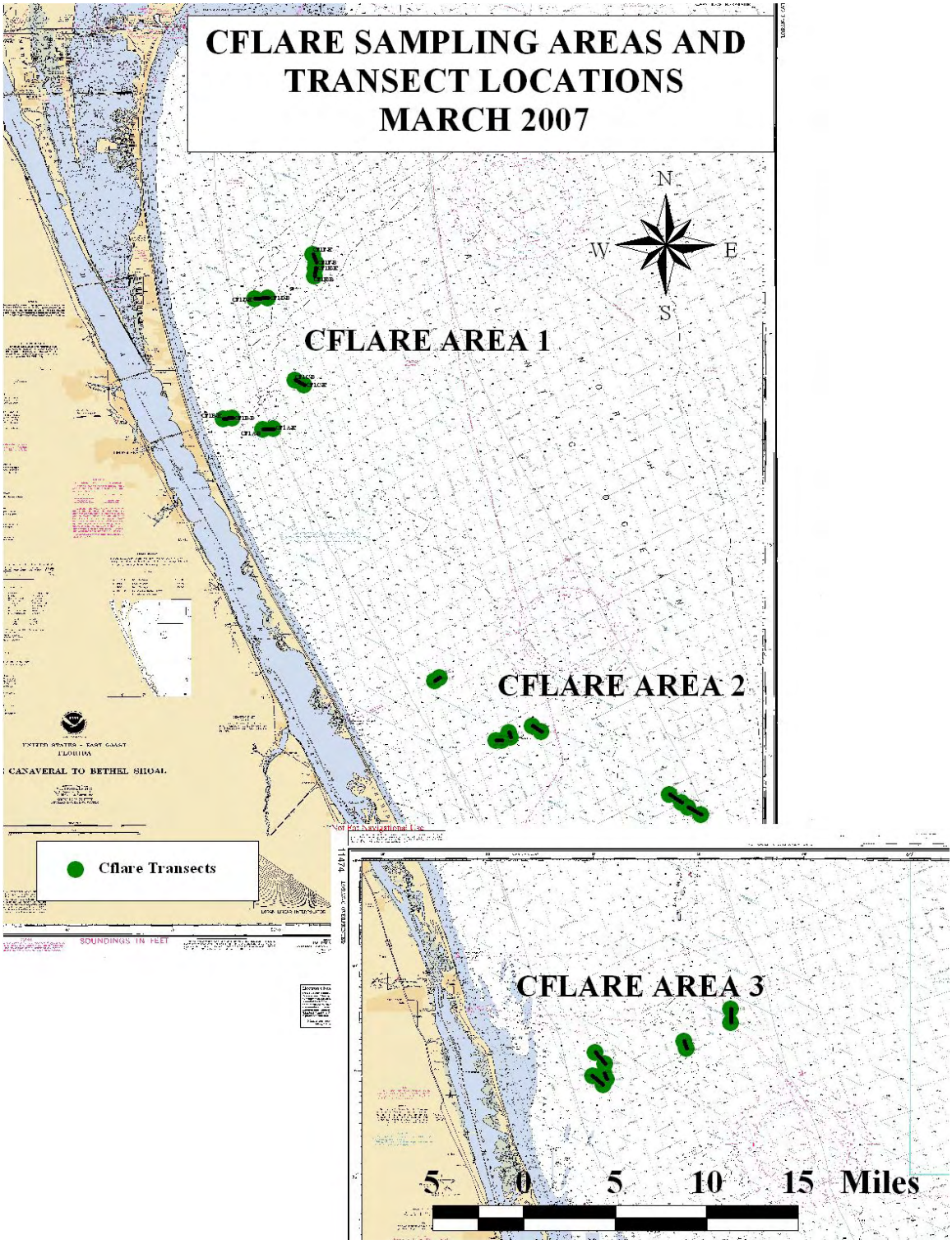


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**Figure 3**

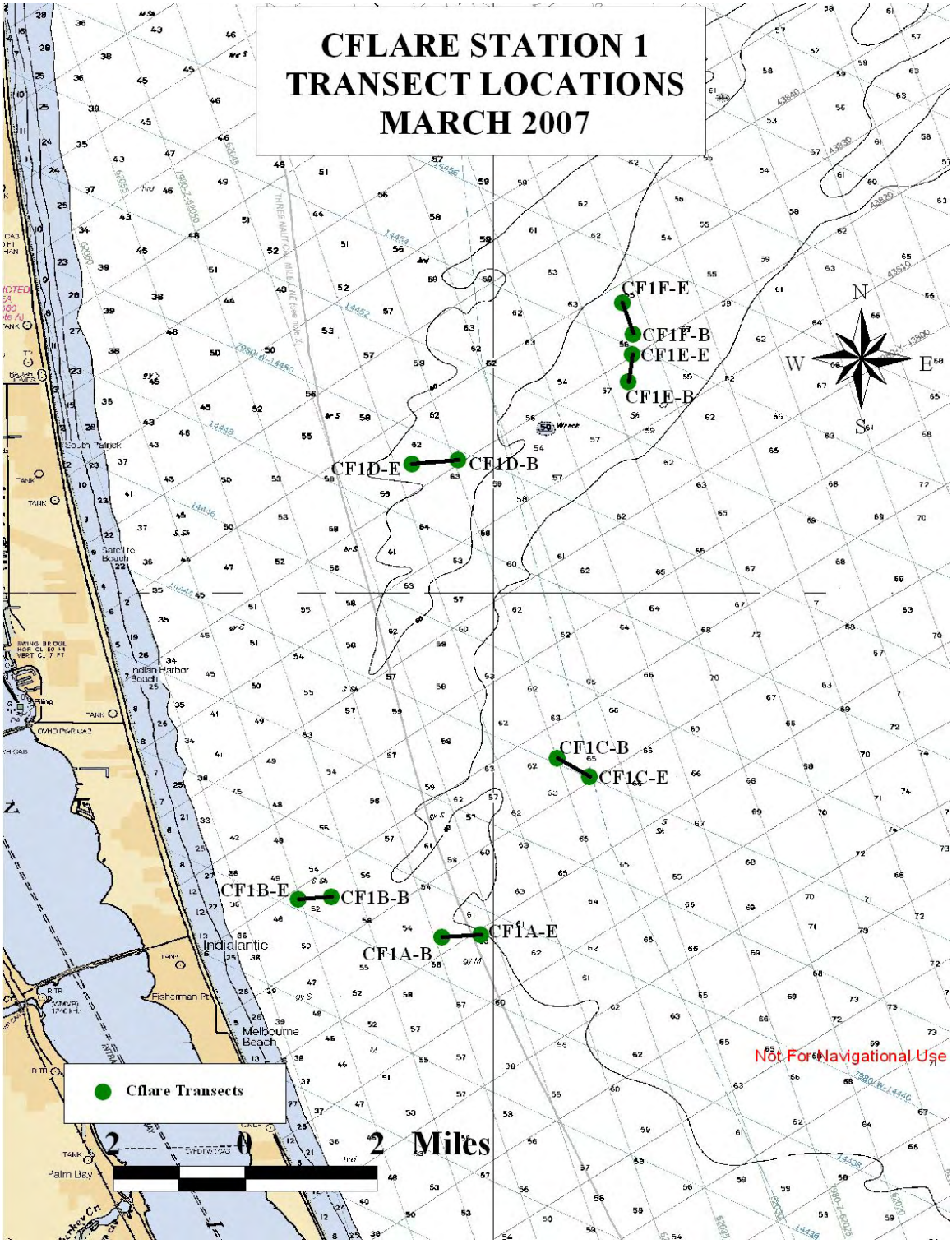


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**Figure 4**

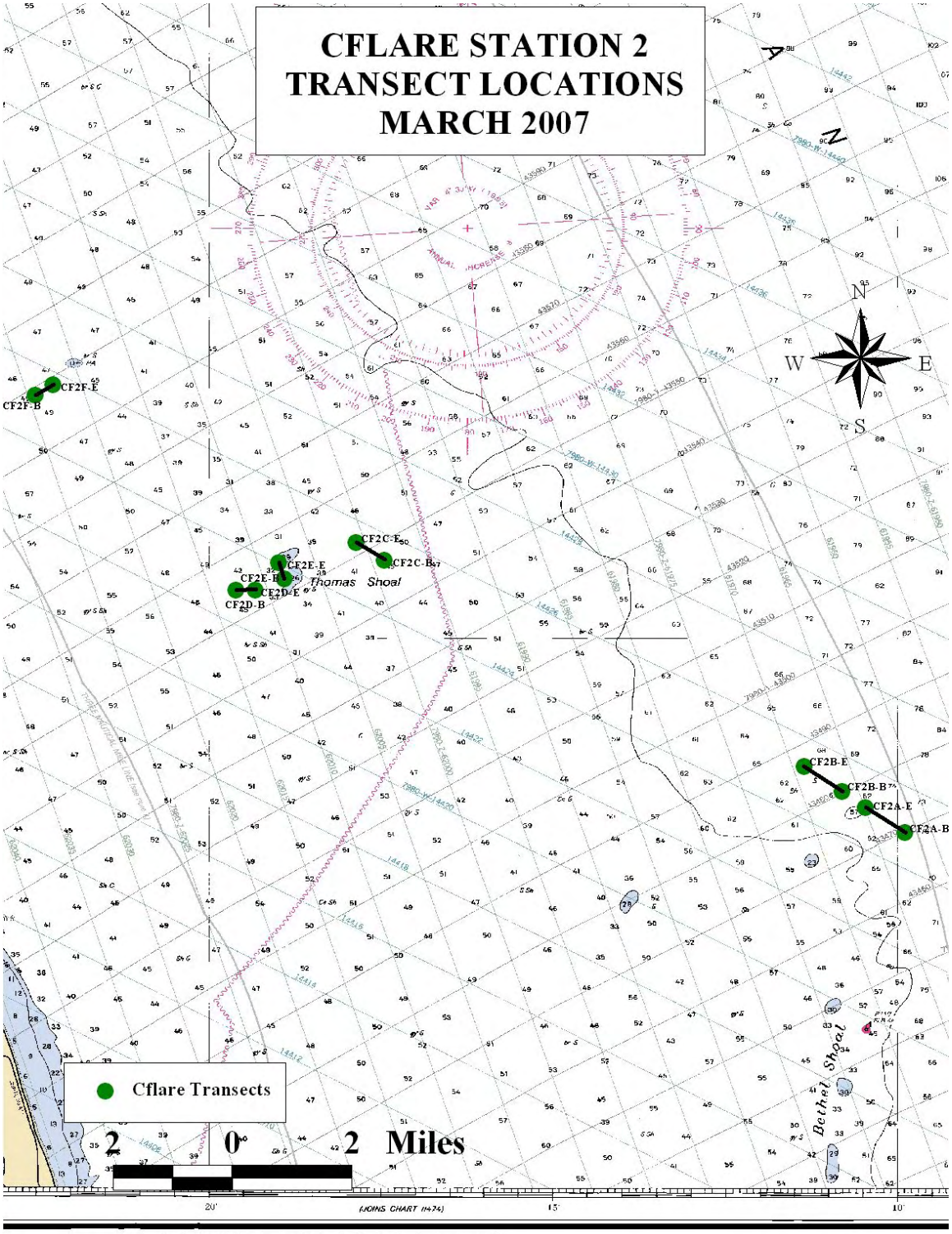


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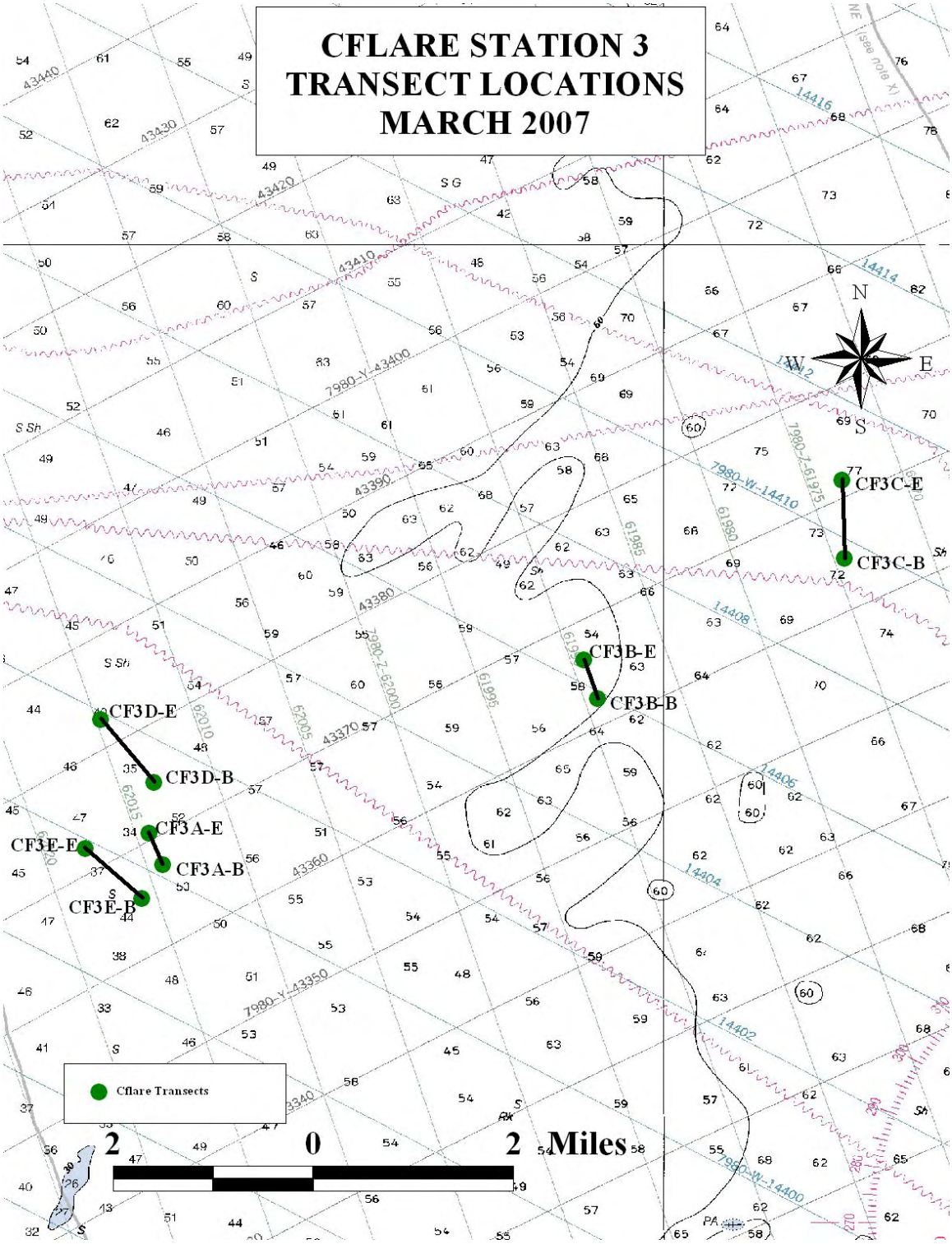
**Figure 5**

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## Table 1

## CAPE CANAVERAL ODMDS SEDIMENT STATION LOCATIONS

| STATION # | LATITUDE | LONGITUDE |
|---|---|---|
| CC1 | 28° 19.53' | 80° 31.03' |
| CC2 | 28° 18.79' | 80° 31.12' |
| CC3 | 28° 18.40' | 80° 30.99' |
| CC4 | 28° 18.67' | 80° 31.71' |
| CC5 | 28° 18.79' | 80° 30.35' |
| CC6 | 28° 19.07' | 80° 30.45' |
| CC7 | 28° 16.98' | 80° 28.65' |
| CC8 | 28° 16.64' | 80° 30.81' |
| CC9 | 28° 17.17' | 80° 32.95' |
| CC10 | 28° 19.51' | 80° 33.58' |
| CC11 | 28° 20.43' | 80° 32.19' |
| CC12 | 28° 20.43' | 80° 29.72' |

## Table 2

## CAPE CANAVERAL ODMDS WQ STATION LOCATIONS

| STATION # | LATITUDE | LONGITUDE |
|---|---|---|
| CC4 | 28° 18.67' | 80° 31.63' |
| CC5 | 28° 18.86' | 80° 30.38' |
| CC7 | 28° 16.43' | 80° 28.59' |
| CC10 | 28° 19.54' | 80° 33.56' |

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**Table 3**

**CFLARE TRANSECT LOCATIONS**

| | BEGIN | | | END | |
|---|---|---|---|---|---|
| TRAN | LATITUDE | LONGITUDE | STA | LATITUDE | LONGITUDE |
| CF1A-B | 28 º 05.485’ | 80 º 30.662’ | CF1A-E | 28 º 05.517’ | 80 º 30.156’ |
| CF1B-B | 28 º 06.019’ | 80 º 32.109’ | CF1B-E | 28 º 05.980’ | 80 º 32.545’ |
| CF1C-B | 28 º 07.836’ | 80 º 29.150’ | CF1C-E | 28 º 07.596’ | 80 º 28.723’ |
| CF1D-B | 28 º 11.749’ | 80 º 30.449’ | CF1D-E | 28 º 11.702’ | 80 º 31.059’ |
| CF1E-B | 28 º 12.784’ | 80 º 28.213’ | CF1E-E | 28 º 13.142’ | 80 º 28.166’ |
| CF1F-B | 28 º 13.407’ | 80 º 28.151’ | CF1F-E | 28 º 13.814’ | 80 º 28.296’ |
| CF2A-B | 27 º 47.176’ | 80 º 09.882’ | CF2A-E | 27 º 47.540’ | 80 º 10.460’ |
| CF2B-B | 27 º 47.772’ | 80 º 10.799’ | CF2B-E | 27 º 48.139’ | 80 º 11.351’ |
| CF2C-B | 27 º 51.140’ | 80 º 17.444’ | CF2C-E | 27 º 51.390’ | 80 º 17.855’ |
| CF2D-B | 27 º 50.697’ | 80 º 19.600’ | CF2D-E | 27 º 50.708’ | 80 º 19.324’ |
| CF2E-B | 27 º 50.865’ | 80 º 18.904’ | CF2E-E | 27 º 51.102’ | 80 º 18.979’ |
| CF2F-B | 27 º 53.538’ | 80 º 22.514’ | CF2F-E | 27 º 53.689’ | 80 º 22.261’ |
| CF3A-B | 27 º 34.629’ | 80 º 14.338’ | CF3A-E | 27 º 34.901’ | 80 º 14.459’ |
| CF3B-B | 27 º 36.069’ | 80 º 10.569’ | CF3B-E | 27 º 36.407’ | 80 º 10.686’ |
| CF3C-B | 27 º 37.284’ | 80 º 08.429’ | CF3C-E | 27 º 37.967’ | 80 º 08.447’ |
| CF3D-B | 27 º 35.341’ | 80 º 14.413’ | CF3D-E | 27 º 35.890’ | 80 º 14.876’ |
| CF3E-B | 27 º 34.336’ | 80 º 14.518’ | CF3E-E | 27 º 34.771’ | 80 º 15.012’ |

### 4.2 Cape Canaveral ODMDS

#### 4.2.2 Sediment Sampling

Sediments collected during the survey were analyzed for sediment particle size distribution (PSD), sediment chemistry (Table 7) and benthic macroinvertebrate identification. Sediment chemistry included analysis for PCBs, pesticides, semi-volatile organics, metals, and organo tins. With the exception of organo tins, sediment chemistry and PSD analysis (SESD PROC-711-R0) were performed by the SESD laboratory in Athens, Georgia. Organo tins were analyzed by Columbia Analytical Laboratory. Benthic macroinvertebrate identification was performed by Barry Vittor and Assoc. in Mobile, AL.

Sediment samples, analyzed for macroinvertebrate species identification, were collected from the OSV BOLD utilizing the $0.04m^2$ Young Grab (supplied by R4). Once on board, the sample was deposited into a large stainless steel pan and carefully aliquoted into #35 screened (0.5 mm) sieve buckets. The sample was washed through the screen until all of the particles smaller than .5 mm passed through the screen. The sample retained on the screen after sieving was carefully washed into a cloth sample bag. This was repeated until all of the material collected by the grab had been sieved. Once all material was sieved, the sample bag was properly labeled and placed into a five gallon bucket containing a 10 % seawater formalin



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solution. Sample bags and buckets were labeled both internally and externally and stored for transfer to contract lab facilities for taxonomic identification.

Sediment sampling for chemistry and PSD at selected stations was accomplished by divers utilizing a 1.5x12 in. Teflon® hand coring tube. These samples were collected by divers from the small boat once the Ship was off station after the collection of the benthic macroinvertebrates. Personnel lowered an equipment basket with a surface float and the necessary number of Teflon® coring tubes to the bottom at the location where macroinvertebrates were collected. A dive team consisting of 2-3 people descended the line attached to the equipment basket, staying clipped into the line at all times if visibility was poor. Divers filled each tube halfway (15 cm), capped the tubes and tied them into the basket. The samples from each location were then homogenized and aliquoted into three eight ounce glass containers, and two whirl-paks. One eight ounce container was analyzed for PCBs, pesticides and semi-volatile organics, one eight ounce container was analyzed for metals and one was analyzed for organo tins. The whirl-paks were analyzed for particle size distribution. Analysis for PSD was conducted by a laser particle size analyzer for size classes 2 mm or less. None of the stations had sufficient sediment size classes greater than 2 mm to warrant wet sieve determination.

All diving was conducted according to EPA rules and regulations as stated in the EPA diving safety manual Rev 1.1, (USEPA 2000).

### 4.2.3 Water Quality Sampling

Water samples were collected and physicochemical parameters measured by means of the Ship's Conductivity, Temperature, and Depth (CTD) rosette water collection system. Besides conductivity, temperature and depth, the CTD also measures salinity and dissolved oxygen. Ship's personnel were responsible for maintaining calibration of the instrument and insuring that it is in good working order prior to the survey. Due to the maintenance and calibration of the CTD system by the Ship's personnel, this system falls outside of the USEPA Science and Ecosystem Support Division's Field Accreditation SOP guidelines. However, since the CTD/rosette system is considered a standard means of measuring oceanographic physicochemical water column parameters and collecting water samples from various depths, the data collected from this system is considered to be representative of the water column where the data was collected. Samples were collected at the surface and bottom in the vicinity of stations 4, 5, 7, and 10 (Figure 1). Water samples were analyzed for the same suite of chemical parameters as the sediment samples (Table 7). Due to the short holding times for samples collected for semi-volatile organics analysis in water, (7 days), all water samples were collected at the end of the survey.

## 4.3 Central Florida Reference Evaluation

The Central Florida Reference Evaluation (CFLARE) consisted of tissue collection only for the purpose of determining the range of background concentrations of various analytes in tissue. There were three sampling locations (Figure 2): one just south of the Cape Canaveral ODMDS (CF1 – Figure 3), one halfway between Cape Canaveral and the Ft. Pierce ODMDS near Sebastion Inlet (CF2 – Figure 4) and one north of the Ft. Pierce ODMDS (CF3 – Figure 5). Polychaetes and Bivalves were the targeted taxa for this sampling effort. Samples were collected by means of a hydraulic dredge aboard the OSV BOLD. The dredge works by



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"jetting" high pressure streams of water into the sediment immediately in front of the dredge, thus washing sediment and macroinvertebrates back into the net of the dredge during the tow. Sufficient sample mass (approximately 60 grams), of each type of organism was needed for each chemical analysis to be performed. Multiple tows (approximately 6) were required at each sampling location in order to collect adequate sample mass for analysis. The location of these tows can be found in Table 3. Tissue analysis included PCBs, pesticides, semi-volatile organics, metals, and organo tins. There is no holding time requirement for tissue samples, providing that they remain frozen.

## 5.0 CAPE CANAVERAL ODMDS RESULTS

### 5.1 Cape Canaveral ODMDS Sediment Analysis Results

#### 5.1.1 Metals in sediment

Metals concentrations (Appendix A1, Table A1-1) in sediment at the Cape Canaveral ODMDS were all background levels with no discernable difference between stations inside the site (CC1-CC6) and stations outside the site (CC7-CC12).

#### 5.1.2 Extractable organics in Sediment

Extractable Organics in Sediment (Appendix A2, Table A2-1) were all below Method Reporting Limit (MRL) values with the exception of some analytes from station CC1. Station CC1 had low value concentrations for several analytes, including Benzo(a)anthracene (9.3 ug/kg), Benzo(a)pyrene (7.7 ug/kg), Benzo(b)fluoranthene (14 ug/kg), Chrysene (11 ug/kg), fluoranthene (19 ug/kg) and Pyrene (20 ug/kg). Sample CC9D, which was a duplicate sample taken at Station CC9 had an estimated concentration of 6.2 ug/kg, whereas the concentration for sample CC9 was below the MRL of 14 ug/kg. Concentrations are well below the Effects Range Low (ERL) toxicity limits for marine sediments (Buchman, 1999).

#### 5.1.3 Pesticides and PCBs in Sediment

All pesticides were reported below MRL values (Appendix A3, Table A3-1). PCB concentrations were very low at all stations. Individual PCB congener concentrations can be found in Appendix A4, Table A4-1. Total PCBs (Table 4) were calculated using the EPA Region 4 summation and by the NOAA summation method. The EPA R4 method is the summation of the concentrations of the 26 congeners at each station. The NOAA method sums a subset of 18 of the 26 congeners and multiplies that number by 2 (EPA/USACE, 2008).

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**Table 4 Total PCBs in Sediment**

| STATION | Total EPA PCBs (ug/kg) | Total NOAA PCBs (ug/kg) |
|---|---|---|
| CC01-07 | 0.693 | 1.124 |
| CC02-07 | 0.26 | 0.36 |
| CC03-07 | 0.353 | 0.468 |
| CC04-07 | 0.377 | 0.61 |
| CC05-07 | 0.355 | 0.542 |
| CC06-07 | 0.2615 | 0.371 |
| CC07-07 | 1.255 | 2.302 |
| CC08-07 | 0.665 | 1.122 |
| CC09-07 | 0.63 | 1.1 |
| CC09D-07 | 1.076 | 1.812 |
| CC010-07 | 0.28 | 0.324 |
| CC011-07 | 0.474 | 0.756 |
| CC012-07 | 0.8055 | 1.411 |

### 5.1.4 Organo Tins in Sediment

Except for two compounds at station CC1, butyltin concentrations were either below the Method Detection Limit (MDL) value or "J" flagged. Station CC1 did however have a concentration of Tri-n-butylitin of 57 ug/kg and a concentration of Di-n-butyltin of 3.3 ug/kg (Appendix A5, Table A5-1).

### 5.1.5 Sediment Particle Size Analysis

Sediment particle size at the Cape Canaveral ODMDS consisted primarily of very fine sediment, predominately clay, silt or very fine sand. Station CC2 inside the site and station CC10 outside the site had a grain size that tended more toward medium sand. A study in late 2003 by EPA to characterize sediment grain size in the bight south of Cape Canaveral showed the particle size distribution around the ODMDS to be highly variable with large areas of primarily silt and clay intermixed with fine and medium sand (USEPA 2005).

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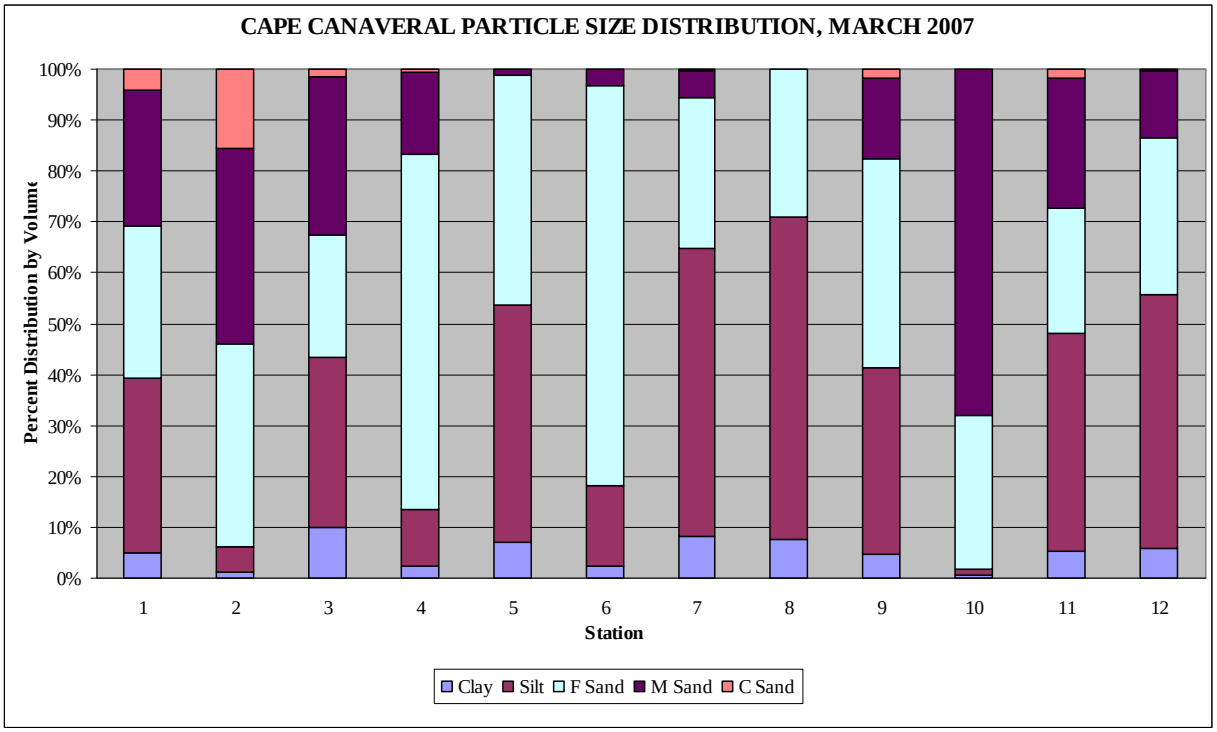
## Table 5 – Sediment Particle Size

| CAPE CANAVERAL ODMDS PARTICAL SIZE DISTRIBUTION MARCH 2007 | | | | | | |
|---|---|---|---|---|---|---|
| STA | Clay 0-3.91 | Silt 3.91-62.5 | F Sand 62.5-250 | M Sand 250-1000 | C Sand 1000-2000 | D50 |
| CC01 | 5.1 | 34.4 | 29.9 | 26.5 | 4.2 | 106.3 |
| CC02 | 1.1 | 5.2 | 40.0 | 38.3 | 15.6 | 336.8 |
| CC03 | 9.9 | 33.5 | 24.2 | 30.9 | 1.6 | 115.6 |
| CC04 | 2.3 | 11.3 | 69.8 | 16.1 | 0.5 | 136.9 |
| CC05 | 7.0 | 46.7 | 45.1 | 1.3 | 0.0 | 52.3 |
| CC06 | 2.3 | 15.8 | 78.9 | 3.1 | 0.0 | 99.5 |
| CC07 | 8.1 | 56.6 | 29.8 | 5.2 | 0.3 | 31.3 |
| CC08 | 7.5 | 63.5 | 29.0 | 0.1 | 0.0 | 28.7 |
| CC09 | 4.8 | 36.6 | 41.0 | 16.0 | 1.7 | 86.8 |
| CC10 | 0.5 | 1.2 | 30.4 | 67.9 | 0.1 | 297.4 |
| CC11 | 5.3 | 42.9 | 24.6 | 25.3 | 1.9 | 69.4 |
| CC12 | 5.9 | 49.9 | 30.7 | 13.2 | 0.4 | 48.8 |

## Figure 6 – Sediment Particle Size

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## 5.2 Cape Canaveral ODMDS Water Analysis Results

### 5.2.1 Metals in Water

All metals concentrations in water were below MRL values or were extremely low (Appendix A1, Table A1-2, A1-3).

### 5.2.2 Extractable Organics in Water

All extractable organics in water were below MRL values (Appendix A2, Table A2-2).

### 5.2.3 Pesticides and PCBs in Water

All pesticides in water were below MRL values (Appendix A3, Table A3-2).

All PCBs in water were below MRL values (Appendix A4, Table A4-2).

### 5.2.4 Organo Tins in Water

All Butyltins in water are either below the MDL or "J" flagged as above the MDL, but below the MRL (Appendix 5, Table A5-2).

### 5.2.5 CTD Results

Physicochemical (temperature, salinity and dissolved oxygen) parameters were measured by means of the Ship's CTD (Conductivity, Temperature and Depth). Water column profile measurements were taken at each of the water quality stations. Following is a graph of the output of the measurements at each station. The water column was generally homogenous, with slightly lower temperatures and higher dissolved oxygen a meter or two off the bottom.

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**Figure 7  CTD Profile at Station CC4**

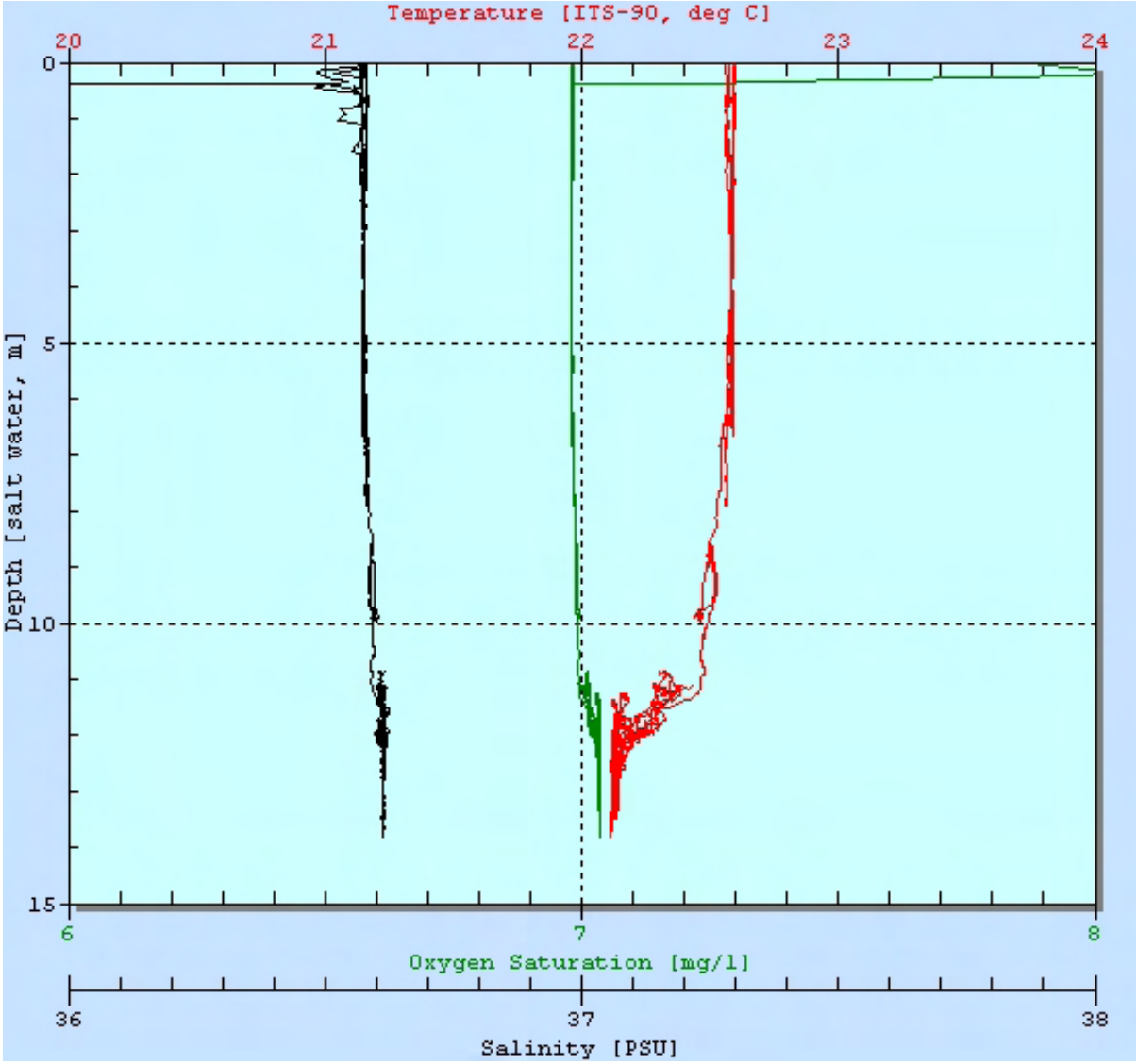


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**Figure 8 CTD Profile at Station CC5**

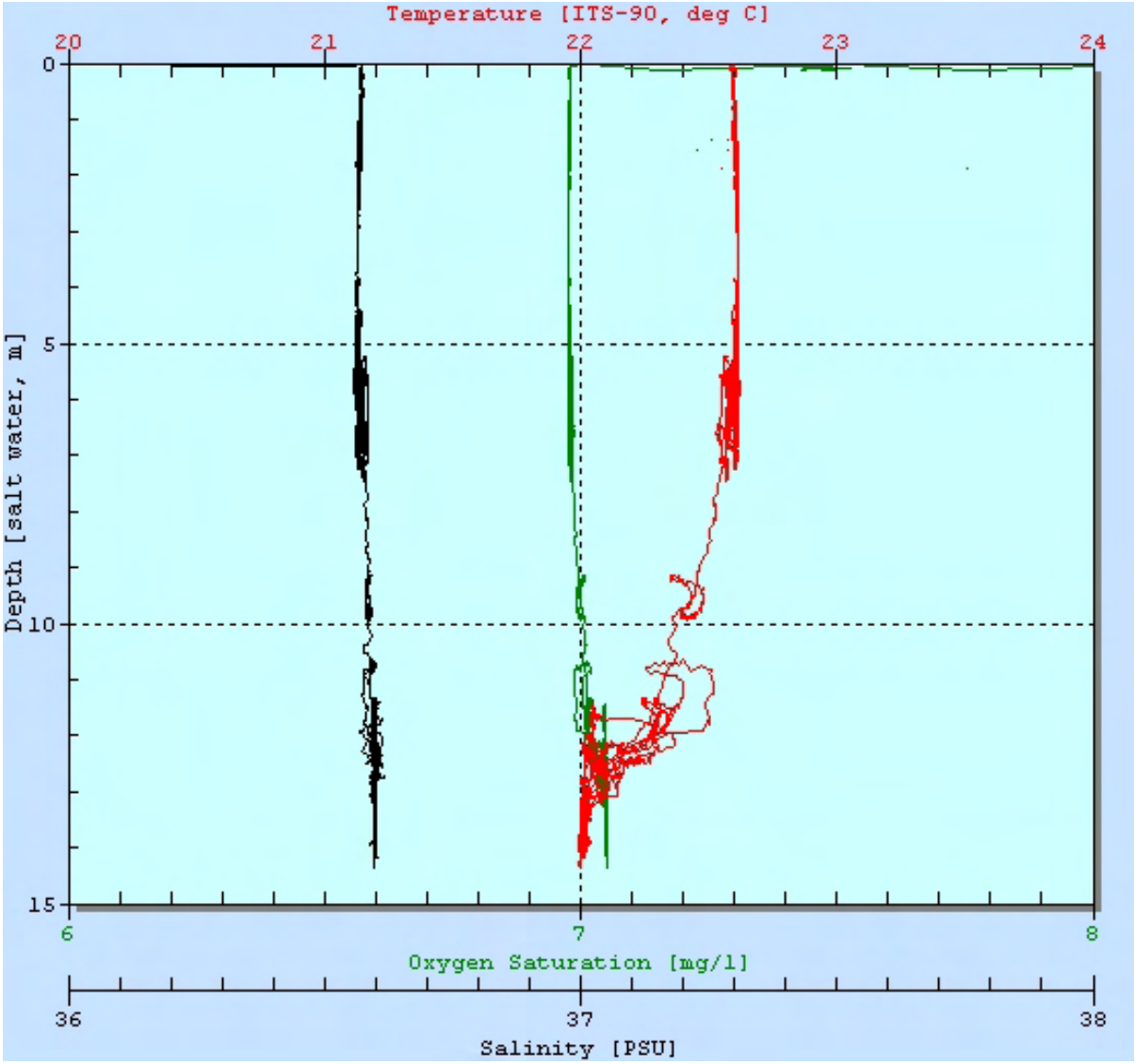


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**Figure 9 CTD Profile at Station CC7**

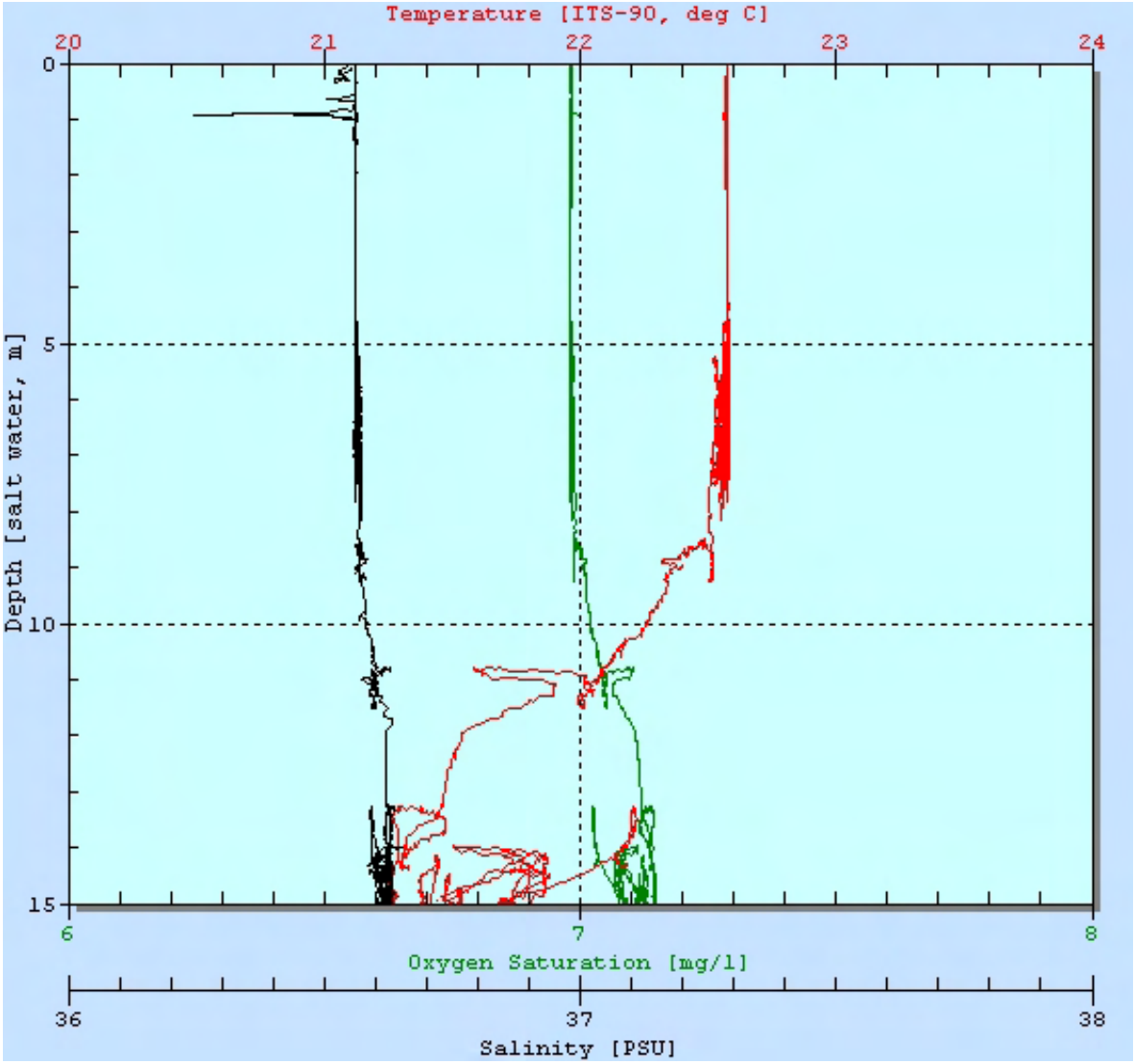


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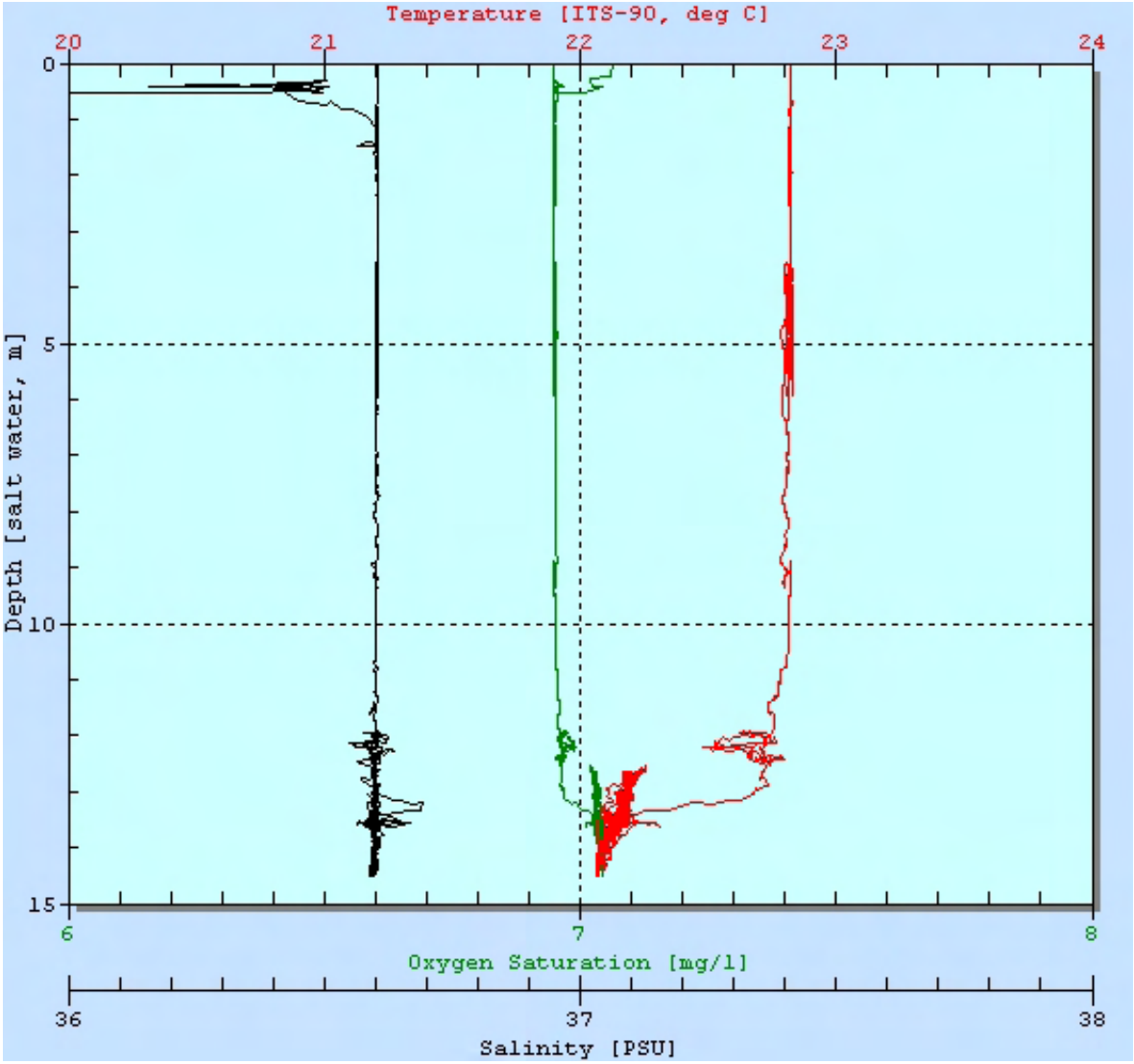
**Figure 10 CTD Profile at Station CC10**

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## 5.3 Cape Canaveral ODMDS Benthic Macroinvertebrates

Macroinvertebrates were collected by means of a 0.04 m2 Young Grab, sieved through a 0.5 mm screen in order to eliminate as much sediment as possible and preserved in a 10% solution of formalin. Macroinvertebrate species identification and population dynamics were analyzed and reported by Barry Vittor and Associates (USEPA 2007). Table 6 summarizes the results of the macroinvetebrate analysis.

The six stations inside the ODMDS (CC1-CC6) were compared against the six stations outside the ODMDS (CC7-CC12) in order to determine whether dumping activities affected the macroinvertebrate assemblages. A total of 174 organisms were identified from the inside stations versus 350 organisms identified from the outside stations. Disposal activities seem to be affecting the total populations of macroinvertebrates more than species composition. Of the 350 individual organisms found outside the site, 200 were approximately evenly distributed between stations CC11 and CC12, both located on the same latitude north of the disposal area. Stations CC1, CC2, CC5 and CC6 inside the site were all located in active disposal zones and all had low numbers (11, 7, 22 and 15 respectively) of macroinvertebrates. Station CC10, located to the west, outside the site, was the only outside station with low numbers (10 individuals). Stations CC3 and CC4, located within the site, but in low use disposal areas, contained 69 and 50 individuals respectively. The remaining outside stations, CC7, CC8 and CC9 contained 47, 52 and 42 individuals respectively.

**Table 6 – Summary of Macroinvertebrate Analysis**

| STA | Individuals | Density (NOS/m2) | Taxa | Biomass (gr) | Taxa Diversity | Taxa Evenness | Taxa Richness |
|---|---|---|---|---|---|---|---|
| **CC01** | 11 | 275 | 8 | 0.0067 | 2.85 | 0.95 | 2.92 |
| **CC02** | 7 | 175 | 5 | 0.0222 | 2.24 | 0.96 | 2.06 |
| **CC03** | 69 | 1725 | 34 | 0.6896 | 4.42 | 0.87 | 7.79 |
| **CC04** | 50 | 1250 | 19 | 0.3446 | 3.82 | 0.9 | 4.6 |
| **CC05** | 22 | 550 | 13 | 0.0572 | 3.19 | 0.86 | 3.88 |
| **CC06** | 15 | 375 | 10 | 0.032 | 3.19 | 0.96 | 3.32 |
| **CC07** | 47 | 1175 | 24 | 0.292 | 4.2 | 0.92 | 5.97 |
| **CC08** | 52 | 1300 | 27 | 0.6108 | 4.43 | 0.93 | 6.58 |
| **CC09** | 42 | 1050 | 27 | 0.6145 | 4.51 | 0.95 | 6.96 |
| **CC10** | 10 | 250 | 8 | 0.0354 | 2.85 | 0.95 | 3.04 |
| **CC11** | 98 | 2450 | 37 | 4.3508 | 4.38 | 0.84 | 7.85 |
| **CC12** | 101 | 2525 | 36 | 4.3583 | 4.66 | 0.9 | 7.58 |

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## 6.0 CENTRAL FLORIDA REFERENCE EVALUATION RESULTS

The purpose of the tissue collection effort was to collect bivalves and polychaetes at undisturbed locations off the East Coast of Florida between Cape Canaveral and Ft. Pierce in order to establish a range of concentrations of a suite of analytes (metals, extractable organics, pesticides, PCBs and organo tins) that can be considered as normal or background levels. The results of the analysis of these samples can be found in Appendix B.

**Table 7**

| TOTAL PCBs in Tissue | | |
|---|---|---|
| SAMPLE | EPA SUM | NOAA SUM |
| CF-01-BI | 0.4895 | 0.867 |
| CF-02-BI | 0.309 | 0.506 |
| CF-03-BI | 0.435 | 0.747 |
| CF-03-POLY | 0.7605 | 1.391 |

## 7.0 Quality Assurance Results

It should be noted that samples from this study were analyzed by two different laboratories, the US-EPA SESD Laboratory in Athens, GA and the Columbia Analytical Services Laboratory in Kelso, WA. The way in which data qualifiers are handled by each laboratory differs slightly, for “J” qualifiers and “U” qualifiers. Following is a description of the differences in qualifier meaning:

In data reported by Columbia Analytical Services (CAS) Laboratory, a “J” flag qualifier indicates that the data value is above the Method Detection Limit (MDL), but below the Minimum Reporting Limit (MRL), whereas a “J” flag qualifier on data from the Athens SESD Laboratory indicates that the data value is an estimated, but valid value above the MRL. “U” qualifiers are also handled differently between the two laboratories. A “U” designation at SESD indicated that the value is below the MRL, whereas a “U” designation from CAS indicates that the data value is below the MDL. Therefore, a “J” qualifier from CAS would normally receive a ”U” qualifier from SESD. A “J” or estimated value from SESD normally has another qualifier associated with it that explains the reason for the estimated value. Due to the very low concentrations that constitute the differences between the two laboratory’s methods of reporting data, the differences do not adversely affect the use of the data to meet the data quality objectives of the survey.

### 7.1 Canaveral ODMDS QA

One duplicate water sample and one duplicate sediment sample was taken in order to determine variability within the sample station and mixing/sample handling technique. The duplicate sediment sample was collected at station CC9 and the duplicate water sample was collected at station CC10. For the sediment sample, separate cores were collected by divers in the immediate vicinity of the station samples. For the water samples a separate water sample was collected side by side with the station sample. There were no discernable analytical differences between the primary station sample and the duplicate sample for either sediment or water.



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## 7.2 CFLARE QA

Dry ice is utilized for shipping and processing tissue samples prior to analysis. Prior to analysis, the frozen tissue and dry ice are ground in a blender to thoroughly mix the sample. A blank was run of the dry ice (DIB1-1B) and of the blenders (DIB-EB) utilized for processing the samples from CFLARE. Both of these blank samples returned detectable analyte concentrations for chromium (0.6 and 0.78 ug/blank), copper (2.1 and 0.44 ug/blank), and nickel (3.9 and 0.99 ug/blank). Zinc was found in sample DIB1-1B at a concentration of 1.2 ug/blank. Note that concentrations of analytes in the dry ice blank itself were actually higher than the dry ice equipment blank. The MRL values for chromium, copper, nickel and zinc are 0.25, 0.25, 0.5 and 0.5 ug/blank respectively. Concentrations of these four analytes in the tissue samples were low enough that contamination from the dry ice could have adversely affected the samples and the data accordingly. The dry ice blank was prepared by filling a 9 ounce sediment container with dry ice and allowing it to sublimate until nothing is left in the jar. The jar is then rinsed with solvent in the laboratory and the rinesate analyzed for contaminates. Due to the nature of how the dry blanks are prepared, the units are presented as a concentration per jar (blank) and not a concentration per unit of measurement. Data from tissue analyzed for chromium, copper, nickel and zinc should be used with caution due to possible cross contamination from the dry ice. No other analytes appear to have been affected and the data can be utilized accordingly.

## 8.0 Quality Control

All sample handling, processing, and preservation was conducted according to EPA/SESD SOPs as follows:

*Analytical Support Branch Laboratory Operations and Quality Assurance Manual*, US Environmental Protection Agency, Region 4, Science and Ecosystem Support Division, Analytical Support Branch, Athens, GA.

SESD Operating Procedure for Field Records (SESDPROC-010-R0)

SESD Operating Procedure for Field Sampling Quality Control (SESDPROC-011-R0)

SESD Operating Procedures for Marine Macroinvertebrate Sampling (SESDPROC-511-R0)

SESD Operating Procedures for Particle Size Analysis - Laser (SESDPROC-711-R0)

SESD Operating Procedures for Sediment Sampling (SESDPROC-200-R0)

SESD Operating Procedures for Surface Water Sampling (SESDPROC-201-R0)

SESD Operating Procedure for Tissue Sample Handling and Processing (SESDPROC-602-Draft)

SESD Operating Procedures for Sample and Evidence Management (SESDPROC-005-R0)

SESD Operating Procedure for Packaging, Marking, Labeling and Shipping of Environmental Samples (SESDPROC-206-R0)



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SESD Operating Procedure for, Global Positioning System (GPS) (SESDPROC-110-R0)

EPA 2000. Diving Safety Manual, Version 1.1. Office of Administration and Resources Management, Safety, Health and Environmental Management Division, Washington, DC.
.

### 8.1 Data Management

Data collected during field sampling activities were recorded in bound field log books and maintained by the chief scientist and crew chiefs. Upon completion of all analyses and data reviews, the data will be stored electronically in the Region 4 Data Archival and Retrieval System (DART).

## 9.0 Conclusions

### 9.1 Cape Canaveral ODMDS

All data reported back from the Cape Canaveral ODMDS sampling effort were either below the analytical method reporting limit (MRL) or at levels low enough to be considered background. There was no discernable difference between sediment or water quality samples taken inside the disposal area versus samples taken outside the disposal area.

The benthic macroinvertebrate data did indicate differences from stations inside the site, versus stations outside the site. Stations inside the site had far fewer numbers of individual species than stations outside the site, although species composition wasn't significantly different. This indicates that in all probability, the macroinvertebrate community had not had enough time to fully re-establish itself after the last disposal event.

### 9.2 CFLARE

CFLARE samples were taken in order to establish the range of normal background concentrations of various analytes in the tissue of bivalves and polychaetes off the central east coast of Florida. With the exception of the four metals (chromium, copper, nickel and zinc), discussed in section 7.2 above, all other analysis meet the Data Quality Objectives (DQOs) of the survey and may be utilized accordingly.

Due to the uncertainty of cross contamination from dry ice for the four metals listed above, it is advisable that a re-sampling effort be undertaken at some point in the future.

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| Table 7 Analytical Methods | | | | |
|---|---|---|---|---|
| Science and Ecosystem Support Division Laboratory | | | | |
| Metals Analysis | | | | |
| | Dry Ice | Sediment | Water | Tissue |
| **Analyte** | **Method** | **Method** | **Method** | **Method** |
| Aluminum | EPA 6010B | EPA 6010B | EPA 200.8 | |
| Antimony | EPA 200.8 | EPA 200.8 | | EPA 200.8 |
| Arsenic | EPA 200.8 | EPA 200.8 | | |
| Barium | EPA 6010B | EPA 200.8 | | |
| Beryllium | EPA 6010B | | EPA 200.8 | |
| Cadmium | EPA 200.8 | | | EPA 6010B |
| Calcium | EPA 6010B | | | |
| Chromium | EPA 6010B | EPA 6010B | EPA 200.8 | EPA 6010B |
| Cobalt | EPA 6010B | | | |
| Copper | EPA 6010B | EPA 200.8 | | EPA 6010B |
| Iron | EPA 6010B | EPA 6010B | EPA 200.8 | |
| Lead | EPA 200.8 | EPA 200.8 | EPA 200.8 | EPA 200.8 |
| Magnesium | EPA 6010B | | | |
| Manganese | EPA 6010B | EPA 6010B | EPA 200.8 | |
| Mercury | | EPA 7473 | EPA 245.1 | EPA 245.6 |
| Molybdenum | EPA 6010B | | | |
| Nickel | EPA 6010B | EPA 6010B | EPA 200.8 | EPA 6010B |
| Potassium | EPA 6010B | | | |
| Selenium | EPA 200.8 | EPA 200.8 | EPA 200.8 | |
| Silver | EPA 6010B | EPA 200.8 | EPA 6010B | EPA 6010B |
| Silver | EPA 200.8 | | | |
| Sodium | EPA 6010B | | | |
| Strontium | EPA 6010B | | | |
| Thallium | EPA 200.8 | | | |
| Tin | EPA 6010B | | | |
| Titanium | EPA 6010B | | | |
| Vanadium | EPA 6010B | | | |
| Yttrium | EPA 6010B | | | |
| Zinc | EPA 6010B | EPA 200.8 | EPA 200.8 | EPA 6010B |
| % Solids | | EPA 200.2 | | |
| **EXTRACTABLE ORGANICS** | | **PESTICIDES** | | |
| **Media** | **Method** | **Media** | **Method** | |
| Sediment | EPA 8270D | Sediment | EPA 8081 | |
| Water | EPA 8270D | Water | EPA 8081 | |
| Tissue | EPA 8270D | Tissue | EPA 8081 | |
| | | | | |
| **PCBs** | | | | |
| **Media** | **Method** | | | |
| Sediment | EPA 1668a | | | |
| Water | EPA 1668a | | | |
| Tissue | EPA 1668a | | | |

| Columbia Analytical Services Laboratory | | | | | |
|---|---|---|---|---|---|
| **Water (CAS)** | | **Tissue (CAS)** | | **TBT** | |
| **Analyte** | **Method** | **Analyte** | **Method** | **Media** | **Method** |
| Arsenic | EPA 6020 | Arsenic | EPA 200.8 | Sediment | Krone |
| Cadmium | EPA 6020 | Cadmium | EPA 200.8 | Water | Krone |
| Copper | EPA 6020 | | | Tissue | Krone |
| Silver | EPA 6020 | | | | |
| Zinc | EPA 6020 | | | | |



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## 10.0 REFERENCES


Buchman, M. F., 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle WA, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, 12 pages.

USEPA 2000. Diving Safety Manual, Version 1.1. Office of Administration and Resources Management, Safety, Health and Environmental Management Division, Washington, DC.

USEPA. 2002. Standard Operation Procedures, Ecological Assessment Branch. US Environmental Protection Agency, Region 4. Athens, GA.

USEPA. 2005. McArthur, Christopher J. and Parsons, M. Spatial Analysis of Sediment Grain Size in the Vicinity of the Canaveral Harbor Ocean Dredged Material Disposal Site. US Environmental Protection Agency, Region 4, Atlanta, GA (EPA-904-R-05-002)

USEPA 2007. *Analytical Support Branch Laboratory Operations and Quality Assurance Manual*, US Environmental Protection Agency, Region 4, Science and Ecosystem Support Division, Analytical Support Branch, Athens, GA.

USEPA 2007. SESD Operating Procedure for Field Records (SESDPROC-010-R0).

USEPA 2007. SESD Operating Procedure for Field Sampling Quality Control (SESDPROC-011-R0).

USEPA 2007. SESD Operating Procedure for, Global Positioning System (GPS) (SESDPROC-110-R0)

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USEPA 2007. SESD Operating Procedure for Packaging, Marking, Labeling and Shipping of Environmental Samples (SESDPROC-206-R0).

USEPA 2007. SESD Operating Procedures for Particle Size Analysis - Laser (SESDPROC-711-R0)

USEPA 2007. SESD Operating Procedures for Sediment Sampling (SESDPROC-200-R0)

USEPA 2007. SESD Operating Procedures for Surface Water Sampling (SESDPROC-201-R0)

USEPA 2007. SESD Operating Procedures for Sample and Evidence Management (SESDPROC-005-R0).

USEPA 2007. SESD Operating Procedure for Tissue Sample Handling and Processing (SESDPROC-602-Draft).


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USEPA 2007. Canaveral Florida ODMDS 2007 Benthic Community Assessment. Prepared by Vittor and Associates, Inc., Mobile Al

USEPA/USACE. 2008. Southeast Regional Implementation Manual (SERIM) For Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Material in Southeastern U.S. Atlantic and Gulf Coast Waters. EPA 904-B-08-001. U.S. Environmental Protection Agency, Region 4 and the U.S. Army Corps of Engineers, South Atlantic Division, Atlanta Georgia.

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# Appendix A

# Cape Canaveral ODMDS

# Data

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# Appendix A1

# Cape Canaveral ODMDS

# Metals Data

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## TABLE A1-1
## CAPE CANAVERAL ODMDS METALS ANALYSIS IN SEDIMENT (mg/kg dry wt.)

| SAMPLE | DATE | TIME | % SOLIDS | Aluminum | Arsenic | Beryllium | Cadmium | Chromium | Copper | Iron |
|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 4300 | 3.5 | 0.33 | 0.25 U | 15 | 13 | 6700 |
| CC02-07 | 03/27/07 | 11:24 | 78 | 470 | 1.6 | 0.25 U | 0.25 U | 3.6 | 0.5 U | 1800 |
| CC03-07 | 03/27/07 | 12:42 | 63 | 4900 | 3.1 | 0.41 | 0.25 U | 14 | 1.5 | 7700 |
| CC04-07 | 03/27/07 | 15:09 | 72 | 1800 | 1.3 | 0.25 U | 0.25 U | 6.3 | 0.7 | 3000 |
| CC05-07 | 03/27/07 | 16:00 | 65 | 2700 | 2.2 | 0.25 U | 0.25 U | 8.8 | 1.1 | 4400 |
| CC06-07 | 03/27/07 | 17:28 | 68 | 1600 | 2 | 0.25 U | 0.25 U | 6.7 | 0.68 | 3800 |
| CC07-07 | 03/28/07 | 9:26 | 61 | 4700 | 3.7 | 0.36 | 0.25 U | 14 | 1.9 | 7500 |
| CC08-07 | 03/28/07 | 10:30 | 59 | 4700 | 4 | 0.34 | 0.25 U | 14 | 2 | 7700 |
| CC09-07 | 03/28/07 | 11:21 | 70 | 4100 | 3.1 | 0.32 | 0.25 U | 13 | 1.4 | 6200 |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 4000 | 3.2 | 0.3 | 0.25 U | 12 | 1.4 | 6100 |
| CC010-07 | 03/28/07 | 13:45 | 77 | 600 | 3.6 | 0.25 U | 0.25 U | 7.4 | 0.5 U | 3000 |
| CC011-07 | 03/28/07 | 14:40 | 68 | 4800 | 3.9 | 0.36 | 0.25 U | 14 | 1.7 | 7300 |
| CC012-07 | 03/28/07 | 15:44 | 64 | 5600 | 4.7 | 0.41 | 0.25 U | 16 | 2 | 8800 |

## CAPE CANAVERAL ODMDS METALS ANALYSIS IN SEDIMENT (mg/kg dry wt.) Cont.

| SAMPLE | DATE | TIME | % SOLIDS | Lead | Manganese | Mercury | Nickel | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 4.8 | 86 | 0.042 U | 2.6 | 1 U | 1 U | 30 |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.98 | 30 | 0.049 U | 1.3 U | 1 U | 0.25 U | 2 |
| CC03-07 | 03/27/07 | 12:42 | 63 | 4.6 | 100 | 0.041 U | 2.8 | 1 U | 1 U | 12 |
| CC04-07 | 03/27/07 | 15:09 | 72 | 2.2 | 40 | 0.031 U | 1 U | 1 U | 0.5 U | 5.6 |
| CC05-07 | 03/27/07 | 16:00 | 65 | 3.3 | 71 | 0.043 U | 1.5 | 1 U | 0.5 U | 8.2 |
| CC06-07 | 03/27/07 | 17:28 | 68 | 2.6 | 68 | 0.035 U | 2 U | 1 U | 1 U | 6 |
| CC07-07 | 03/28/07 | 9:26 | 61 | 5.8 | 95 | 0.043 U | 3.1 | 1 U | 1 U | 13 |
| CC08-07 | 03/28/07 | 10:30 | 59 | 5.9 | 100 | 0.044 U | 3 | 1 U | 1 U | 13 |
| CC09-07 | 03/28/07 | 11:21 | 70 | 4.9 | 85 | 0.038 U | 1.6 | 1 U | 1 U | 10 |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 4.7 | 83 | 0.046 U | 1.5 | 1 U | 1 U | 11 |
| CC010-07 | 03/28/07 | 13:45 | 77 | 1.5 | 35 | 0.046 U | 0.5 U | 1 U | 1 U | 2.2 |
| CC011-07 | 03/28/07 | 14:40 | 68 | 5.4 | 99 | 0.048 U | 1.6 | 1 U | 1 U | 12 |
| CC012-07 | 03/28/07 | 15:44 | 64 | 6.5 | 120 | 0.047 U | 2.7 | 1 U | 1 U | 14 |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

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## TABLE A1-2 CAPE CANAVERAL ODMDS METALS IN WATER (ug/l, except for iron - mg/l)

| SAMPLE | DATE | TIME | Aluminum | | Beryllium | | Chromium | | Iron | | Lead | | Manganese | | Mercury | | Nickel | | Selenium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07SWT | 03/30/07 | 21:07 | 100 | U | 2.5 | U | 5.6 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC04-07SWB | 03/30/07 | 21:06 | 580 | | 2.5 | U | 7 | U | 480 | J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC05-07SWT | 03/30/07 | 20:45 | 100 | U | 2.5 | U | 5 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC05-07SWB | 03/30/07 | 20:44 | 390 | | 2.5 | U | 6.7 | U | 390 | J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC07-07SWT | 03/30/07 | 19:47 | 100 | U | 2.5 | U | 5 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC07-07SWB | 03/30/07 | 19:47 | 140 | | 2.5 | U | 5.5 | U | 220 | J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC010-07SWT | 03/30/07 | 21:31 | 100 | U | 2.5 | U | 5.3 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC010D-07SWT | 03/30/07 | 21:31 | 100 | U,J,QM-1 | 2.5 | U | 5 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| CC010-07SWB | 03/30/07 | 21:30 | 780 | | 2.5 | U | 6.5 | U | 770 | J,QC-6 | 5 | U,J,QL-1,QC-5 | 11 | J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| QA-CTD | 03/30/07 | 22:20 | 100 | U | 2.5 | U | 5 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5,QI-1 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |
| QA-PB | 03/30/07 | 21:50 | 100 | U | 2.5 | U | 5 | U | 200 | U,J,QC-6 | 5 | U,J,QL-1,QC-5,QI-1 | 10 | U,J,QC-6 | 0.2 | U | 5 | U,J,QR-1 | 10 | U |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.
J - The identification of the analyte is acceptable: The reported value is an estimate.
QL-1 - Laboratory control spike recovery less than method control limits.
QL-2 - Laboratory control spike recovery greater than method control limits.
QI-1- Internal standard was outside the method control limit
QR-1 - MRL verification recovery less than lower control limits.
QR-2 - MRL verification recovery greater than upper control limits.
QM-1 - Matrix spike recovery is less than method control limits.
QC-5 - Calibration check standard less than method control limits
QC-6 - Calibration check standard greater than method control limits

| TABLE A1-3 CAPE CANAVERAL ODMDS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *CAS METALS IN WATER (ug/l) | | | | | | | | | | | |
| **Sample** | **Date** | **Time** | **Arsenic** | | **Cadmium** | | **Copper** | | **Silver** | | **Zinc** |
| CC04-07-SWT | 03/30/07 | 21:07 | 1.27 | N | 0.007 | J | 0.22 | | 0.007 | J | 0.8 |
| CC04-07-SWB | 03/30/07 | 21:06 | 1.37 | N | 0.012 | J | 0.8 | | 0.035 | | 1.98 |
| CC05-07-SWT | 03/30/07 | 20:45 | 1.28 | N | 0.009 | J | 0.26 | | 0.006 | J | 1.41 |
| CC05-07-SWB | 03/30/07 | 20:44 | 1.37 | N | 0.01 | J | 0.3 | | 0.005 | J | 3.95 |
| CC07-07-SWT | 03/30/07 | 19:47 | 1.37 | N | 0.006 | J | 0.21 | | 0.008 | J | 2.5 |
| CC07-07-SWB | 03/30/07 | 19:47 | 1.41 | N | 0.008 | J | 0.29 | | 0.007 | J | 6.59 |
| CC10-07-SWT | 03/30/07 | 21:31 | 1.29 | N | 0.006** | U | 0.28 | | 0.005 | J | 1.01 |
| CC10-07-SWB | 03/30/07 | 21:30 | 1.51 | N | 0.013 | J | 0.36 | | 0.005** | U | 2.35 |

*Columbia Analytical Services Laboratory

**Method Detection Limit (MDL) Value.

**Qual**

N - Matrix spike recovery not within control limits

J - Estimated concentration less than the MRL, but greater than the MDL

U - Value below analytical detection limits

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# Appendix A2

# Cape Canaveral ODMDS

# Extractable Organic Analysis Data

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# TABLE A2-1 CAPE CANAVERAL ODMDS EXTRACTABLE ORGANICS IN SEDIMENT (ug/kg dry wt.)

| STATION | DATE | TIME | % SOLIDS | 2-Methylnaphthalene | | Acenaphthene | | Acenaphthylene | | Anthracene | | Benzo(a)anthracene | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 31 | U | 15 | U | 15 | U | 15 | U | 9.3 | J,Q2 | | |
| CC02-07 | 03/27/07 | 11:24 | 78 | 25 | U | 12 | U | 12 | U | 12 | U | 12 | U | | |
| CC03-07 | 03/27/07 | 12:42 | 63 | 31 | U | 16 | U | 16 | U | 16 | U | 16 | U | | |
| CC04-07 | 03/27/07 | 15:09 | 72 | 26 | U | 13 | U | 13 | U | 13 | U | 13 | U | | |
| CC05-07 | 03/27/07 | 16:00 | 65 | 28 | U | 14 | U | 14 | U | 14 | U | 14 | U | | |
| CC06-07 | 03/27/07 | 17:28 | 68 | 26 | U | 13 | U | 13 | U | 13 | U | 13 | U | | |
| CC07-07 | 03/28/07 | 9:26 | 61 | 32 | U | 16 | U | 16 | U | 16 | U | 16 | U | | |
| CC08-07 | 03/28/07 | 10:30 | 59 | 31 | U | 16 | U | 16 | U | 16 | U | 16 | U | | |
| CC09-07 | 03/28/07 | 11:21 | 70 | 29 | U | 14 | U | 14 | U | 14 | U | 14 | U | | |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 29 | U | 14 | U | 14 | U | 14 | U | 14 | U | | |
| CC010-07 | 03/28/07 | 13:45 | 77 | 25 | U | 12 | U | 12 | U | 12 | U | 12 | U | | |
| CC011-07 | 03/28/07 | 14:40 | 68 | 30 | U | 15 | U | 15 | U | 15 | U | 15 | U | | |
| CC012-07 | 03/28/07 | 15:44 | 64 | 32 | U | 16 | U | 16 | U | 16 | U | 16 | U | | |

| STATION | DATE | TIME | % SOLIDS | Benzo(a)pyrene | | Benzo(b)fluoranthene | | Benzo(g,h,i)perylene | | Benzo(k)fluoranthene | | Chrysene | | Dibenzo(a,h)anthracene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 7.7 | J,Q2 | 14 | J,Q2 | 15 | U | 15 | U | 11 | J,Q2 | 15 | U |
| CC02-07 | 03/27/07 | 11:24 | 78 | 12 | U | 12 | U | 12 | U | 12 | U | 12 | U | 12 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U |
| CC05-07 | 03/27/07 | 16:00 | 65 | 14 | U | 14 | U | 14 | U | 14 | U | 14 | U | 14 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U | 13 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U |
| CC08-07 | 03/28/07 | 10:30 | 59 | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U |
| CC09-07 | 03/28/07 | 11:21 | 70 | 14 | U | 14 | U | 14 | U | 14 | U | 14 | U | 14 | U |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 14 | U | 14 | U | 14 | U | 14 | U | 14 | U | 14 | U |
| CC010-07 | 03/28/07 | 13:45 | 77 | 12 | U | 12 | U | 12 | U | 12 | U | 12 | U | 12 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 15 | U | 15 | U | 15 | U | 15 | U | 15 | U | 15 | U |
| CC012-07 | 03/28/07 | 15:44 | 64 | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U | 16 | U |

| STATION | DATE | TIME | % SOLIDS | Fluoranthene | | Fluorene | | Indeno (1,2,3-cd) pyrene | | Naphthalene | | Phenanthrene | | Pyrene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 19 | | 15 | U | 15 | U | 31 | U | 15 | U | 20 | |
| CC02-07 | 03/27/07 | 11:24 | 78 | 12 | U | 12 | U | 12 | U | 25 | U | 12 | U | 25 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 16 | U | 16 | U | 16 | U | 31 | U | 16 | U | 31 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 13 | U | 13 | U | 13 | U | 26 | U | 13 | U | 26 | U |
| CC05-07 | 03/27/07 | 16:00 | 65 | 14 | U | 14 | U | 14 | U | 28 | U | 14 | U | 28 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 13 | U | 13 | U | 13 | U | 26 | U | 13 | U | 26 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 16 | U | 16 | U | 16 | U | 32 | U | 16 | U | 32 | U |
| CC08-07 | 03/28/07 | 10:30 | 59 | 16 | U | 16 | U | 16 | U | 31 | U | 16 | U | 31 | U |
| CC09-07 | 03/28/07 | 11:21 | 70 | 14 | U | 14 | U | 14 | U | 29 | U | 14 | U | 29 | U |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 6.2 | J,Q2 | 14 | U | 14 | U | 29 | U | 14 | U | 29 | U |
| CC010-07 | 03/28/07 | 13:45 | 77 | 12 | U | 12 | U | 12 | U | 25 | U | 12 | U | 25 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 15 | U | 15 | U | 15 | U | 30 | U | 15 | U | 30 | U |
| CC012-07 | 03/28/07 | 15:44 | 64 | 16 | U | 16 | U | 16 | U | 32 | U | 16 | U | 32 | U |

**Qualifier**

U-The analyte was not detected at or above the reporting limit.

J-The identification of the analyte is acceptable; the reported value is an estimate.

Q-2-Result greater than MDL but less than MRL.

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# TABLE A2-2 CAPE CANAVERAL ODMDS EXTRACTABLE ORGANICS IN WATER (ug/l) - MARCH 30, 2007

| STATION | WATER COLUMN | TIME | 2-Methylnaphthalene | | Acenaphthene | | Acenaphthylene | | Anthracene | | Benzo(a)anthracene | | Benzo(a)pyrene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| CC04-07 | BOTTOM | 21:06 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC05-07 | SURFACE | 20:45 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC05-07 | BOTTOM | 20:44 | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| CC07-07 | SURFACE | 19:47 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC07-07 | BOTTOM | 19:47 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC010-07 | SURFACE | 21:31 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC010-07 | DUP | 21:31 | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| CC010-07 | BOTTOM | 21:30 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| QA-CTD | QA | 22:20 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |

| STATION | WATER COLUMN | TIME | Benzo(b)fluoranthene | | Benzo(g,h,i)perylene | | Benzo(k)fluoranthene | | Chrysene | | Dibenzo(a,h)anthracene | | Fluoranthene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| CC04-07 | BOTTOM | 21:06 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC05-07 | SURFACE | 20:45 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC05-07 | BOTTOM | 20:44 | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| CC07-07 | SURFACE | 19:47 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC07-07 | BOTTOM | 19:47 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC010-07 | SURFACE | 21:31 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| CC010-07 | DUP | 21:31 | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U | 2 | U |
| CC010-07 | BOTTOM | 21:30 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |
| QA-CTD | QA | 22:20 | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U | 1.9 | U |

| STATION | WATER COLUMN | TIME | Fluorene | | Indeno (1,2,3-cd) pyrene | | Naphthalene | | Pentachlorophenol | | Phenanthrene | | Pyrene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 2 | U | 2 | U | 2 | U | 9.8 | U,J,Q-6 | 2 | U | 2 | U |
| CC04-07 | BOTTOM | 21:06 | 1.9 | U | 1.9 | U | 1.9 | U | 9.7 | U,J,Q-6 | 1.9 | U | 1.9 | U |
| CC05-07 | SURFACE | 20:45 | 1.9 | U | 1.9 | U | 1.9 | U | 9.7 | U,J,Q-6 | 1.9 | U | 1.9 | U |
| CC05-07 | BOTTOM | 20:44 | 2 | U | 2 | U | 2 | U | 9.8 | U,J,Q-6 | 2 | U | 2 | U |
| CC07-07 | SURFACE | 19:47 | 1.9 | U | 1.9 | U | 1.9 | U | 9.7 | U,J,Q-6 | 1.9 | U | 1.9 | U |
| CC07-07 | BOTTOM | 19:47 | 1.9 | U | 1.9 | U | 1.9 | U | 9.7 | U,J,Q-6 | 1.9 | U | 1.9 | U |
| CC010-07 | SURFACE | 21:31 | 1.9 | U | 1.9 | U | 1.9 | U | 9.6 | U,J,Q-6 | 1.9 | U | 1.9 | U |
| CC010-07 | DUP | 21:31 | 2 | U | 2 | U | 2 | U | 10 | U,J,Q-6 | 2 | U | 2 | U |
| CC010-07 | BOTTOM | 21:30 | 1.9 | U | 1.9 | U | 1.9 | U | 9.6 | U,J,Q-6 | 1.9 | U | 1.9 | U |
| QA-CTD | QA | 22:20 | 1.9 | U | 1.9 | U | 1.9 | U | 9.7 | U,J,Q-6 | 1.9 | U | 1.9 | U |

**Qualifier**

U-The analyte was not detected at or above the reporting limit.

J-The identification of the analyte is acceptable; the reported value is an estimate.

Q-2-Result greater than MDL but less than MRL.

Q-6-Appropriate QC not prepared and/or analyzed with this sample.

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# Appendix A3

# Cape Canaveral ODMDS

# Pesticide Analysis Data

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## TABLE A4-1 CAPE CANAVERAL ODMDS PCBs IN SEDIMENT (ug/kg Dry Wt.)

| STATION | DATE | TIME | % SOLIDS | PCB Congener #8 | | PCB Congener #18 | | PCB Congener #28 | | PCB Congener #44 | | PCB Congener #49 | | PCB Congener #52 | | PCB Congener #66 | | PCB Congener #77 | | PCB Congener #87 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 0.024 | U | **0.026** | | 0.024 | U | **0.05** | J, QR-2 | **0.047** | J,QR-2, QL-2 | **0.028** | J,QL-1 | 0.024 | U | 0.024 | U | 0.024 | U |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1, QM-1 | 0.02 | U | 0.02 | U | 0.02 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.028** | J,QR-2, QL-2 | 0.026 | U,J,QL-1 | 0.026 | U | 0.026 | U | 0.026 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U,J,QL-1 | 0.018 | U | 0.018 | U | 0.018 | U |
| CC05-07 | 03/27/07 | 16:00 | 65 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U,J,QL-1 | 0.021 | U | 0.021 | U | 0.021 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U,J,QL-1 | 0.019 | U | 0.019 | U | 0.019 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U,J,QL-1 | 0.026 | U | 0.026 | U | 0.026 | U |
| CC08-07 | 03/28/07 | 10:30 | 59 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U,J,QL-1 | 0.026 | U | 0.026 | U | 0.026 | U |
| CC09-07 | 03/28/07 | 11:21 | 70 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1 | 0.02 | U | 0.02 | U | 0.02 | U |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 0.022 | U | 0.022 | U | 0.022 | U | **0.076** | J,QR-2 | **0.043** | J,QR-2, QL-2 | **0.046** | J,QL-1 | 0.022 | U | 0.022 | U | **0.061** | |
| CC010-07 | 03/28/07 | 13:45 | 77 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | **0.055** | J,QR-2, QL-2 | 0.018 | U,J,QL-1 | 0.018 | U | 0.018 | U | 0.018 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U,J,QL-1 | 0.024 | U | 0.024 | U | 0.024 | U |
| CC012-07 | 03/28/07 | 15:44 | 64 | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U,J,QL-1 | 0.025 | U | 0.025 | U | 0.025 | U |

| STATION | DATE | TIME | % SOLIDS | PCB Congener #101 | | PCB Congener #105 | | PCB Congener #118 | | PCB Congener #126 | | PCB Congener #128 | | PCB Congener #138 | | PCB Congener #153 | | PCB Congener #156 | | PCB Congener #169 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | **0.032** | | 0.024 | U | **0.033** | | 0.024 | U | 0.024 | U | **0.051** | | **0.045** | | 0.024 | U | 0.024 | U |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U |
| CC05-07 | 03/27/07 | 16:00 | 65 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | **0.026** | | **0.021** | | 0.021 | U | 0.021 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.028** | | 0.026 | U | 0.026 | U | 0.026 | U |
| CC08-07 | 03/28/07 | 10:30 | 59 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.042** | | **0.034** | | 0.026 | U | 0.026 | U |
| CC09-07 | 03/28/07 | 11:21 | 70 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| CC09D-07 | 03/28/07 | 11:25 | 69 | **0.1** | | **0.047** | | **0.11** | | 0.022 | U | **0.031** | | **0.13** | | **0.075** | | 0.022 | U | 0.022 | U |
| CC010-07 | 03/28/07 | 13:45 | 77 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U |
| CC012-07 | 03/28/07 | 15:44 | 64 | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U |

| STATION | DATE | TIME | % SOLIDS | PCB Congener #170 | | PCB Congener #180 | | PCB Congener #183 | | PCB Congener #184 | | PCB Congener #187 | | PCB Congener #195 | | PCB Congener #206 | | PCB Congener #209 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 0.024 | U | **0.035** | | 0.024 | U | 0.024 | U | **0.032** | | 0.024 | U | **0.026** | | **0.12** | |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | **0.12** | | **0.041** | |
| CC05-07 | 03/27/07 | 16:00 | 65 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | **0.024** | | 0.021 | U | **0.053** | | 0.021 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | **0.024** | | 0.019 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 0.026 | U | **0.034** | | 0.026 | U | 0.026 | U | **0.09** | | 0.026 | U | **0.68** | | **0.15** | |
| CC08-07 | 03/28/07 | 10:30 | 59 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.042** | | 0.026 | U | **0.22** | | **0.054** | |
| CC09-07 | 03/28/07 | 11:21 | 70 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | **0.038** | | 0.02 | U | **0.28** | | **0.082** | |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 0.022 | U | **0.031** | | 0.022 | U | 0.022 | U | **0.034** | | 0.022 | U | **0.14** | | 0.04 | U,B2 |
| CC010-07 | 03/28/07 | 13:45 | 77 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | **0.028** | | 0.024 | U | **0.15** | | 0.04 | U,B2 |
| CC012-07 | 03/28/07 | 15:44 | 64 | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | **0.049** | | 0.025 | U | **0.37** | | **0.099** | |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.
J - The identification of the analyte is acceptable: The reported value is an estimate.
QL-1 - Laboratory control spike recovery less than method control limits.
QL-2 - Laboratory control spike recovery greater than method control limits.
QR-1 - MRL verification recovery less than lower control limits.
QR-2 - MRL verification recovery greater than upper control limits.
QM-1 - Matrix spike recovery is less than method control limits.
B2 - Reporting level elevated due to trace amounts of analyte present in method blank.

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# TABLE A3-2 CAPE CANAVERAL PESTICIDES IN WATER (ug/l) March 30, 2007

| STATION | LOCATION | TIME | 4,4'-DDD (p,p'-DDD) | | 4,4'-DDE (p,p'-DDE) | | 4,4'-DDT (p,p'-DDT) | | Aldrin | | alpha-BHC | | alpha-Chlordane | | beta-BHC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 0.019 | U | 0.0095 | U | 0.024 | U | 0.0095 | U | 0.0048 | U | 0.0095 | U | 0.0095 | U |
| CC04-07 | BOTTOM | 21:06 | 0.019 | U | 0.0097 | U | 0.031 | U,D-4 | 0.0097 | U | 0.0049 | U | 0.0097 | U | 0.0097 | U |
| CC05-07 | SURFACE | 20:45 | 0.02 | U | 0.0099 | U | 0.043 | U,D-4 | 0.0099 | U | 0.0049 | U | 0.0099 | U | 0.0099 | U |
| CC05-07 | BOTTOM | 20:44 | 0.019 | U | 0.0095 | U | 0.024 | U | 0.0095 | U | 0.0048 | U | 0.0095 | U | 0.0095 | U |
| CC07-07 | SURFACE | 19:47 | 0.019 | U | 0.0094 | U | 0.067 | U,D-4 | 0.0094 | U | 0.0047 | U | 0.0094 | U | 0.0094 | U |
| CC07-07 | BOTTOM | 19:47 | 0.02 | U | 0.0098 | U | 0.76 | U,D-4 | 0.0098 | U | 0.0049 | U | 0.0098 | U | 0.0098 | U |
| CC010-07 | SURFACE | 21:31 | 0.019 | U | 0.0097 | U | 0.024 | U | 0.0097 | U | 0.0048 | U | 0.0097 | U | 0.0097 | U |
| CC010D-07 | DUP | 21:31 | 0.019 | U | 0.0097 | U | 0.047 | U,D-4 | 0.0097 | U | 0.0048 | U | 0.0097 | U | 0.0097 | U |
| CC010-07 | BOTTOM | 21:30 | 0.019 | U | 0.0096 | U | 0.45 | U,D-4 | 0.0096 | U | 0.0048 | U | 0.0096 | U | 0.0096 | U |
| QA-CTD | QA | 22:20 | 0.019 | U | 0.0096 | U | 0.03 | U,D-4 | 0.0096 | U | 0.0073 | U,D-4 | 0.0096 | U | 0.0096 | U |

| STATION | LOCATION | TIME | delta-BHC | | Dieldrin | | Endosulfan I (alpha) | | Endosulfan II (beta) | | Endosulfan Sulfate | | Endrin | | Endrin aldehyde | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 0.0095 | U | 0.0095 | U | 0.0095 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC04-07 | BOTTOM | 21:06 | 0.0097 | U | 0.0097 | U | 0.0097 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC05-07 | SURFACE | 20:45 | 0.0099 | U | 0.0099 | U | 0.0099 | U | 0.02 | U | 0.025 | U | 0.02 | U | 0.025 | U |
| CC05-07 | BOTTOM | 20:44 | 0.0095 | U | 0.0095 | U | 0.0095 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC07-07 | SURFACE | 19:47 | 0.0094 | U | 0.0094 | U | 0.0094 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC07-07 | BOTTOM | 19:47 | 0.0098 | U | 0.0098 | U | 0.0098 | U | 0.02 | U | 0.025 | U | 0.02 | U | 0.025 | U |
| CC010-07 | SURFACE | 21:31 | 0.0097 | U | 0.0097 | U | 0.0097 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC010D-07 | DUP | 21:31 | 0.0097 | U | 0.0097 | U | 0.0097 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC010-07 | BOTTOM | 21:30 | 0.0096 | U | 0.0096 | U | 0.0096 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| QA-CTD | QA | 22:20 | 0.0096 | U | 0.0096 | U | 0.0096 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |

| STATION | LOCATION | TIME | Endrin ketone | | gamma-BHC (Lindane) | | gamma-Chlordane | | Heptachlor | | Heptachlor epoxide | | Methoxychlor | | Toxaphene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 0.024 | U | 0.0048 | U | 0.0095 | U | 0.0071 | U | 0.0095 | U | 0.048 | U | 0.95 | U |
| CC04-07 | BOTTOM | 21:06 | 0.024 | U | 0.0049 | U | 0.0097 | U | 0.0073 | U | 0.0097 | U | 0.049 | U | 0.97 | U |
| CC05-07 | SURFACE | 20:45 | 0.025 | U | 0.0049 | U | 0.0099 | U | 0.0074 | U | 0.0099 | U | 0.049 | U | 0.99 | U |
| CC05-07 | BOTTOM | 20:44 | 0.024 | U | 0.0048 | U | 0.0095 | U | 0.0072 | U | 0.0095 | U | 0.048 | U | 0.95 | U |
| CC07-07 | SURFACE | 19:47 | 0.024 | U | 0.0047 | U | 0.0094 | U | 0.0071 | U | 0.0094 | U | 0.047 | U | 0.94 | U |
| CC07-07 | BOTTOM | 19:47 | 0.025 | U | 0.0049 | U | 0.0098 | U | 0.0074 | U | 0.0098 | U | 0.049 | U | 0.98 | U |
| CC010-07 | SURFACE | 21:31 | 0.024 | U | 0.0048 | U | 0.0097 | U | 0.0072 | U | 0.0097 | U | 0.048 | U | 0.97 | U |
| CC010D-07 | DUP | 21:31 | 0.024 | U | 0.0048 | U | 0.0097 | U | 0.0072 | U | 0.0097 | U | 0.048 | U | 0.97 | U |
| CC010-07 | BOTTOM | 21:30 | 0.024 | U | 0.0048 | U | 0.0096 | U | 0.0072 | U | 0.0096 | U | 0.048 | U | 0.96 | U |
| QA-CTD | QA | 22:20 | 0.024 | U | 0.0089 | U,D-4 | 0.0096 | U | 0.0072 | U | 0.0096 | U | 0.048 | U | 0.96 | U |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

D-4 - MRL elevated due to interferences.

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# Appendix A4

# Cape Canaveral ODMDS

# PCB Analysis Data

US EPA ARCHIVE DOCUMENT

## TABLE A4-1 CAPE CANAVERAL ODMDS PCBs IN SEDIMENT (ug/kg Dry Wt.)

| STATION | DATE | TIME | % SOLIDS | PCB Congener #8 | | PCB Congener #18 | | PCB Congener #28 | | PCB Congener #44 | | PCB Congener #49 | | PCB Congener #52 | | PCB Congener #66 | | PCB Congener #77 | | PCB Congener #87 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 0.024 | U | **0.026** | | 0.024 | U | **0.05** | J, QR-2 | **0.047** | J,QR-2, QL-2 | **0.028** | J,QL-1 | 0.024 | U | 0.024 | U | 0.024 | U |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1, QM-1 | 0.02 | U | 0.02 | U | 0.02 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.028** | J,QR-2, QL-2 | 0.026 | U,J,QL-1 | 0.026 | U | 0.026 | U | 0.026 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U,J,QL-1 | 0.018 | U | 0.018 | U | 0.018 | U |
| CC05-07 | 03/27/07 | 16:00 | 65 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U,J,QL-1 | 0.021 | U | 0.021 | U | 0.021 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U,J,QL-1 | 0.019 | U | 0.019 | U | 0.019 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U,J,QL-1 | 0.026 | U | 0.026 | U | 0.026 | U |
| CC08-07 | 03/28/07 | 10:30 | 59 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U,J,QL-1 | 0.026 | U | 0.026 | U | 0.026 | U |
| CC09-07 | 03/28/07 | 11:21 | 70 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1 | 0.02 | U | 0.02 | U | 0.02 | U |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 0.022 | U | 0.022 | U | 0.022 | U | **0.076** | J,QR-2 | **0.043** | J,QR-2, QL-2 | **0.046** | J,QL-1 | 0.022 | U | 0.022 | U | **0.061** | |
| CC010-07 | 03/28/07 | 13:45 | 77 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | **0.055** | J,QR-2, QL-2 | 0.018 | U,J,QL-1 | 0.018 | U | 0.018 | U | 0.018 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U,J,QL-1 | 0.024 | U | 0.024 | U | 0.024 | U |
| CC012-07 | 03/28/07 | 15:44 | 64 | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U,J,QL-1 | 0.025 | U | 0.025 | U | 0.025 | U |

| STATION | DATE | TIME | % SOLIDS | PCB Congener #101 | | PCB Congener #105 | | PCB Congener #118 | | PCB Congener #126 | | PCB Congener #128 | | PCB Congener #138 | | PCB Congener #153 | | PCB Congener #156 | | PCB Congener #169 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | **0.032** | | 0.024 | U | **0.033** | | 0.024 | U | 0.024 | U | **0.051** | | **0.045** | | 0.024 | U | 0.024 | U |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U |
| CC05-07 | 03/27/07 | 16:00 | 65 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | **0.026** | | **0.021** | | 0.021 | U | 0.021 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.028** | | 0.026 | U | 0.026 | U | 0.026 | U |
| CC08-07 | 03/28/07 | 10:30 | 59 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.042** | | **0.034** | | 0.026 | U | 0.026 | U |
| CC09-07 | 03/28/07 | 11:21 | 70 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| CC09D-07 | 03/28/07 | 11:25 | 69 | **0.1** | | **0.047** | | **0.11** | | 0.022 | U | **0.031** | | **0.13** | | **0.075** | | 0.022 | U | 0.022 | U |
| CC010-07 | 03/28/07 | 13:45 | 77 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U |
| CC012-07 | 03/28/07 | 15:44 | 64 | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U |

| STATION | DATE | TIME | % SOLIDS | PCB Congener #170 | | PCB Congener #180 | | PCB Congener #183 | | PCB Congener #184 | | PCB Congener #187 | | PCB Congener #195 | | PCB Congener #206 | | PCB Congener #209 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC01-07 | 03/27/07 | 10:20 | 57 | 0.024 | U | **0.035** | | 0.024 | U | 0.024 | U | **0.032** | | 0.024 | U | **0.026** | | **0.12** | |
| CC02-07 | 03/27/07 | 11:24 | 78 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U |
| CC03-07 | 03/27/07 | 12:42 | 63 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U |
| CC04-07 | 03/27/07 | 15:09 | 72 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | **0.12** | | **0.041** | |
| CC05-07 | 03/27/07 | 16:00 | 65 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | **0.024** | | 0.021 | U | **0.053** | | 0.021 | U |
| CC06-07 | 03/27/07 | 17:28 | 68 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | **0.024** | | 0.019 | U |
| CC07-07 | 03/28/07 | 9:26 | 61 | 0.026 | U | **0.034** | | 0.026 | U | 0.026 | U | **0.09** | | 0.026 | U | **0.68** | | **0.15** | |
| CC08-07 | 03/28/07 | 10:30 | 59 | 0.026 | U | 0.026 | U | 0.026 | U | 0.026 | U | **0.042** | | 0.026 | U | **0.22** | | **0.054** | |
| CC09-07 | 03/28/07 | 11:21 | 70 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | **0.038** | | 0.02 | U | **0.28** | | **0.082** | |
| CC09D-07 | 03/28/07 | 11:25 | 69 | 0.022 | U | **0.031** | | 0.022 | U | 0.022 | U | **0.034** | | 0.022 | U | **0.14** | | 0.04 | U,B2 |
| CC010-07 | 03/28/07 | 13:45 | 77 | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U | 0.018 | U |
| CC011-07 | 03/28/07 | 14:40 | 68 | 0.024 | U | 0.024 | U | 0.024 | U | 0.024 | U | **0.028** | | 0.024 | U | **0.15** | | 0.04 | U,B2 |
| CC012-07 | 03/28/07 | 15:44 | 64 | 0.025 | U | 0.025 | U | 0.025 | U | 0.025 | U | **0.049** | | 0.025 | U | **0.37** | | **0.099** | |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.
J - The identification of the analyte is acceptable: The reported value is an estimate.
QL-1 - Laboratory control spike recovery less than method control limits.
QL-2 - Laboratory control spike recovery greater than method control limits.
QR-1 - MRL verification recovery less than lower control limits.
QR-2 - MRL verification recovery greater than upper control limits.
QM-1 - Matrix spike recovery is less than method control limits.
B2 - Reporting level elevated due to trace amounts of analyte present in method blank.

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# TABLE A3-2 CAPE CANAVERAL PESTICIDES IN WATER (ug/l) March 30, 2007

| STATION | LOCATION | TIME | 4,4'-DDD (p,p'-DDD) | | 4,4'-DDE (p,p'-DDE) | | 4,4'-DDT (p,p'-DDT) | | Aldrin | | alpha-BHC | | alpha-Chlordane | | beta-BHC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 0.019 | U | 0.0095 | U | 0.024 | U | 0.0095 | U | 0.0048 | U | 0.0095 | U | 0.0095 | U |
| CC04-07 | BOTTOM | 21:06 | 0.019 | U | 0.0097 | U | 0.031 | U,D-4 | 0.0097 | U | 0.0049 | U | 0.0097 | U | 0.0097 | U |
| CC05-07 | SURFACE | 20:45 | 0.02 | U | 0.0099 | U | 0.043 | U,D-4 | 0.0099 | U | 0.0049 | U | 0.0099 | U | 0.0099 | U |
| CC05-07 | BOTTOM | 20:44 | 0.019 | U | 0.0095 | U | 0.024 | U | 0.0095 | U | 0.0048 | U | 0.0095 | U | 0.0095 | U |
| CC07-07 | SURFACE | 19:47 | 0.019 | U | 0.0094 | U | 0.067 | U,D-4 | 0.0094 | U | 0.0047 | U | 0.0094 | U | 0.0094 | U |
| CC07-07 | BOTTOM | 19:47 | 0.02 | U | 0.0098 | U | 0.76 | U,D-4 | 0.0098 | U | 0.0049 | U | 0.0098 | U | 0.0098 | U |
| CC010-07 | SURFACE | 21:31 | 0.019 | U | 0.0097 | U | 0.024 | U | 0.0097 | U | 0.0048 | U | 0.0097 | U | 0.0097 | U |
| CC010D-07 | DUP | 21:31 | 0.019 | U | 0.0097 | U | 0.047 | U,D-4 | 0.0097 | U | 0.0048 | U | 0.0097 | U | 0.0097 | U |
| CC010-07 | BOTTOM | 21:30 | 0.019 | U | 0.0096 | U | 0.45 | U,D-4 | 0.0096 | U | 0.0048 | U | 0.0096 | U | 0.0096 | U |
| QA-CTD | QA | 22:20 | 0.019 | U | 0.0096 | U | 0.03 | U,D-4 | 0.0096 | U | 0.0073 | U,D-4 | 0.0096 | U | 0.0096 | U |

| STATION | LOCATION | TIME | delta-BHC | | Dieldrin | | Endosulfan I (alpha) | | Endosulfan II (beta) | | Endosulfan Sulfate | | Endrin | | Endrin aldehyde | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 0.0095 | U | 0.0095 | U | 0.0095 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC04-07 | BOTTOM | 21:06 | 0.0097 | U | 0.0097 | U | 0.0097 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC05-07 | SURFACE | 20:45 | 0.0099 | U | 0.0099 | U | 0.0099 | U | 0.02 | U | 0.025 | U | 0.02 | U | 0.025 | U |
| CC05-07 | BOTTOM | 20:44 | 0.0095 | U | 0.0095 | U | 0.0095 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC07-07 | SURFACE | 19:47 | 0.0094 | U | 0.0094 | U | 0.0094 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC07-07 | BOTTOM | 19:47 | 0.0098 | U | 0.0098 | U | 0.0098 | U | 0.02 | U | 0.025 | U | 0.02 | U | 0.025 | U |
| CC010-07 | SURFACE | 21:31 | 0.0097 | U | 0.0097 | U | 0.0097 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC010D-07 | DUP | 21:31 | 0.0097 | U | 0.0097 | U | 0.0097 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| CC010-07 | BOTTOM | 21:30 | 0.0096 | U | 0.0096 | U | 0.0096 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |
| QA-CTD | QA | 22:20 | 0.0096 | U | 0.0096 | U | 0.0096 | U | 0.019 | U | 0.024 | U | 0.019 | U | 0.024 | U |

| STATION | LOCATION | TIME | Endrin ketone | | gamma-BHC (Lindane) | | gamma-Chlordane | | Heptachlor | | Heptachlor epoxide | | Methoxychlor | | Toxaphene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC04-07 | SURFACE | 21:07 | 0.024 | U | 0.0048 | U | 0.0095 | U | 0.0071 | U | 0.0095 | U | 0.048 | U | 0.95 | U |
| CC04-07 | BOTTOM | 21:06 | 0.024 | U | 0.0049 | U | 0.0097 | U | 0.0073 | U | 0.0097 | U | 0.049 | U | 0.97 | U |
| CC05-07 | SURFACE | 20:45 | 0.025 | U | 0.0049 | U | 0.0099 | U | 0.0074 | U | 0.0099 | U | 0.049 | U | 0.99 | U |
| CC05-07 | BOTTOM | 20:44 | 0.024 | U | 0.0048 | U | 0.0095 | U | 0.0072 | U | 0.0095 | U | 0.048 | U | 0.95 | U |
| CC07-07 | SURFACE | 19:47 | 0.024 | U | 0.0047 | U | 0.0094 | U | 0.0071 | U | 0.0094 | U | 0.047 | U | 0.94 | U |
| CC07-07 | BOTTOM | 19:47 | 0.025 | U | 0.0049 | U | 0.0098 | U | 0.0074 | U | 0.0098 | U | 0.049 | U | 0.98 | U |
| CC010-07 | SURFACE | 21:31 | 0.024 | U | 0.0048 | U | 0.0097 | U | 0.0072 | U | 0.0097 | U | 0.048 | U | 0.97 | U |
| CC010D-07 | DUP | 21:31 | 0.024 | U | 0.0048 | U | 0.0097 | U | 0.0072 | U | 0.0097 | U | 0.048 | U | 0.97 | U |
| CC010-07 | BOTTOM | 21:30 | 0.024 | U | 0.0048 | U | 0.0096 | U | 0.0072 | U | 0.0096 | U | 0.048 | U | 0.96 | U |
| QA-CTD | QA | 22:20 | 0.024 | U | 0.0089 | U,D-4 | 0.0096 | U | 0.0072 | U | 0.0096 | U | 0.048 | U | 0.96 | U |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

D-4 - MRL elevated due to interferences.

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# Appendix A5

# Cape Canaveral ODMDS

# TBT Analysis Data

| TABLE A5-1 CAPE CANAVERAL ODMDS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CAS BUTYLTINS IN SEDIMENT (ug/kg Dry Weight) | | | | | | | | | | | |
| **Sta** | **Date** | **Time** | **Tetra-n-butylti** | | **Tri-n-butyltin** | | **Di-n-butyltin** | | **n-Butyltin** | | **Tri-n-propyltin %** |
| CC01-07-SD | 03/27/07 | 10:20 | 0.79 | J | **57** | | **3.3** | | 1.4 | J | 61 |
| CC02-07-SD | 03/27/07 | 11:24 | 0.13** | U | 0.1** | U | 0.37 | J | 0.054** | U | 46 |
| CC03-07-SD | 03/27/07 | 12:42 | 0.13 | U | 0.1 | U | 0.18 | J | 0.054 | U | 50 |
| CC04-07-SD | 03/27/07 | 15:09 | 0.13 | U | 0.1 | U, I | 0.4 | J | 0.054 | U, I | 48 |
| CC05-07-SD | 03/27/07 | 16:00 | 0.13 | U | 0.1 | U, I | 0.43 | J | 0.27 | J | 50 |
| CC06-07-SD | 03/27/07 | 17:28 | 0.13 | U | 0.1 | U, I | 0.52 | JP | 0.054 | U, I | 55 |
| CC07-07-SD | 03/28/07 | 9:26 | 0.13 | U | 0.1 | U | 0.46 | J | 0.054 | U, I | 47 |
| CC08-07-SD | 03/28/07 | 10:30 | 0.13 | U | 0.1 | U | 0.55 | J | 0.3 | J | 39 |
| CC09-07-SD | 03/28/07 | 11:21 | 0.13 | U | 0.49 | J | 0.38 | JP | 0.054 | U, I | 46 |
| CC10-07-SD | 03/28/07 | 13:45 | 0.13 | U | 0.1 | U | 0.23 | J | 0.054 | U | 55 |
| CC11-07-SD | 03/28/07 | 14:40 | 0.13 | U | 0.1 | U | 0.51 | J | 0.054 | U | 40 |
| CC12-07-SD | 03/28/07 | 15:44 | 0.13 | U | 0.68 | J | 1.4 | J | 1.3 | J | 50 |

*Columbia Analytical Services Laboratory

**Minimum Detection Limit (MDL) Value

**Qual**

N - Matrix spike recovery not within control limits

J - Estimated concentration less than the MRL, but greater than the MDL

U - Value below analytical detection limits

I - The MRL/MDL has been elevated due to a matrix interference.

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| TABLE A5-2 CAPE CANAVERAL ODMDS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *CAS BUTYLTINS IN WATER (ug/l) | | | | | | | | | | | | |
| Sta | Date | Time | Tetra-n-butyltin | | Tri-n-butyltin | | Di-n-butyltin | | n-Butyltin | | Tri-n-propyltin % | |
| CC04-07-SWT | 03/30/2007 | 21:07 | 0.0015** | U | 0.0006** | U | 0.014 | J | 0.0076 | J | 92 | SUR |
| CC04-07-SWB | 03/30/2007 | 21:06 | 0.0015 | U | 0.0006 | U | 0.012 | J | 0.0058 | J | 108 | SUR |
| CC05-07-SWT | 03/30/2007 | 20:45 | 0.0015 | U | 0.0006 | U | 0.0097 | J | 0.0039 | J | 119 | SUR |
| CC05-07-SWB | 03/30/2007 | 20:44 | 0.0015 | U | 0.0006 | U | 0.012 | J | 0.0046 | J | 83 | SUR |
| CC07-07-SWT | 03/30/2007 | 19:47 | 0.0015 | U | 0.0006 | U | 0.0092 | J | 0.0061 | J | 119 | SUR |
| CC07-07-SWB | 03/30/2007 | 19:47 | 0.0015 | U | 0.0006 | U | 0.0089 | J | 0.0056 | J | 115 | SUR |
| CC10-07-SWT | 03/30/2007 | 21:31 | 0.0015 | U | 0.0006 | U | 0.0099 | J | 0.0041 | J | 116 | SUR |
| CC10-07-SWB | 03/30/2007 | 21:30 | 0.0015 | U | 0.0006 | U | 0.007 | J | 0.0039 | J | 112 | SUR |

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**Minimum Detection Limit (MDL) Value

**Qual**

N - Matrix spike recovery not within control limits

J - Estimated concentration less than the MRL, but greater than the MDL

U - Value below analytical detection limits

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# Appendix B

# Central Florida Reference Evaluation

# Data

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# Appendix B1

# Central Florida Reference Evaluation

# Metals Data

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| TABLE B1-1 CENTRAL FLORIDA REFERENCE EVALUATION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METALS ANALYSIS IN TISSUE (mg/kg Wet Weight)* | | | | | | | | | | | | | | | |
| **Sta** | **Tissue** | **Date** | **Time** | **% Lipids** | **Arsenic** | **Cadmium** | **Chromium**** | **Copper**** | **Lead** | **Mercury**** | | **Nickel**** | **Silver** | | **Zinc**** |
| CF-01 | Bivalve | 03/30/07 | 18:36 | 0.3 | 4.9 | 2 | 2.3 | 1.3 | 0.21 | 0.037 | | 1.5 | 0.24 | U | 15 |
| CF-01 | Polychaete | 03/30/07 | 12:23 | 0.7 | 11 | 0.55 | 2.3 | 3.7 | 0.73 | 0.041 | | 3.4 | 0.24 | U | 19 |
| CF-02 | Bivalve | 03/29/07 | 17:17 | 0.6 | 2.9 | 0.85 | 1.3 | 1.4 | 0.1 | 0.021 | U | 2.1 | 0.18 | U | 7.4 |
| CF-02 | Polychaete | 03/30/07 | 9:43 | 0.8 | 35 | 0.99 | 2.2 | 3.5 | 1.1 | 0.046 | | 1 | 0.21 | U | 23 |
| CF-03 | Bivalve | 03/29/07 | 8:30 | 0.9 | 4.2 | 1.2 | 1 | 1.2 | 0.21 | 0.02 | U | 0.61 | 0.19 | U | 8.5 |
| CF-03 | Polychaete | 03/29/07 | 15:21 | 0.9 | 47 | 1.1 | 0.95 | 3.9 | 1.3 | 0.024 | | 0.89 | 0.25 | U | 18 |

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****Concentrations of these analytes above the MRL were found in the dry ice/blender blanks (Appendix B6) - Data should be used with caution.**

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

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| TABLE B1-2 CENTRAL FLORIDA REFERENCE EVALUATION | | | | | | | |
|---|---|---|---|---|---|---|---|
| CAS* METALS IN TISSUE (mg/kg Wet Weight) | | | | | | | |
| STA | SAMPLE | MATRIX | DATE | TIME | % SOLIDS | ARSENIC | CADMIUM |
| CF-02 | CF-02-BI | Bivalve | 03/29/07 | 17:17 | 19.9 | 3.46 | 1.06 |
| CF-02 | CF-02-BI DUP | Bivalve Dup | 03/29/07 | 17:17 | 19.9 | 3.16 | 0.99 |
| CF-02 | CF-02-POLY | Polychaete | 03/29/07 | 9:43 | 26.9 | 38.20 | 1.19 |

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# Appendix B2

# Central Florida Reference Evaluation

# Extractable Organic Data

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# CENTRAL FLORIDA REFERENCE EVALUATION

## EXTRACTABLE ORGANICS ANALYSIS IN TISSUE (ug/kg Wet Weight)

| STA | SAMPLE | DATE | TIME | % Lipids | 2-Methylnaphthalene | | Acenaphthene | | Acenaphthylene | | Anthracene | | Benzo(a)anthracene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1,QR1 | 0.02 | U |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1,QR1 | 0.02 | U |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1,QR1 | 0.02 | U |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U,J,QL-1,QR1 | 0.02 | U |
| **STA** | **SAMPLE** | **DATE** | **TIME** | **% Lipids** | **Benzo(a)pyrene** | | **Benzo(b)fluoranthene** | | **Benzo(g,h,i)perylene** | | **Benzo(k)fluoranthene** | | | |
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.02 | U,J,QL-1,QR-1 | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.02 | U,J,QL-1,QR-1 | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.02 | U,J,QL-1,QR-1 | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 0.02 | U,J,QL-1,QR-1 | 0.02 | U | 0.02 | U | 0.02 | U | | |
| **STA** | **SAMPLE** | **DATE** | **TIME** | **% Lipids** | **Chrysene** | | **Dibenzo(a,h)anthracene** | | **Fluoranthene** | | **Fluorene** | | | |
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| **STA** | **SAMPLE** | **DATE** | **TIME** | **% Lipids** | **Indeno (1,2,3-cd) pyrene** | | **Naphthalene** | | **Phenanthrene** | | **Pyrene** | | | |
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 0.02 | U | 0.02 | U | 0.02 | U | 0.02 | U | | |

**Qualifier**

J - The analyte was not detected at or above the reporting limit.

- The identification of the analyte is acceptable: The reported value is an estimate.

QL-1 - Laboratory control spike recovery less than method control limits.

QR-1 - MRL verification recovery less than lower control limits.

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# Appendix B3

# Central Florida Reference Evaluation

# Pesticide Data

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# CENTRAL FLORIDA REFERENCE EVALUATION

## PESTICIDES IN TISSUE (ug/kg Wet Weight)

| STA | SAMPLE | DATE | TIME | % Lipids | 4,4'-DDD (p,p'-DDD) | | 4,4'-DDE (p,p'-DDE) | | 4,4'-DDT (p,p'-DDT) | | Aldrin | | alpha-BHC | | alpha-Chlordane | | beta-BHC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 1.3 | U | 0.67 | U | 1.7 | U | 0.67 | U | 0.61 | J,Q-4 | 0.67 | U | 0.67 | U |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 1.3 | U | 1.9 | J,Q-4 | 1.7 | U | 1.9 | J,Q-4 | 13 | J,Q-4 | 0.65 | U | 0.65 | U |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 1.3 | U | 0.67 | U | 1.7 | U | 2.1 | J,Q-4 | 16 | J,Q-4 | 0.67 | U | 0.67 | U |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 1.3 | U | 0.66 | U | 5.7 | | 0.66 | U | 3.4 | J,Q-4 | 0.66 | U | 0.66 | U |

| STA | SAMPLE | DATE | TIME | % Lipids | delta-BHC | | Dieldrin | | Endosulfan I (alpha) | | Endosulfan II (beta) | | Endosulfan Sulfate | | Endrin | | Endrin ketone | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.67 | U | 0.67 | U | 0.67 | U | 1.3 | U | 1.7 | U | 1.3 | U | 1.7 | U |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.65 | U | 0.65 | U | 0.65 | U | 1.3 | U | 1.7 | U | 1.3 | U | 1.7 | U |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.67 | U | 0.67 | U | 0.67 | U | 1.3 | U | 1.7 | U | 1.3 | U | 1.7 | U |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 0.66 | U | 0.66 | U | 0.66 | U | 1.3 | U | 1.7 | U | 1.3 | U | 1.7 | U |

| STA | SAMPLE | DATE | TIME | % Lipids | gamma-BHC (Lindane) | | gamma-Chlordane | | Heptachlor | | Heptachlor epoxide | | Methoxychlor | | Toxaphene | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.33 | U | 0.69 | | 0.5 | U | 0.67 | U | 3.3 | U | 67 | U | | |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.32 | U | 0.65 | U | 0.49 | U | 0.65 | U | 3.2 | U | 65 | U | | |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.33 | U | 0.67 | U | 0.5 | U | 0.67 | U | 3.3 | U | 67 | U | | |
| CF-03 | CF-03-POLY | 3/29/07 | 15:21 | 0.9 | 0.33 | U | 0.66 | U | 0.5 | U | 0.66 | U | 3.3 | U | 66 | U | | |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

J - The identification of the analyte is acceptable: The reported value is an estimate.

Q-4: Greater than 40 percent difference between primary and confirmatory GC columns.

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# Appendix B4

# Central Florida Reference Evaluation

# PCB Data

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## CENTRAL FLORIDA REFERENCE EVALUATION

### PCBs IN TISSUE (ug/kg Wet Weight)

| STA | SAMPLE | DATE | TIME | % Lipids | PCB Congener #8 | | PCB Congener #18 | | PCB Congener #28 | | PCB Congener #44 | | PCB Congener #49 | | PCB Congener #52 | | PCB Congener #66 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.019 | U | 0.019 | U | 0.019 | U | 0.021 | U | 0.021 | U | 0.019 | U | 0.019 | U |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.019 | U | 0.019 | U | 0.019 | U | 0.021 | U | 0.021 | U | 0.019 | U | 0.019 | U |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.021 | U | 0.021 | U | 0.021 | U | 0.023 | U | 0.024 | U | 0.021 | U | 0.021 | U |
| CF-03 | CF-03-PO | 3/29/07 | 15:21 | 0.9 | 0.022 | U | 0.022 | U | 0.022 | U | 0.024 | U | 0.024 | U | 0.022 | U | 0.022 | U |
| **STA** | **SAMPLE** | **DATE** | **TIME** | **% Lipids** | **PCB Congener #77** | | **PCB Congener #87** | | **PCB Congener #101** | | **PCB Congener #105** | | **PCB Congener #118** | | **PCB Congener #126** | | **PCB Congener #128** | |
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.02 | | 0.019 | U | 0.019 | U |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U |
| CF-03 | CF-03-PO | 3/29/07 | 15:21 | 0.9 | 0.022 | U | 0.022 | U | 0.024 | U,B2 | 0.022 | U | 0.042 | | 0.022 | U | 0.022 | U,J,D2 |
| **STA** | **SAMPLE** | **DATE** | **TIME** | **% Lipids** | **PCB Congener #138** | | **PCB Congener #153** | | **PCB Congener #156** | | **PCB Congener #169** | | **PCB Congener #170** | | **PCB Congener #180** | | | |
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.039 | U,B2 | 0.066 | | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | | |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | 0.019 | U | | |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.031 | U,B2 | 0.047 | | 0.021 | U | 0.021 | U | 0.021 | U | 0.021 | U | | |
| CF-03 | CF-03-PO | 3/29/07 | 15:21 | 0.9 | 0.045 | U,J,B2,D2 | 0.067 | J,D2 | 0.022 | U | 0.022 | U | 0.022 | U,J,D2 | 0.026 | U,J,B2, D2 | | |
| **STA** | **SAMPLE** | **DATE** | **TIME** | **% Lipids** | **PCB Congener #183** | | **PCB Congener #184** | | **PCB Congener #187** | | **PCB Congener #195** | | **PCB Congener #206** | | **PCB Congener #209** | | | |
| CF-01 | CF-01-BI | 3/30/07 | 18:36 | 0.3 | 0.019 | U | 0.019 | U | 0.11 | | 0.019 | U | 0.061 | | 0.021 | J,QL-2 | | |
| CF-02 | CF-02-BI | 3/29/07 | 17:17 | 0.6 | 0.019 | U | 0.019 | U | 0.02 | | 0.019 | U | 0.059 | | 0.019 | U | | |
| CF-03 | CF-03-BI | 3/29/07 | 8:30 | 0.9 | 0.021 | U | 0.021 | U | 0.058 | | 0.021 | U | 0.081 | J,QM-1 | 0.021 | U | | |
| CF-03 | CF-03-PO | 3/29/07 | 15:21 | 0.9 | 0.022 | U,J,D2 | 0.022 | U | 0.11 | J,D2 | 0.022 | U,J,D2 | 0.25 | J,D2 | 0.044 | J,QL-2,D2 | | |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

J - The identification of the analyte is acceptable: The reported value is an estimate.

QL-2 - Laboratory control spike recovery greater than method control limits.

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# Appendix B5

# Central Florida Reference Evaluation

# Organotin Data

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# CENTRAL FLORIDA REFERENCE EVALUATION

## BUTYLTIN ANALYSIS IN TISSUE (ug/kg Wet Weight)

| Sample | Date | Tetra-n-butyltin | | Tri-n-butyltin | | Di-n-butyltin | | n-Butyltin | | Tri-n-propyltin % | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CF-01-BI | 03/30/07 | 0.43** | U | 0.35** | U | 0.64 | J | 0.11** | U | 67 | SUR |
| CF-01-POLY | 03/30/07 | 0.52** | U | 0.43** | U | 0.47 | J | 0.15 | JP | 65 | SUR |
| CF-02-BI | 03/29/07 | 0.43** | U | 0.35** | U | 0.17** | U | 0.11** | U | 90 | SUR |
| CF-02-POLY | 03/29/07 | 0.56 | J | 0.44** | U | 0.65 | J | 0.14** | U | 80 | SUR |
| CF-03-BI | 03/29/07 | 0.43** | U | 0.35** | U | 0.51 | J | 0.11** | U | 75 | SUR |
| CF-03-POLY | 03/29/07 | 0.48** | U | 1.2 | JP | 0.35 | J | 0.41 | JP | 92 | SUR |

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**Minimum Detection Limit (MDL) Value

**Qualifier**

U - Value below analytical detection limits

J - Estimated concentration less than the MRL, but greater than the MDL

N - Matrix spike sample recovery not within control limits

P: The GC or HPLC criteria is exceeded

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# CENTRAL FLORIDA REFERENCE EVALUATION

## DRY ICE BLANKS (UG/KG)

| Sample | Date | Time | Aluminum | | Antimony | | Arsenic | | Barium | | Beryllium | | Cadmium | | Calcium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DIB1-1B | 04/06/07 | 13:30 | 5 | U | 0.05 | U | 0.05 | U | 0.25 | U | 0.15 | U | 0.025 | U | 12 | U |
| DIB-EB | 04/13/07 | 10:15 | 5 | U | 0.05 | U | 0.05 | U | 0.25 | U | 0.15 | U | 0.025 | U | 12 | U |
| **Sample** | **Date** | **Time** | **Chromium** | | **Cobalt** | | **Copper** | | **Iron** | | **Lead** | | **Magnesium** | | **Manganese** | |
| DIB1-1B | 04/06/07 | 13:30 | **0.6** | | 0.25 | U | **2.1** | | 5 | U | 0.05 | U | 12 | U | 0.25 | U |
| DIB-EB | 04/13/07 | 10:15 | **0.78** | | 0.25 | U | **0.44** | | 5 | U | 0.05 | U | 12 | U | 0.25 | U |
| **Sample** | **Date** | **Time** | **Molybdenum** | | **Nickel** | | **Potassium** | | **Selenium** | | **Silver** | | **Silver** | | **Sodium** | |
| DIB1-1B | 04/06/07 | 13:30 | 0.25 | U | **3.9** | | 50 | U | 0.1 | U | 0.25 | U | 0.025 | U | 50 | U |
| DIB-EB | 04/13/07 | 10:15 | 0.25 | U | **0.99** | | 50 | U | 0.1 | U | 0.25 | U | 0.025 | U | 50 | U |
| **Sample** | **Date** | **Time** | **Strontium** | | **Thallium** | | **Tin** | | **Titanium** | | **Vanadium** | | **Yttrium** | | **Zinc** | |
| DIB1-1B | 04/06/07 | 13:30 | 0.25 | U | 0.05 | U | 0.75 | U | 0.25 | U | 0.25 | U | 1.5 | U | **1.2** | |
| DIB-EB | 04/13/07 | 10:15 | 0.25 | U | 0.05 | U | 0.75 | U | 0.25 | U | 0.25 | U | 1.5 | U | 0.5 | U |

**Qualifier**

U - The analyte was not detected at or above the reporting limit.

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**End of Report**