

**ATTACHMENT C**  
**SITE MANAGEMENT AND MONITORING PLAN**  
**SABINE-NECHES WATERWAY, TEXAS**  
**OCEAN DREDGED MATERIAL DISPOSAL SITES**

**I. GENERAL**

The Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (33 USC Section 1401, et seq.) is the legislative authority regulating the disposal of dredged material into ocean waters, including the territorial sea. The transportation of dredged material for the purpose of placement into ocean waters is permitted by the U.S. Army Corps of Engineers (USACE) or in the case of Federal projects, authorized for disposal under MPRSA Section 103(e), applying environmental criteria established by the U.S. Environmental Protection Agency (EPA) in the Ocean Dumping Regulations (40 CFR Parts 220–229).

Section 102(c) of the MPRSA and 40 CFR 228.4(e)(l) authorize the EPA to designate Ocean Dredged Material Disposal Sites (ODMDS) in accordance with requirements at 40 CFR 228.5 and 228.6. Section 103(b) of MPRSA requires that the USACE use dredged material sites designated by EPA to the maximum extent feasible. Where use of an EPA-designated site is not feasible, the USACE may, with concurrence of EPA, select an alternative site in accordance with MPRSA 103(b).

Section 228.3 of the Ocean Dumping Regulations established disposal site management responsibilities; however, the Water Resources Development Act of 1992 (WRDA 92; Public Law 102-580) included a number of amendments to the MPRSA specific to ODMDS management. Section 102(c) of MPRSA as amended by Section 506 of WRDA 92 provides that:

1. Site management plans shall be developed for each ODMDS designated pursuant to Section 102(c) of MPRSA.
2. After January 1, 1995, no ODMDS shall receive a final designation unless a Site Management Plan has been developed.
3. For ODMDSs that received a final designation prior to January 1, 1995, Site Management Plans shall be developed as expeditiously as practicable, but no later than January 1, 1997, giving priority to sites with the greatest potential impact on the environment.
4. Beginning on January 1, 1997, no permit or authorization for dumping shall be issued for a site unless it has received a final designation pursuant to Section 102(c) MPRSA or it is an alternate site selected by the USACE under Section 103(b) of MPRSA.

This Site Management Plan for the Sabine-Neches Waterway, Texas (SNWW) ODMDSs was developed jointly by EPA Region 6 and USACE, Galveston District (USACE-SWG). In accordance with Section 102(c)(3) of the MPRSA, as amended by WRDA 92, the plan includes the following:

1. A baseline assessment of conditions at the sites;

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2. A program for monitoring the sites;
  3. Special management conditions or practices to be implemented at the sites that are necessary for protection of the environment;
  4. Consideration of the quantity of dredged material to be discharged at the sites, and the presence, nature, and bioavailability of the contaminants in the material;
  5. Consideration of the anticipated use of the sites over the long term, including the anticipated closure date for the sites, if applicable, and any need for management of the sites after the closure; and
  6. A schedule for review and revision of the plan.

## **II. SITE MANAGEMENT OBJECTIVES**

The purpose of ODMDs management is to ensure that placement activities do not unreasonably degrade the marine environment or interfere with other beneficial uses (e.g., navigation) of the ocean. The specific objectives of management of the SNWW ODMDs are as follows:

1. Ocean discharge of only that dredged material that satisfies the criteria set forth in 40 CFR Part 227 Subparts B, C, D, E, and G and Part 228.4(e) and is suitable for unrestricted placement at the ODMDs; and
2. Avoidance of excessive mounding, either within the site boundaries or in areas adjacent to the sites, as a direct result of placement operations.

These objectives will be achieved through the following measures:

1. Regulation and administration of ocean dumping permits;
2. Development and maintenance of a site monitoring program; and
3. Evaluation of permit compliance and monitoring results.

## **III. ROLES AND RESPONSIBILITIES**

In accordance with Section 102(c) of the MPRSA and with the Regional Memorandum of Understanding (MOU) between USACE-SWG and EPA Region 6 on Management of ODMDs signed August 13, 1993, EPA is responsible for designation of ODMDs. Where use of an EPA-designated site is not feasible, the USACE-SWG may, with concurrence with EPA Region 6, select an alternative site in accordance with Section 103(b) of the MPRSA as amended by Section 506 of WRDA 92.

Development of Site Management Plans for ODMDs within USACE-SWG's area of operation is the joint responsibility of EPA Region 6 and the USACE-SWG. Both agencies are responsible for assuring that all components of the Site Management Plans are implementable, practicable, and applicable to site management decision-making.

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## IV. FUNDING

Physical, chemical, and biological effects-based testing of dredged material prior to placement at the ODMDS shall be undertaken and funded by the Permittee, if the project is permitted, or USACE-SWG, for Federal projects. The permittee or USACE-SWG, as appropriate, shall also be responsible for costs associated with placement site hydrographic monitoring. Should monitoring indicate that additional studies and/or tests are needed at the ODMDSs, the cost for such work would be shared by the Permittee or USACE-SWG and EPA Region 6. Physical, chemical, and biological effects-based testing at the ODMDS, or in the site environs after discharge, which is not required as a result of hydrographic monitoring, shall be funded by EPA Region 6. Federal funding of all aspects of this Site Management Plan is contingent on availability of appropriated funds.

## V. BASELINE ASSESSMENT

### A. Site Characterization (Existing Maintenance ODMDSs)

Four ODMDSs have been designated for maintenance of the SNWW (Figure 1). Following is a brief description of each site.

ODMDS No. 1 is located approximately 16 nautical miles from shore, about 6,000 feet west of the Sabine Bank Channel. This site occupies an area of approximately 2.4 square nautical miles, with depths ranging from 36 to 43 feet. The site is triangular in shape, with vertices at the following coordinates:

29°28'03"N, 93°41'14"W

29°26'11"N, 93°41'14"W

29°26'11"N, 93°44'11"W

ODMDS No. 2 is located approximately 11.8 nautical miles from shore, about 6,000 feet southwest of the Sabine Bank Channel. This site occupies an area of approximately 4.2 square nautical miles, with depths ranging from 30 to 43 feet. The site is trapezoidal in shape, with vertices at the following coordinates:

29°30'41"N, 93°43'49"W

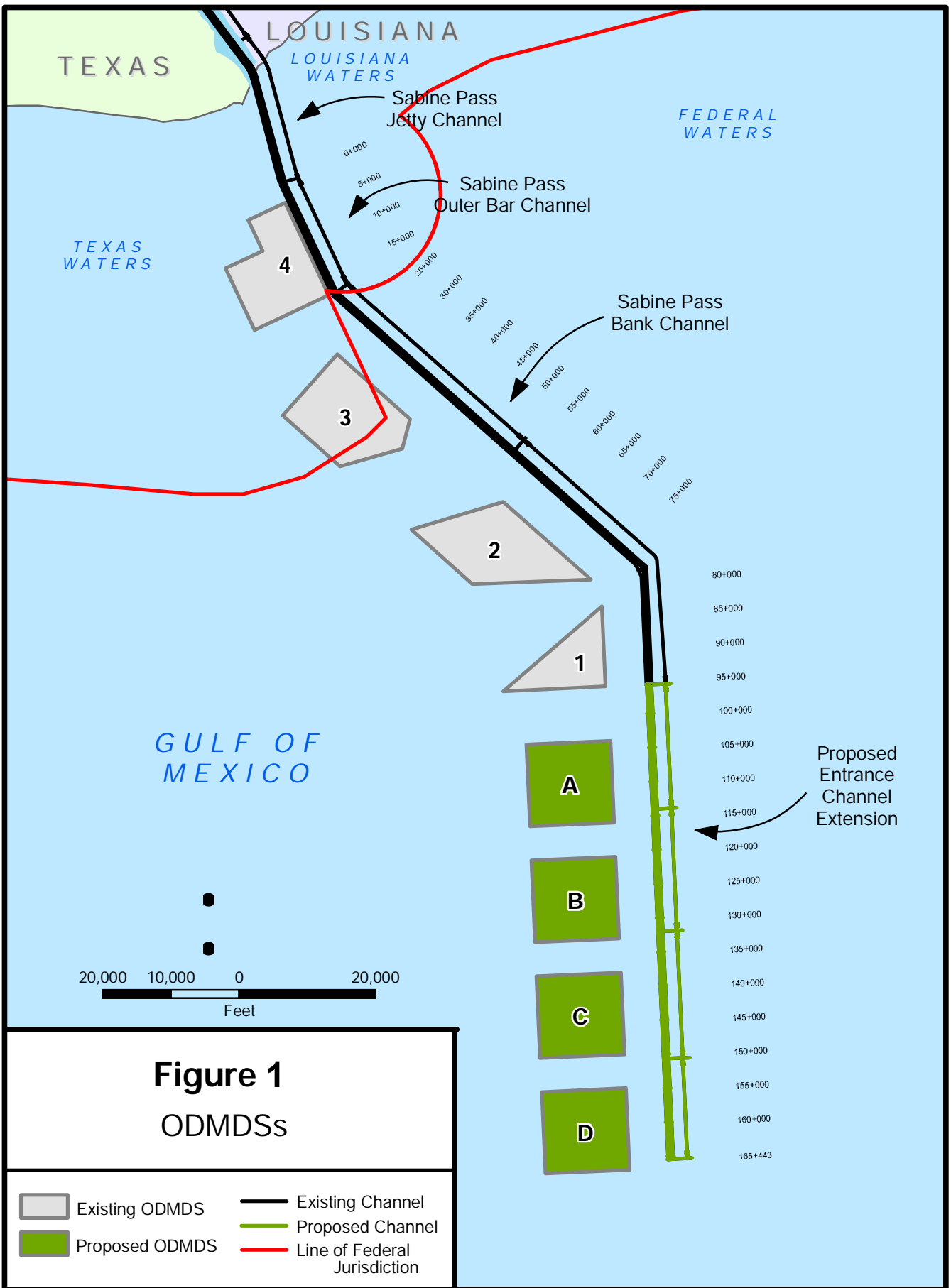
29°28'42"N, 93°41'33"W

29°28'42"N, 93°44'49"W

29°30'08"N, 93°46'27"W

ODMDS No. 3 is located approximately 6.8 nautical miles from shore, about 6,000 feet southwest of the Sabine Bank Channel. This site occupies an area of approximately 4.7 square nautical miles, with a depth of about 33 feet. The site is a pentagon, with vertices at the following coordinates:

29°34'24"N, 93°48'13"W



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29°32'47"N, 93°46'16"W  
29°32'06"N, 93°46'29"W  
29°31'42"N, 93°48'16"W  
29°32'59"N, 93°49'48"W

ODMDS No. 4 is located approximately 2.7 nautical miles from shore, about 500 feet southwest of the Sabine Pass Outer Bar Channel. This site occupies an area of approximately 4.2 square nautical miles, with depths ranging from 16 to 30 feet. The site is L-shaped, with vertices at the following coordinates:

29°38'09"N, 93°49'23"W  
29°35'53"N, 93°48'18"W  
29°35'06"N, 93°50'24"W  
29°36'37"N, 93°51'09"W  
29°37'00"N, 93°50'06"W  
29°37'46"N, 93°50'26"W

Two sediment reference areas have been established for this project. Reference Site 1 and 2 is located east of the Sabine Bank Channel with vertices at the following coordinates:

29°27'30"N, 93°37'00"W  
29°27'30"N, 93°36'45"W  
29°26'38"N, 93°36'45"W  
29°26'38"N, 93°37'00"W

Reference Site 3 and 4 is located northeast of the Sabine Bank Channel with vertices at the following coordinates:

29°35'52"N, 93°41'45"W  
29°35'52"N, 93°41'30"W  
29°35'00"N, 93°41'30"W  
29°35'00"N, 93°41'45"W

Baseline conditions at the SNWW Maintenance ODMDSs were assessed during the site designation process. Details of baseline conditions, including descriptions of the marine environment in the site vicinity and the physical, chemical and biological characteristics of the sediments and the water column at the site, are contained in the "Final Environmental Impact Statement (EIS) for the Sabine-Neches, Texas Dredged Material Disposal Site Designation" prepared by EPA, Criteria and Standards Division, in March 1983. An update of the general area of the existing ODMDSs is presented in PBS&J (2009).

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## B. Site Characterization (Proposed Extension Channel ODMDSs)

The proposed ODMDSs A–D are anticipated to receive both virgin material from project construction and future maintenance material from the Extension Channel (see Figure 1). They are located 21 to 30 miles offshore, with vertices at the following coordinates:

### ODMDS A

29° 24' 47" N, 93° 43' 29" W

29° 24' 47" N, 93° 41' 08" W

29° 22' 48" N, 93° 41' 09" W

29° 22' 49" N, 93° 43' 29" W

### ODMDS B

29° 21' 59" N, 93° 43' 29" W

29° 21' 59" N, 93° 41' 08" W

29° 20' 00" N, 93° 41' 09" W

29° 20' 00" N, 93° 43' 29" W

### ODMDS C

29° 19' 11" N, 93° 43' 29" W

29° 19' 11" N, 93° 41' 09" W

29° 17' 12" N, 93° 41' 09" W

29° 17' 12" N, 93° 43' 29" W

### ODMDS D

29° 16' 22" N, 93° 43' 29" W

29° 16' 22" N, 93° 41' 10" W

29° 14' 24" N, 93° 44' 10" W

29° 14' 24" N, 93° 43' 29" W

These ODMDSs occupy areas of approximately 5.3 square miles each with depths ranging from 44 to 46 feet. One sediment reference area is proposed for the proposed ODMDSs, since the ODMDS EIS found that the offshore area is very constant, both in depth and grain-size characteristics. Reference Site A–D is located east of the Extension Channel with vertices at the following coordinates:

29° 20' 00" N, 93° 37' 00" W

29° 20' 00" N, 93° 36' 45" W

29° 19' 08" N, 93° 36' 45" W

29° 19' 08" N, 93° 37' 00" W

Baseline conditions at the proposed ODMDs A–D were assessed during the site designation process. Details of baseline conditions, including descriptions of the marine environment in the site vicinity and the physical, chemical, and biological characteristics of the sediments and the water column at the site, are contained in the ODMDs Site Designation EIS to which this Attachment is appended.

### C. Historical Use of Sites

ODMDs Nos. 1, 2, 3, and 4 received final designation on September 10, 1987 (52 FR 175). The present configurations of these sites were established in 1971. They received interim designation in 1977 (42 FR 7), and were historically used for placement of dredged material throughout this period. A description of dredged volumes from 1960 through 1979 is contained within the designation EIS. Dredged quantities between 1979 and 2009 are depicted in Table 1.

TABLE 1  
DREDGED QUANTITIES, 1979 TO 2009

Dredging Interval	Quantity of Dredged Material (cubic yards)
October 1– 4, 1979	58,080
March 19–May 30, 1981	3,589,486
April 27–May 20, 1982	1,693,264
July 24–August 7, 1983	200,000
July 22–September 30, 1984	5,835,135
June 13–September 7, 1985	5,353,000
May 12–July 13, 1986	5,626,837
July 11–September 21, 1987	3,972,320
September 4–October 16, 1988	3,002,319
April 5–July 20, 1991	5,251,477
August 22–October 21, 1991	5,566,950
September 11–November 7, 1992	2,363,981
December 10, 1993–January 10, 1994	1,911,311
August 12–September 12, 1994	1,337,096
September 1 –October 30, 1994	2,899,203
January 23–April 26, 1996	3,723,835
March 12–September 25, 1997	4,742,465
August 13–October 7, 1998	4,398,064
January 11–May 2, 2000	4,782,702
May 12–June 18, 2001	4,063,603
July 27 –August 13, 2002	2,877,918
August 6–September 27, 2003	3,544,956
December 17, 2004–January 8, 2005	2,922,465
July 28–August 26, 2006	1,524,203
December 28, 2007–April 24, 2008	2,646,462
2009	Maintenance Dredging-Ongoing
Total	83,887,132
Average	3,355,485

The material is dredged from the SNWW: Sabine Bank, Sabine Pass Outer Bar, and Sabine Pass Jetty channels, and transported to the ODMDS by hopper dredge or scow. The dredge, either a conventional bottom-opening hopper or a split-hulled hopper, travels from the dredging site with its doors closed. Upon reaching the designated ODMDS, the hoppers are opened and the material is released as the dredge travels through the site. The hoppers are closed before the dredge leaves the site. The disposal operations occur 24 hours a day, 7 days a week until the dredging is completed. Historically, dredged material release points were not specified; however, a 500-foot-wide no-discharge zone immediately inside the boundaries of each ODMDS was observed to prevent short-term transport of the material out of the sites.

#### **D. Proposed ODMDSs**

The proposed ODMDSs have not previously received any dredged material from the existing SNWW project.

### **VI. QUANTITY OF MATERIAL AND LEVEL OF CONTAMINATION**

#### **A. Summary of Information Used to Determine Size of the Site**

Historically, the dredging frequency for this navigation project ranges from 1 year for the Outer Bar Channel to 5 years for the Jetty Channel, with an average of about 3,355,485 cubic yards (cy) of material excavated per dredging contract. The excavated channel sediments can be characterized as clayey-sandy-silts. Average particle-size distributions are described in Table 2.

TABLE 2

EXCAVATED CHANNEL SEDIMENT AVERAGE PARTICLE-SIZE DISTRIBUTION

Location	% Sand	% Silt	% Clay
Channel	14.6	45.8	39.6
ODMDS No. 1	95.3	2.3	2.4
ODMDS No. 2	60.0	24.3	15.8
ODMDS No. 3	49.4	28.6	22.1
ODMDS No. 4	9.1	45.8	45.1
Reference Area 1 and 2	48.8	35.4	15.9
Reference Area 3 and 4	49.1	33.5	17.4

As described in the site designation EIS, the existing interim designated ODMDSs were evaluated as an alternative for final designation, as were other mid-shelf and deepwater areas. Although no specific analyses were conducted to determine optimal size for each placement area, the existing sites were determined to be the preferred alternative for final designation. However, the sizes of the sites have been re-examined by the use of the MDFATE model from USACE Engineering Research and Design Center (ERDC) (PBS&J, 2009) to ensure the sites were large enough to handle the expected maintenance material from the SNWW Channel Improvement Project (CIP). Primary considerations in EPA (1983) for selecting these sites were as follows:



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1. Benthic sampling data indicated that despite more than 20 years of disposal, no significant changes had occurred in the faunal communities as a result of disposal operations, and that future changes in the benthic community were not anticipated to occur from continued disposal into these sites.
  2. The sites are situated in a high-energy erosional zone and can generally accept large volumes of dredged material with little apparent net change to the bottom.
  3. The sites are within the inlet zone and are adjacent to the channel, providing easy access for dredged material placement operations and reduce costs.
  4. Studies have shown that there are no unique fisheries in the area.
  5. Regulations require that, wherever feasible, historically used sites be designated.

The irregular shapes of the areas are a result of their locations. ODMDS No. 1 is situated adjacent to the safety fairway and Sabine Bank, whereas ODMDS No. 2 is located between the intersection of two safety fairways, and Sabine Bank. Similarly, ODMDS No. 3 is located at the intersection of two safety fairways.

## **B. Summary of Testing Requirements per Regional Implementation Agreement and Summary of Past Dredged Material Evaluations**

On September 24, 1992, a Regional Implementation Agreement (RIA) was executed between EPA Region 6, and SWG. The RIA was revised and updated, and a new RIA issued November 3, 2003. This RIA described protocols for evaluating the quality of the dredged material and implementation of the *Green Book* (EPA/USACE, 1991). These protocols describe chemical parameters to be analyzed, as well as required detection limits. It also specifies how toxicity testing and bioaccumulation assessments are to be conducted, as well as organisms to be utilized. Since that time, all sediment evaluations have been conducted in accordance with the RIA. Since the mid-1970s before development of the RIA, dredged material from the SNWW had been evaluated numerous times to determine suitability for offshore placement. This testing was performed to determine levels of metals and organic constituents, as well as toxicity and bioaccumulation assessments. Testing performed for this project is summarized in Table 3. The testing indicated that the material was suitable for offshore placement without special management conditions.

## **VII. ANTICIPATED SITE USE**

As previously discussed, the dredging frequency for this project ranges from 1 to 5 years with an average of approximately 3,355,000 cy of material excavated per dredging contract. It is anticipated that, with the SNWW CIP, the existing maintenance ODMDSs would receive a total of 10.5 million cubic yards (mcy) of dredged material per maintenance cycle, and the proposed channel extension ODMDSs would receive a total of 3.0 mcy of dredged material per maintenance cycle. Presently, the ODMDSs are coordinated to receive dredged material from the federally maintained SNWW CIP. Material from other sources is not presently placed at these sites, and none is expected in the foreseeable future, except the construction material from the SNWW CIP.

TABLE 3

## DREDGED MATERIALS TIMETABLE

Date	Type of Testing
February 22 and March 1, 1977	Pre-dredging Bulk Analyses
June 1978	Toxicity and Bioaccumulation Assessment
October 1978	Toxicity and Bioaccumulation Assessment
September 1979	Toxicity and Bioaccumulation Assessment
December 1, 1981	Pre-dredging Bulk Analyses
November 30, 1982	Pre-dredging Bulk Analyses
November 1983	Toxicity and Bioaccumulation Assessment
December 1983	Toxicity and Bioaccumulation Assessment
May 14, 1984	Pre-dredging Bulk Analyses
February 24, 1986	Pre-dredging Bulk Analyses
January 29, 1987	Pre-dredging Bulk Analyses
May 22, 1992	Pre-dredging Bulk Analyses
November 1993	Toxicity and Bioaccumulation Assessment
December 8, 1993	Pre-dredging Bulk Analyses
November 16, 1995	Pre-dredging Bulk Analyses
February 4, 1998	Pre-dredging Bulk Analyses
June 10, 1999	Toxicity and Bioaccumulation Assessment
July 12, 2004	Toxicity and Bioaccumulation Assessment

Currently, no beneficial use of the material dredged from the offshore segments of the SNWW is practiced. It is the policy of the USACE-SWG to implement beneficial uses of dredged material, wherever practicable. However, beneficial uses of the material from this project have not yet been identified.

## VIII. SPECIAL MANAGEMENT CONDITIONS OR PRACTICES

Currently, no special management conditions or practices related to placement of dredged material into the designated ODMDs have been required. As previously discussed, evaluations of sediment quality have indicated that the material from the channel is suitable for offshore placement without such requirements. However, all operations shall be conducted such that the dredged material remains within the bounds of the ODMDs immediately following descent to the ocean floor.

A seasonal restriction has been recommended by the National Marine Fisheries Service (NMFS), during formal consultation undertaken pursuant to the Endangered Species Act (NMFS, 2007). This restriction was based on potential impacts of hopper dredging operations on several species of threatened and endangered sea turtles. The recommendation is to restrict hopper dredging to the period from December 1 through March 31, during which turtle abundance is at a minimum. This recommendation pertains, however, only to actual dredging operations, and not placement of the material into the ODMDs. While it may not be practical to observe this restriction for all dredging cycles, it will be practiced when feasible.

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## IX. MONITORING PROGRAM

The primary purpose of the Site Monitoring Program is to evaluate the impact of the placement of dredged material on the marine environment. The evaluations will be used for making decisions, preventing unacceptable adverse effects beyond the site boundary, and ensuring regulatory compliance over the life of the ODMDs. Emphasis will be placed on determining physical impacts since, to date, dredged material from the SNWW has been determined to be acceptable for ocean placement without special conditions; however, consideration of contaminants will also be included. Testing of dredged material is conducted based on *Green Book* and RIA procedures; however, it is necessary to verify that the decisions made regarding the suitability of the dredged material are correct and that the material is not having an adverse impact to the environment. In the event that the material persists in the ODMDs, there may be potential for long-term contaminant effects on the benthos.

The size and location of the SNWW ODMDs were determined pursuant to the General Criteria as listed in 40 CFR 228.5 and the Specific Criteria at 40 CFR 228.6(a). There are no significant environmental resources delineated within or immediately outside of the designated ODMDs. Since these sites are dispersive in nature, the primary concern of the use of the sites is the potential short-term build-up of dredged material, such that a hazard to navigation is presented. Another concern is whether there is significant short-term movement of the dredged material beyond the ODMD boundaries; specifically, the benthic community can be impacted if significant rapid movement of material off the sites occurs, resulting in burial of benthic populations outside the sites. Studies have shown that benthic organisms can burrow through 6 to 9 inches of dredged material without significant impacts on the community (EPA/USACE, 1996).

The Site Monitoring Program is designed as a tiered program. If initial tier results fail predetermined limits, then a more complex set of tests is invoked at the next tier to determine the extent of impact. The tiers are used to facilitate rapid, accurate, and economical collection of information for use by the EPA Region 6, and the USACE-SWG. The tiered testing for these factors is described below.

### A. Construction Material

While the literature on maintenance material disposal on the Gulf Coast indicates only minor short-term and negligible long-term mounding from placement activities, little information is available for virgin material ODMDs. Mounding from the construction material, while acceptable, is higher and of firmer material than is true for the maintenance material. Additionally, construction placement is expected to last for only a period of 2 years or less, and more-frequent monitoring would be expected than would be necessary for the periodic but short-term placement that occurs with maintenance dredging. The following monitoring and surveillance program is proposed for the SNWW CIP ODMDs during construction. The monitoring is discussed in detail below. ODMD 1 and ODMD C are the existing and proposed ODMDs, respectively, expected to receive the most construction material and are selected as worst cases for the monitoring described below.

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A major consideration in the acceptability of the size of the ODMDSs was the location of the dredge when each discharge occurs. To prevent excessive mounding, it is necessary that a method be utilized to record the location of each discharge to ensure that the dredge distributes material uniformly over the ODMDS, while it avoids approaching the edges of the ODMDS too closely. The following is the scheme used in the modeling to avoid excessive mounding and dispersal of material outside the ODMDS: two discharges at all exterior placement points (one should a larger dredge be used), followed by one discharge at each of the interior placement points in a given sequence until each has been utilized (figures 2a and 2b, ODMDS C and ODMDS 1, respectively). Continue repeating the sequence with one discharge at each interior placement point until construction is complete.

## **Tier CI**

### *Bathymetric Surveys*

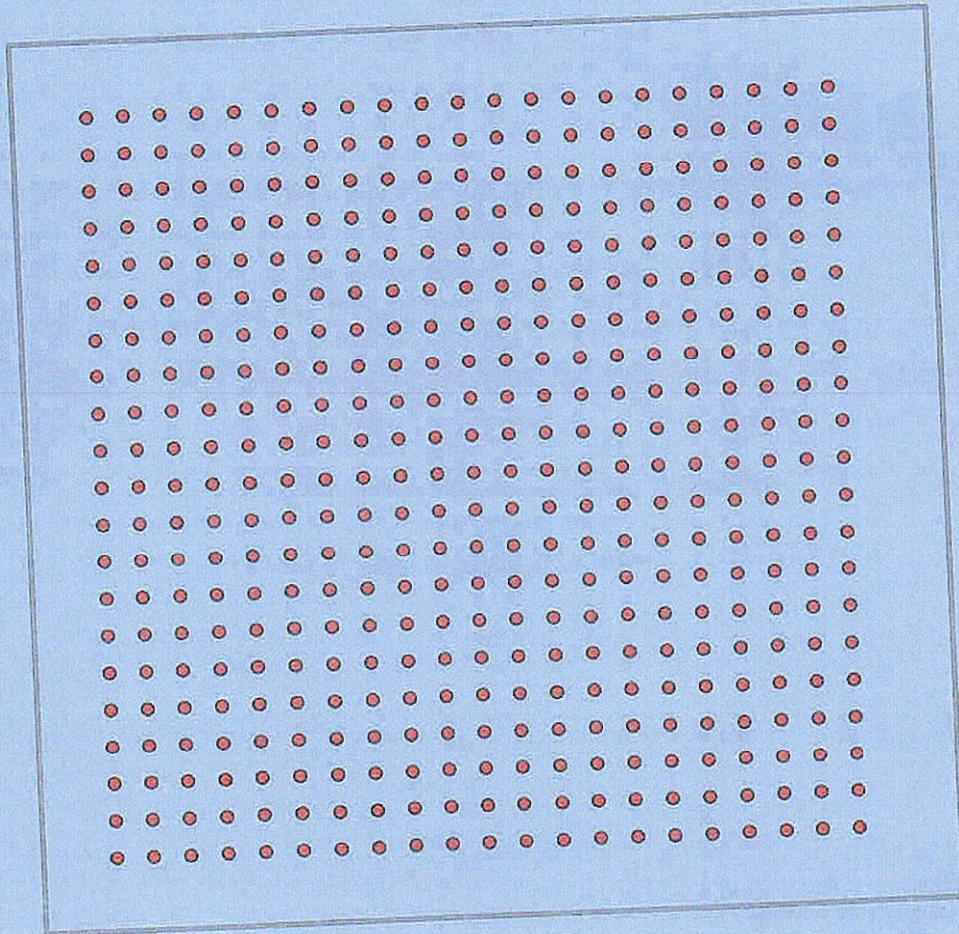
Routine bathymetric scans shall be conducted for the ODMDSs to determine that there is no excessive mounding, e.g., to elevations greater than 10 feet above the existing bottom elevation (unless an alternate height is determined in agreement between the EPA and USACE on a case-by-case basis), and that there is no short-term transport of material beyond the limits of the ODMDS. Therefore, an accumulation of 1 foot of sedimentation along the ODMDS boundary will be considered the threshold level for movement of material outside of the designated ODMDSs. These determinations will be based on a comparison of the results with predisposal surveys.

Bathymetric surveys shall be obtained before the start of disposal operations and monthly thereafter until operations are complete. Additional surveys shall then be performed after 6 months and 1 year.

Hydrographic surveys shall be conducted along transects within the ODMDSs. These transects shall be oriented perpendicular to the channel in the direction of sediment transport (i.e., southwest). Transect intervals shall be every 1,000 feet extending 1,000 feet outside each boundary. In addition, a depth profile shall be obtained along the boundary.

Surveys shall be obtained using a USACE or contract survey vessel equipped with electronic surveying capabilities. The vessel must be equipped with positioning equipment with a horizontal precision of 1 foot. The fathometer, which shall display real-time depth on real-time location, must have a precision of 0.5 foot. All data shall be collected using methodology described in Engineer Manual (EM) 1110-2-1003, dated January 1, 2002.

GULF OF MEXICO



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**Figure 2a**  
Area C  
New Work Materials  
Large Hopper

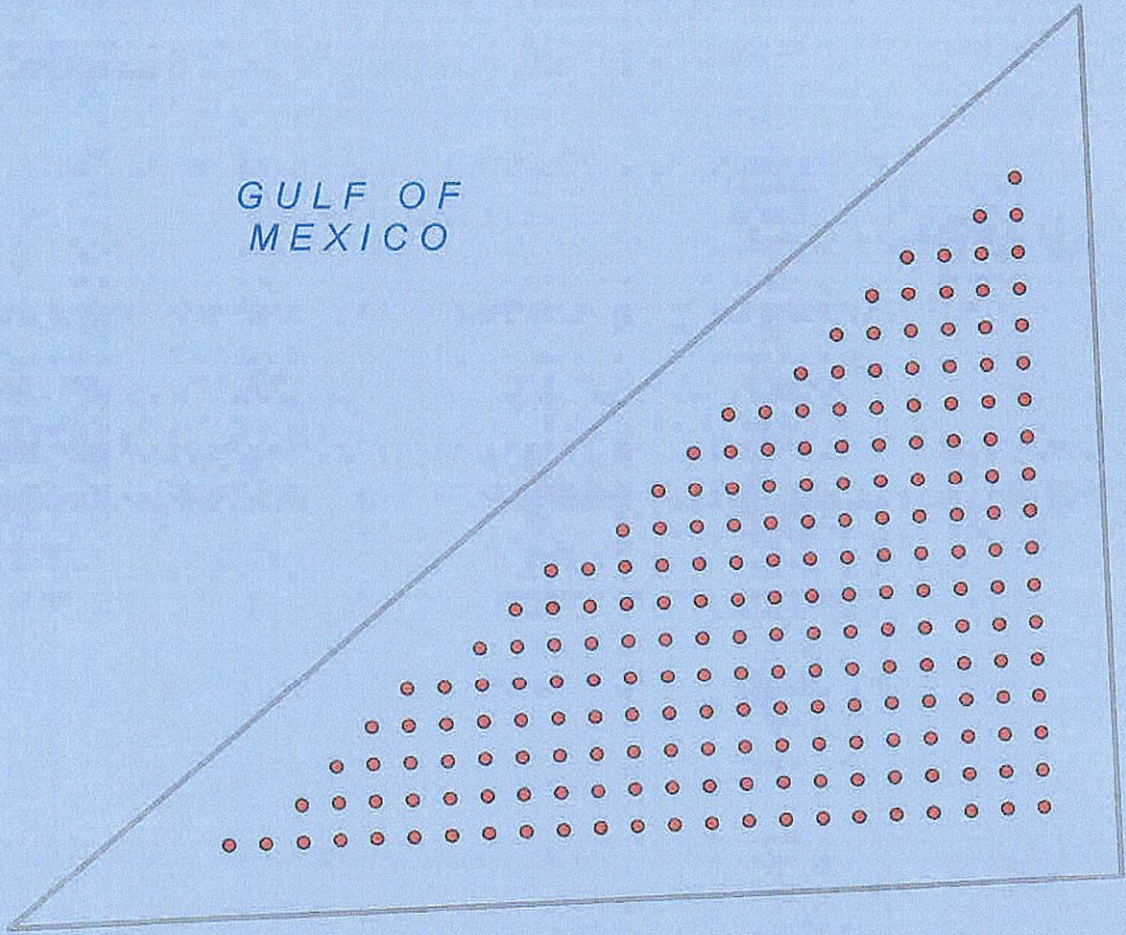
 Proposed ODMDS Area C     Disposal Points



0                      2,500                      5,000  
Feet

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**Figure 2b**  
Area 1  
New Work Materials  
Large Hopper

 Existing ODMDS Area 1     Disposal Points



0                      2,500                      5,000  
Feet

A horizontal scale bar with three segments. The first segment is labeled '0', the second '2,500', and the third '5,000'. The unit 'Feet' is written at the right end of the bar.

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### *Data Analysis*

If the surveys indicate deposited dredged material is not mounding to elevations greater than the threshold elevation above the existing bottom elevation, and there is no short-term movement of material beyond the limits of the ODMDS, then the management objectives are being met. Further monitoring shall be conducted as scheduled.

If the monthly surveys indicate movement of material outside of the designated limits, then the disposal operation will be reviewed to determine whether the disposal sequence is being properly followed. The disposal sequence shall be adjusted as necessary to compensate for the movement.

If the after-disposal surveys indicate mounding to elevations greater than the threshold elevation and/or movement of material out of the ODMDS has occurred, then the monitoring program shall proceed to Tier C2.

### *Sediment Chemistry*

Monitoring stations, which consist of a control station, stations located immediately outside the ODMDS, and stations located some distance downcurrent from the site should be sampled for the items noted in the following paragraph to determine whether impacts are occurring outside of the ODMDS. Monitoring stations will entail two stations on each side of the ODMDS, roughly 300 feet from the ODMDS edges, a control site located upcurrent of the ODMDS, and two stations located 10,000 feet downcurrent (southwest) of the downcurrent edge of the ODMDS. This program is duplicated for ODMDS 1 and C (Figure 3). One additional monitoring site is added on the northwest side of ODMDS 1 to accommodate the irregular shape. Substrate elevation should also be determined at each sampling station during each sampling event.

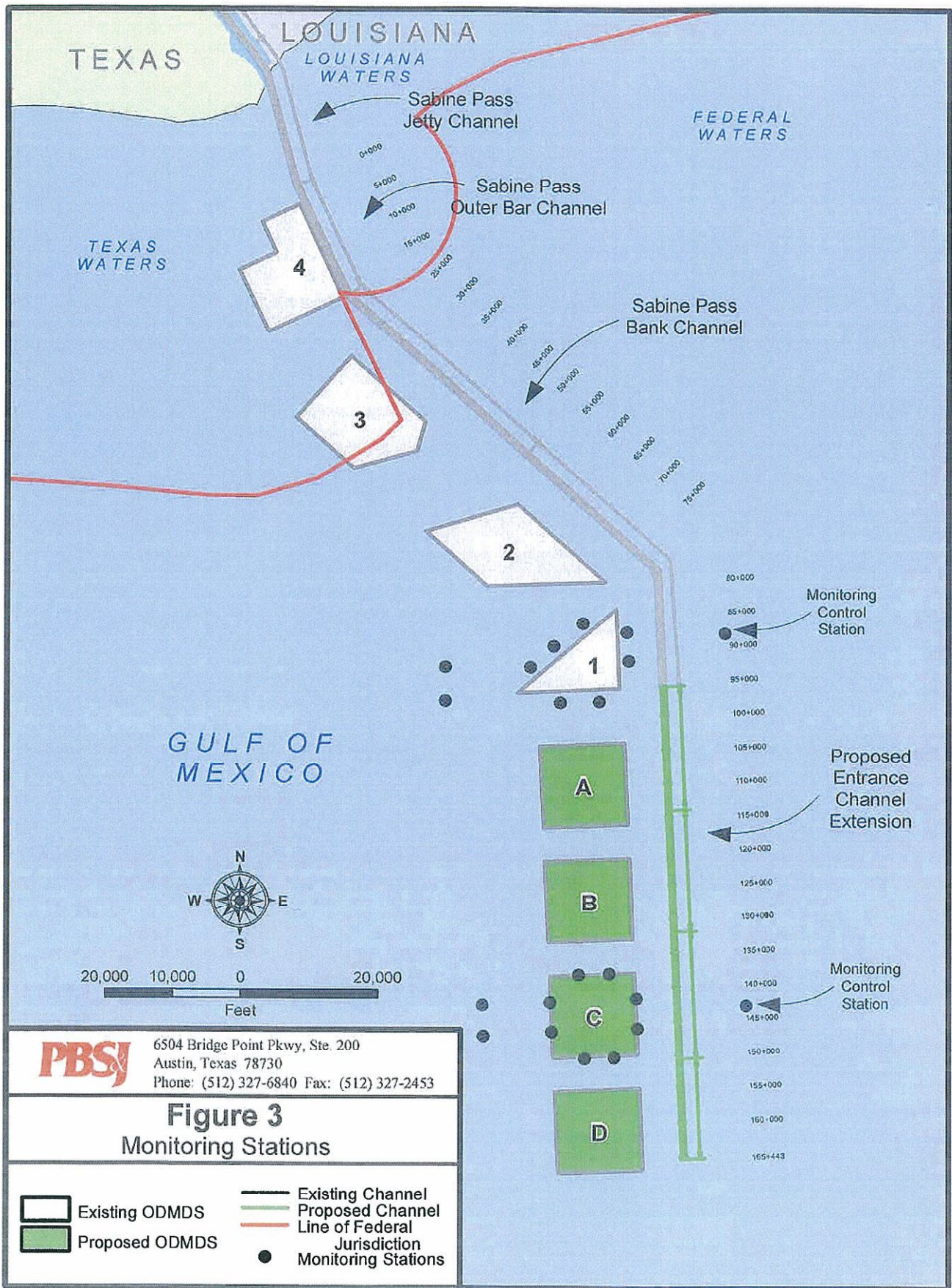
These stations shall be sampled before and at the completion of disposal operations. Postdisposal sampling shall occur 6 months and 1 year after the cessation of discharge of virgin material at the site. Samples shall be collected for (1) grain-size analysis, and (2) chemical characterization of sediments.

### *Data Analysis*

If contaminant concentrations are not significantly different from before-disposal data, then the management objectives are being met. Further monitoring shall be conducted as scheduled.

- If significant increases in levels of contaminants are observed but bathymetric monitoring indicates that there is no short-term transport of material beyond the limits of the ODMDS, as determined in Bathymetric Surveys Tier C1, then this is an indication that the increase is not a result of dredged material placement. Further monitoring shall be conducted as scheduled.

If significant increases in levels of contaminants are observed and bathymetric monitoring indicates that there is short-term transport of material beyond the limits of the ODMDS, as determined in Bathymetric Surveys Tier C1, then a determination will be made whether a



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bioassay/bioaccumulation study is warranted to determine effects to the benthic community. The studies are described below as Biological Testing under Tier C2.

### *Benthos*

Monitoring stations, which consist of a control station, stations located immediately outside the ODMDS, and stations located some distance downcurrent from the site should be sampled for the items noted in the following paragraph to determine whether impacts are occurring outside of the ODMDS. Monitoring stations will entail two stations on each side of the ODMDS, roughly 300 feet from the ODMDS edges (stations B1 through B8), a control site located upcurrent of the ODMDS, and two stations located 10,000 feet downcurrent (southwest) of the downcurrent edge of the ODMDS. These should be the same stations used for sediment chemistry (see Figure 3). Substrate elevation should also be determined at each sampling station during each sampling event.

These stations shall be sampled before and at the completion of disposal operations. Postdisposal sampling shall occur 6 months and 1 year after the cessation of discharge of virgin material at the site. Samples shall be collected for macrobenthic invertebrates (in triplicate). Macrobenthic community structure during each sampling event shall be compared to the control sample to eliminate effects of potential seasonal variation. Significant changes are defined as statistically significant differences in community structure or population density.

### *Data Analysis*

If macrobenthic community structure is not significantly different than the control, then the management objectives are being met. Further monitoring shall be conducted as scheduled.

If significant changes are observed, then further analysis shall be conducted under Tier C2.

## **Tier C2**

### *Bathymetric Surveys*

If deposited dredged material mounds to elevations above the threshold value, then monitoring shall continue as scheduled and could possibly be extended. A Notice to Mariners shall be posted as appropriate.

If transport of material from the site is occurring, hydrographic surveys shall be expanded to include the impacted areas to determine the changes in dispersion of the material. An accumulation of more than 1 foot of sedimentation along the ODMDS boundary will be considered the threshold level for significant movement of material outside of the designated ODMDS.

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## *Data Analysis*

### **During Dredging:**

If deposited dredged material is mounding to elevations above the threshold value but less than 15 feet above the existing bottom elevation, and there is no significant short-term transport of material beyond the limits of the ODMDS, then monitoring shall continue as scheduled. A Notice to Mariners shall be issued as appropriate.

If deposited dredged material is mounding to elevations greater than 15 feet above the existing bottom elevation, and there is no significant short-term transport of material beyond the limits of the ODMDS, then bathymetric monitoring shall continue as scheduled. A Notice to Mariners shall be posted as appropriate. If mounding is considered to be excessive, alterations to the placement operations may be warranted.

If significant movement of material out of the ODMDS is occurring, bathymetric monitoring shall be expanded to include the impacted areas to determine the changes in dispersion of the material. Following completion of disposal operations, surveys shall continue on a quarterly basis for 1 year or until agreement is reached between the EPA and USACE-SWG to discontinue monitoring. Findings shall be documented for future reference.

### **After Dredging:**

If deposited dredged material has mounded to elevations above the threshold value but less than 15 feet above the existing bottom elevation, and there is no significant short-term transport of material beyond the limits of the ODMDS, then bathymetric monitoring shall continue at predetermined 6-month intervals for 1 year or until agreement is reached between the EPA and USACE-SWG to discontinue monitoring. Findings shall be documented for future reference, and a Notice to Mariners shall be issued as appropriate.

If deposited dredged material is mounding to elevations greater than 15 feet above the existing bottom elevation, and there is no significant short-term transport of material beyond the limits of the ODMDS, then bathymetric monitoring shall continue at predetermined 6-month intervals for 1 year or until agreement is reached between the EPA and USACE-SWG to discontinue monitoring. Findings shall be documented for future reference, and a Notice to Mariners shall be issued as appropriate.

If significant movement of material out of the ODMDS has occurred, bathymetric monitoring shall be expanded to include the impacted areas to determine the changes in dispersion of the material and shall continue on a quarterly basis for a 1-year period or until agreement is reached between the EPA and USACE-SWG to discontinue monitoring. Findings shall be documented for future reference.

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### *Sediment Chemistry*

If the results of the Tier C1 sediment chemistry evaluation suggest the need for additional testing, then solid-phase bioassay and bioaccumulation testing shall be conducted in accordance with the procedures described in the RIA. If the sediment can be attributable to recent dredging, funding for testing under this Tier will be provided by USACE-SWG or the Permittee, as appropriate; otherwise funding will be provided by EPA, Region 6. Any such testing is contingent on availability of appropriated funds.

### *Data Analysis*

If significant toxicity is not found, testing shall continue as described in Tier C1. However, subsequent sampling shall continue on a quarterly basis for the 1-year period following completion of disposal operations or until agreement is reached between the EPA and USACE-SWG to discontinue monitoring. Findings shall be documented for future reference.

If significant toxicity is found, the USACE-SWG together with EPA Region 6 will consider various management options to rectify the situation. Because the ODMDS is a dispersive site, potential sources of toxicity other than dredged material must also be considered. A decision must also be made whether to allow continued use of this site. Findings shall be documented for future reference.

### *Benthos*

A significant change in community structure or population density may be an indication that the substrate has changed. This could be a result of natural redistribution of sediments or the dredged material may be moving beyond the ODMDS at a faster rate than anticipated. A change in community structure could also indicate that toxicity has occurred. Monitoring the macrobenthic community shall continue on a quarterly basis until 1 year following completion of discharge operations has elapsed or until agreement is reached between the EPA and USACE-SWG to discontinue monitoring.

### *Data Analysis*

If significant changes are observed but bathymetric monitoring indicates that there is no short-term transport of material beyond the limits of the ODMDS, as determined in Bathymetric Surveys Tier C1, then this is an indication that the changes are not a result of dredged material placement. Further monitoring shall be conducted as scheduled.

If significant changes are observed and bathymetric monitoring indicates that there is short-term transport of material beyond the limits of the ODMDS, as determined in Bathymetric Surveys Tier C1, then this is an indication that the changes may be a result of dredged material placement. Further monitoring shall be conducted as scheduled.

- If significant changes are observed 1 year following completion of disposal operations, then the monitoring shall continue on a quarterly basis for 1 additional year. If significant changes are

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observed after the second year, further monitoring plans will be developed based on the degree of impact.

If significant changes are observed and there is an indication that the sediments are toxic, as determined in Sediment Chemistry Tier C2, then this is an indication that the changes may be a result of dredged material placement. Further monitoring shall be conducted as scheduled.

- If significant changes are observed 1 year following completion of disposal operations, then the monitoring shall continue on a quarterly basis for 1 additional year. If significant changes are observed after the second year, further monitoring plans will be developed based on the degree of impact.

## **B. Maintenance Material**

### **Tier MI**

Physical and chemical evaluations of the ODMDS material shall be conducted to characterize possible effects from the placement of dredged material occurring at the site(s). Physical analyses of the sediment can assist in assessing the impact of disposal practices on the benthic environment at the disposal site and determine if dredged material is migrating offsite. Chemical analyses of the sediment shall be conducted to establish whether contaminants of concern are suspected to be affecting the benthic environment at the disposal site(s).

#### *Bathymetric Surveys*

The ODMDSs are located outside of the safety fairway for large vessel traffic; therefore, the mounding will be considered in regard to shallow-draft vessels only. Considering the grain-size characteristics of typical maintenance dredged material from this channel, significant mounding is not expected subsequent to discharge operations. The threshold elevation for mounding of dredged material within the ODMDS will be 10 feet, or other mutually agreed-upon elevation, above the existing bottom elevation.

Since the sites are dispersive, movement of material from the sites is expected to occur after disposal operations cease. In order to detect if short-term movement of the material out of the designated ODMDS is occurring at a significant rate, hydrographic surveys of the ODMDS shall be obtained before the start of disposal operations and soon after completion of disposal operations. An accumulation of 1 foot of sedimentation along the ODMDS boundary will be considered the threshold level for movement of material outside of the designated ODMDS. This determination shall be based on a comparison of the results of these before and after surveys.

Hydrographic surveys shall be conducted along transects within the ODMDS. These transects shall be oriented perpendicular to the channel in the direction of sediment transport (i.e., southwest). Transect intervals shall be every 1,000 feet extending 1,000 feet outside each boundary. In addition a depth profile shall be obtained along the boundary.

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Surveys shall be obtained using a USACE or contract survey vessel equipped with electronic surveying capabilities. The vessel must be equipped with positioning equipment with a horizontal precision of 1 foot. The fathometer, which shall display real-time depth on real-time location, must have a precision of 0.5 foot. All data shall be collected using methodology described in EM 1110-2-1003, dated January 1, 2002.

### *Data Analysis*

If deposited dredged material is not mounding to elevations greater than the threshold elevation above the existing bottom elevation, and there is no short-term movement of material beyond the limits of the ODMDS, then the management objectives are met. No further postdisposal monitoring will be required.

If mounding to elevations greater than the threshold elevation and/or movement of material out of the ODMDS has occurred, as determined by the postdredging survey, then the monitoring program shall proceed to Tier M2.

### *Sediment Chemistry*

Sediment chemistry analyses shall be conducted in conjunction with the dredged material evaluations from samples collected in the navigation channel. Collecting samples from both the navigation channel and ODMDS during the same sampling event has been determined to be the most efficient use of resources. Because most ODMDSs lie directly adjacent to the navigation channels, there are relatively short distances between the two areas. As described in the RIA, sediment testing in the navigation channels generally occurs on a 5-year cycle. Sediment chemistry results from the ODMDSs should be compared to the results collected from the navigation channel. Significantly elevated sediment concentrations are defined as concentrations above the range of contaminant levels in dredged sediments that the Regional Administrator and the District Engineer found to be suitable for disposal at the ODMDS.

### *Data Analysis*

If contaminant concentrations are not significantly different than navigation channel concentrations, then no further testing is needed.

If significant increases in levels of contaminants are observed at the ODMDS, then a determination will be made whether a bioassay/bioaccumulation study is warranted to determine effects to the benthic community. The studies are described below as Biological Testing under Tier M2.

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## **Tier M2**

### *Bathymetric Surveys*

If transport of material from the sites is occurring, hydrographic surveys shall be expanded to include the impacted areas and shall be performed on a semiannual basis to determine the changes in dispersion of the material until the impacts are no longer observed. An accumulation of more than 1 foot of sedimentation along the ODMDS boundary will be considered the threshold level for significant movement of material outside of the designated ODMDS.

### *Data Analysis*

If deposited dredged material is mounding to elevations above the threshold value, but less than 15 feet above the existing bottom elevation, and there is no significant short-term transport of material beyond the limits of the ODMDS, then semiannual postdisposal monitoring shall occur as described.

If at 6 months after disposal, deposited dredged material remains mounded to elevations greater than half the postdisposal elevations, then bathymetric surveys shall be continued.

If deposited dredged material is mounding to elevations greater than 15 feet and/or significant movement of material out of the ODMDS has occurred, the Galveston District, together with EPA Region 6, will consider various management options to rectify the situation. Such options could include, but are not limited to, expansion of the ODMDS or relocation of the ODMDS within the zone of siting feasibility described in the designation EIS.

### *Biological Testing*

If the results of the Tier M1 sediment chemistry evaluation suggest the need for additional testing, then solid-phase bioassay and bioaccumulation testing shall be conducted in accordance with the procedures described in the RIA. If the sediment can be attributable to recent dredging, funding for testing under this Tier will be provided by USACE-SWG or the permittee, as appropriate; otherwise funding will be provided by EPA, Region 6. Any such testing is contingent on availability of appropriated funds.

### *Data Analysis*

If toxicity is not indicated, then no further testing is needed, and disposal activities can continue at the ODMDS.

If toxicity is indicated at the ODMDS, the Galveston District, together with EPA Region 6, will consider various management options to rectify the situation. Because the ODMDS is a dispersive site, potential sources of toxicity other than dredged material must also be considered. If planned use of the ODMDS is imminent, a decision must also be made whether to allow continued use of this site.

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## **X. SITE MANAGEMENT PLAN REVIEW AND REVISION**

Pursuant to Section 102(c) of the MPRSA, as amended by WRDA 92, the Site Management Plan for the SNWW ODMDs will be reviewed and revised, if necessary, not less frequently than 10 years after adoption and every 10 years, thereafter.

Modifications or updates to the Site Management Plan may be necessary, based on specific needs identified for specific authorized projects. Modifications or updates to the Site Management Plan may be proposed by the USACE-SWG or EPA Region 6. Following a 30-day review period of the changes(s), the modifications may be incorporated into the plan by mutual consent of both agencies.

## **XI. REFERENCES**

National Marine Fisheries Service (NMFS). 2007. Revision 2 to the November 19, 2003 Biological Opinion concerning Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Areas Using Hopper Dredges by COE Galveston, New Orleans, Mobile, and Jacksonville Districts (Consultation Number F/SER/2000/01287).

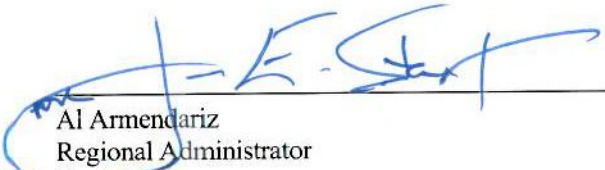
PBS&J. 2009. Environmental Impact Statement, Sabine-Neches Waterway Channel Improvement Project, Texas, Ocean Dredged Material Disposal Site Designation. Document 050232. PBS&J, Austin, Texas.

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U.S. Environmental Protection Agency/U.S. Army Corps of Engineers (EPA/USACE). 1991. Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual (Green Book). EPA-503/8-91/001. 205 pp plus appendices.

———. 1996. Guidance document for development of site management plans for ocean dredged material disposal sites. Office of Water (4504F), Environmental Protection Agency, Washington, D.C.

This Site Management and Monitoring Plan complies with Section 102(c)(3) of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 USC Sections 1401, et seq.) as amended by Section 506 of the Water Resources Development Act of 1992 (WRDA 92; Public Law 102-580) and has been approved by the following officials of Region 6 of the U.S. Environmental Protection Agency, and Galveston District of the U.S. Army Corps of Engineers. This plan goes into effect upon the date of the last signature:

  
\_\_\_\_\_  
Al Armendariz  
Regional Administrator  
Region 6  
U.S. Environmental Protection Agency

5/7/10  
Date

  
\_\_\_\_\_  
David C. Weston  
Colonel, Corps of Engineers  
District Engineer  
Galveston District  
U.S. Army Corps of Engineers

29 APRIL 2010  
Date