



**US Army Corps
of Engineers®**
Galveston District

CORPUS CHRISTI SHIP CHANNEL, TEXAS

**SITE MANAGEMENT PLAN
FOR THE MAINTENANCE DREDGING
OCEAN DREDGED MATERIAL DISPOSAL SITE**

**AS REQUIRED BY
SECTION 102 OF THE
MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT**

SITE MANAGEMENT PLAN

CORPUS CHRISTI SHIP CHANNEL, TEXAS OCEAN DREDGED MATERIAL DISPOSAL SITE

I. General

The Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. 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 Corps of Engineers or, in the case of Federal projects, authorized for disposal under MPRSA Section 103(e), applying environmental criteria established by the Environmental Protection Agency in the Ocean Dumping Regulations (40 CFR Parts 220-229).

Section 102(c) of the MPRSA and 40 CFR 228.4(e)(1) authorize the Environmental Protection Agency (EPA) to designate ocean dredged material disposal sites (ODMDSs) in accordance with requirements at 40 CFR 228.5 and 228.6. Section 103(b) of MPRSA requires that the Corps of Engineers (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 Corpus Christi Ship Channel, TX Ocean Dredged Material Disposal Site, was developed jointly by the U.S. Environmental Protection Agency, Region 6 (EPA, Region 6) and the U.S. Army Corps of Engineers, 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 site;
2. A program for monitoring the site;
3. Special management conditions or practices to be implemented at the site that are necessary for protection of the environment;
4. Consideration of the quantity of dredged material to be discharged at the site, and the presence, nature, and bioavailability of the contaminants in the material;
5. Consideration of the anticipated use of the site over the long term, including the anticipated closure date for the site, if applicable, and any need for management of the site after the closure;
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 Corpus Christi Ship Channel, TX Ocean Dredged Material Disposal Site for maintenance material are as follows:

1. Ocean discharge of only that dredged material that satisfies the criteria set forth in 40 CPR Part 227 Subparts B, C, D, E, and G and Part 228.4(e) and is suitable for unrestricted placement at the ODMDS;

2. Avoidance of excessive mounding either within the site boundaries or in areas adjacent to the site, 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;
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 MOU between USACE-SWG and EPA, Region 6 on Management of ODMDSs signed August 13, 1993, EPA is responsible for designation of ODMDSs. 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 1992.

Development of site management plans for ODMDSs within the Galveston District 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, practical, and applicable to site management decision-making.

IV. Funding

Physical, chemical, and biological effects-based testing shall be undertaken on sediments to be deposited at the ODMDS. This testing will be conducted at least every five years, or as necessary to address contaminant concerns due to unanticipated events, and will be 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 ODMDS, 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, that 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. The Corpus Christi Ship Channel Maintenance ODMDS is located approximately 1.5 miles offshore, and about 1,000 feet southwest of the centerline of the Outer Bar Channel. The site is rectangular in shape with corner coordinates located at:

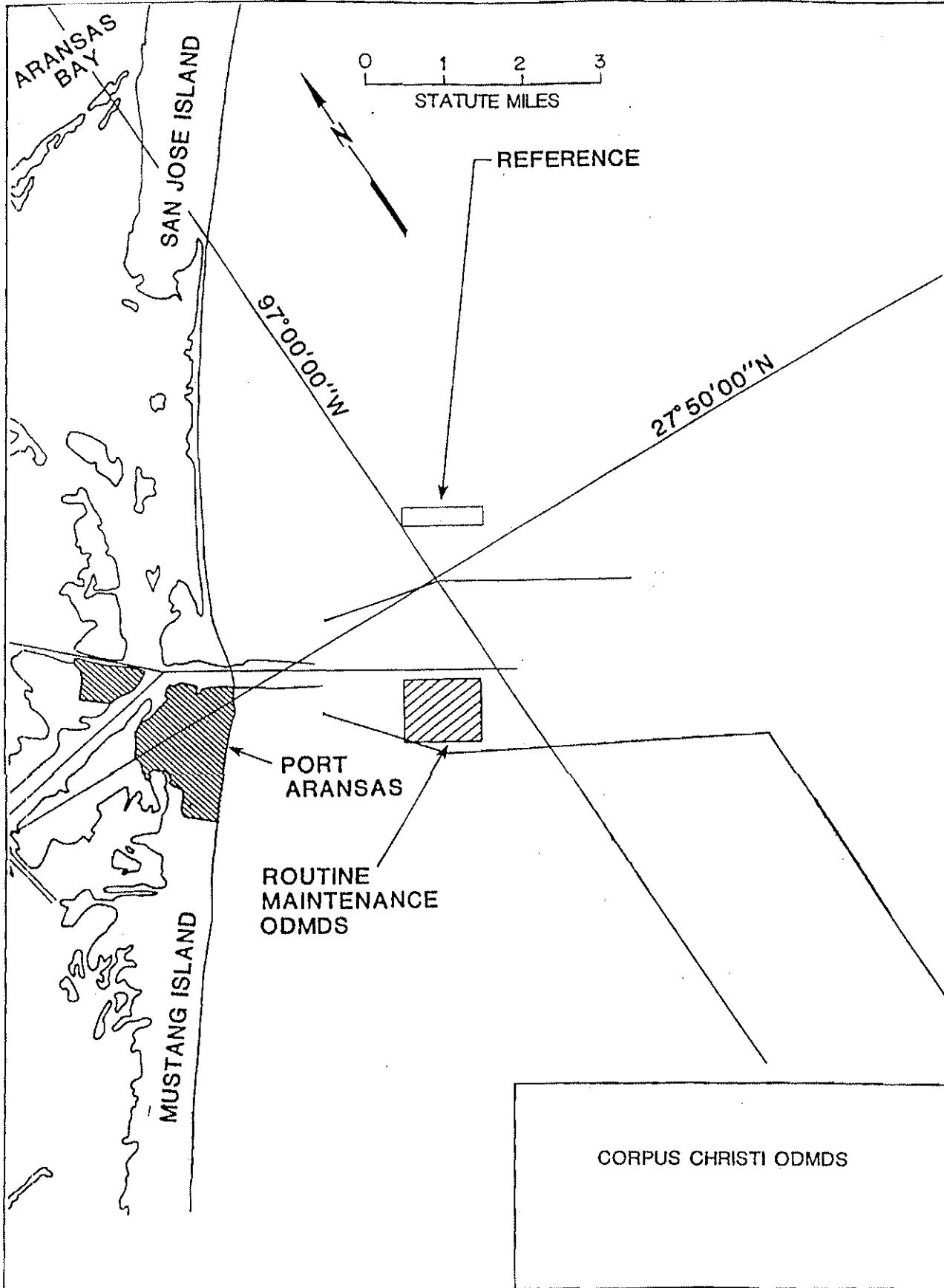
27°49'10"N, 97°01'09"W;
27°48'42"N, 97°00'21"W;
27°48'06"N, 97°00'48"W;
27°48'33"N, 97°01'36"W.

This site occupies an area of approximately 0.63 square nautical miles, with depths ranging from 35 to 50 feet. The sediment reference area is located northeast of the channel with vertices at the following coordinates:

27°50'10"N, 96°59'17"W;
27°50'20"N, 96°59'09"W;
27°50'48"N, 96°59'57"W;
27°50'38"N, 97°00'05"W.

Baseline conditions at the Corpus Christi Ship Channel Maintenance ODMDS 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), Corpus Christi Ship Channel, Ocean Dredged Material Disposal Site Designation" prepared by EPA, Region 6, in April 1989.

B. Historical Use of the Site. The Corpus Christi Ship Channel maintenance ODMDS received final designation on July 11, 1989 (54 FR 131). Historically, the dredging frequency for this navigation project is approximately 2.1 years, with an average of about 1,377,887 cubic yards (CY) of material excavated per dredging contract. Descriptions of dredged volumes from 1969 through 2007 are depicted in the following table:



Maintenance Dredging History

STARTED	COMPLETED	QUANTITY DREDGED (CUBIC YARDS)
May 12, 1969	July 3, 1969	898,568
June 8, 1970	July 19, 1970	570,010
May 19, 1971	September 25, 1971	4,846,577
July 3, 1972	June 30, 1973	1,749,500
March 5, 1973	March 26, 1973	123,036
July 1, 1973	November 6, 1973	1,586,547
September 23, 1976	October 27, 1976	1,026,053
April 20, 1977	May 31, 1977	671,622
April 14, 1978	August 2, 1978	337,704
August 14, 1980	March 1, 1981	4,205,334
August 10, 1982	September 30, 1982	969,500
August 22, 1984	October 12, 1984	1,865,930
September 4, 1992	December 6, 1992	1,774,816
August 9, 1995	September 18, 1995	724,339
June 11, 1999	July 11, 1999	1,417,492
April 9, 2003	July 7, 2003	930,657
July 21, 2006	August 10, 2006	149,706
February 24, 2007	May 23, 2007	954,566
Total		24,801,957
Average		1,377,887

The material is dredged from the Corpus Christi Ship Channel Outer Bar and 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, seven days a week until the dredging is completed.

Prior to the 1989 final designation of the maintenance site, another placement site located closer to shore was used for dredged material discharge. As explained in the Final EIS, this

historically-used site was not selected as the final site because it was located within a buffer zone adjacent to a biologically sensitive area.

VI. Quantity of Material and Level of Contamination

A. Summary of information used to determine size of the site. Historically, since 1969, the dredging frequency for this navigation project is approximately 2.1 years, with an average of about 1,377,887 CY of material excavated per dredging contract. Since the final designation of the maintenance ODMDS in 1989, however, the average quantity of material dredged and deposited offshore decreased to approximately 991,929 CY, while the dredging interval increased to about 2.5 years. The excavated channel sediments can be characterized as predominantly sand with some silt and clay. But, the ODMDS contains a higher percentage of sand than do the channel and reference area. Overall grain size characteristics of the sediment are indicated by the D_{50} , which represents the median particle size. The sediments in the channel and the Reference Area are characterized as very fine sand, while the ODMDS is fine sand. Average particle size distribution is described in the table below.

Particle Size Distribution

LOCATION	AVERAGE COMPOSITION (%)			D_{50} (mm)
	SAND	SILT	CLAY	
Channel	60.7	18.3	20.9	0.117
ODMDS	96.1	3.9	0.0	0.200
Reference Area	58.5	15.7	25.9	0.080

As described in the site designation **EIS**, the size of the ODMDS was determined by simulations run on a computer model. These simulations assumed an average shoaling rate of about 955,000 CY/year, or 1.35 million CY of material to be dredged during each maintenance contract. This quantity is not significantly different from the current average of approximately 991,900 CY dredged per cycle, although the current rate is based on a 2.5-year frequency. Therefore, a smaller average quantity of material is deposited less often than the previous rate. The site can be described as dispersive; therefore the dredged material deposited there is expected to erode and dissipate.

Primary considerations for selecting this site were as follows:

1. The vicinity of the Site has received material dredged from the Corpus Christi Ship Channel Project since the 1960s. Past studies have not determined any significant adverse impacts from disposal in the vicinity.
2. Past studies have determined that this is a high-energy erosional zone and can generally accept large volumes of dredged material with little apparent net change to the bottom.
3. The site is within the inlet zone and is 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.

B. Summary of testing requirements per Regional Implementation Agreement (RIA) and summary of past dredged material evaluations. On September 24, 1992, a RIA was executed between EPA Region 6, and the Galveston District. This RIA was updated on November 3, 2003 (U.S. EPA and USACE, 2003), and describes protocols for evaluating the quality of the dredged material and implementation of the "GREEN BOOK" (U.S. EPA and 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 Corpus Christi Ship Channel Project 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 the following table:

Sediment Quality Assessment History

DATE	TYPE OF TESTING
August 1980	Toxicity and Bioaccumulation Assessment
March 17, 1982	Pre-dredging Bulk Analyses
June 28, 1984	Pre-dredging Bulk Analyses
April 1985	Toxicity and Bioaccumulation Assessment
March 15, 1990 - April 4, 1990	Pre-dredging Bulk Analyses

DATE	TYPE OF TESTING
September 1995	Toxicity and Bioaccumulation Assessment
January 28, 1999	Pre-dredging Bulk Analyses
August 2002	Toxicity and Bioaccumulation Assessment

The above testing indicated that the material was suitable for offshore placement without special management conditions.

VII. Anticipated Site Use

As previously discussed, the current dredging frequency for this project is approximately 2.5 years, with a average of approximately 991,929 CY of material excavated per dredging contract. It is anticipated that the channel will continue to shoal at a similar rate. Presently, the ODMDS only receives dredged material from the Federally-maintained Corpus Christi Ship Channel Project. Material from other sources is not presently placed at this site, and none is expected in the foreseeable future.

Currently, no beneficial use of material dredged from Corpus Christi Ship Channel is practiced. It is the policy of the Galveston District to implement beneficial uses of dredged material, wherever practicable. The high sand content of the channel sediments suggests that there are potential beneficial uses of this material. These will be investigated, in coordination with other State and Federal agencies.

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, 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.

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 Corpus Christi Ship Channel Project 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 "Greenbook" and RIA procedures, however it is necessary to verify 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 dredged material persists in the ODMDS, there may be potential for long-term contaminant effects on the benthos.

The size and location of the Corpus Christi Ship Channel Project 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 this site is dispersive in nature, the primary concern of the use of the site 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 ODMDS boundaries; specifically, the benthic community can be impacted if significant rapid movement of material off the site occurs, resulting in burial of benthic populations outside the site. Studies have shown that benthic organisms can burrow through 6-9 inches of dredged material without significant impacts on the community (Maurer, et al., 1978).

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.

MAINTENANCE MATERIAL

TIER M1

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. 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.

Bathymetric Surveys

The ODMDS is 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 ten (10) feet above the existing bottom elevation.

Since the site is dispersive, movement of material from the site 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 one (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 each 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 one (1) foot. The fathometer, which shall display real-time depth on real-time location, must have a precision of 0.5 feet. All data shall be collected using methodology described in Engineer Manual 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 post-disposal 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 post-dredging 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 five-year cycle. Sediment chemistry results from the ODMDS 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 on the benthic community. The studies are described below as Biological Testing under Tier M2.

TIER M2**Bathymetric Surveys**

If transport of material from the site is occurring, hydrographic surveys shall be expanded to include the impacted area and shall be performed on a semi-annual basis to determine the changes in dispersion of the material until the impacts are no longer observed. An accumulation of more than one (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 fifteen (15) feet above the existing bottom elevation and there is no significant short-term transport of material beyond the limits of the ODMDS, then semi-annual post-disposal monitoring shall occur as described.
- ◆ If at six months after disposal, deposited dredged material remains mounded to elevations greater than half the post-disposal elevations, then bathymetric surveys shall be continued.
- ◆ If deposited dredged material is mounding to elevations greater than fifteen (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.

X. References

- Maurer, D.L., R.T. Keck, J.C. Tinsman, W.A. Leathem, C.A. Wethe, M. Huntzinger, C. Lord, and T.M. Church. 1978. Vertical Migration of Benthos in Simulated Dredged Material Overburdens, Vol. 1: Marine Benthos. Technical Report D-78-35. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- NMFS (National Marine Fisheries Service), 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).
- U.S. EPA and USACE. 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual*. EPA-503/8-91/001. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, Washington, D.C.
- U.S. EPA and USACE. 2003. *Regional Implementation Agreement for Testing and Reporting Requirements for Ocean Disposal of Dredged Material off the Louisiana and Texas Coasts Under Section 103 of The Marine Protection, Research and Sanctuaries Act*. U.S. Environmental Protection Agency, Region 6 and U.S. Army Corps of Engineers, Galveston and New Orleans Districts.

XI. Site Management Plan Review and Revision

Pursuant to Section 102(c) of the MPRSA, as amended by WRDA 1992, the Site Management Plan for the Corpus Christi Ship Channel 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 either the USACE-SWG or EPA Region 6. Following a thirty (30) day review period of the changes(s), the modifications may be incorporated into the plan by mutual consent of both agencies.

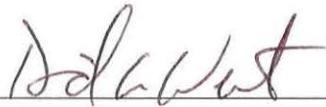
This Site Management Plan complies with Section 102(c)(3) of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. Sections 1401, *et seq.*) as amended by Section 506 of the Water Resources Development Act of 1992 (WRDA 92; Public Law 102-580), and has been approved by the following 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:



Richard E. Greene
Regional Administrator
Region 6
U.S. Environmental Protection Agency

NOV 25 2008

Date



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

15 DEC 2008

Date