

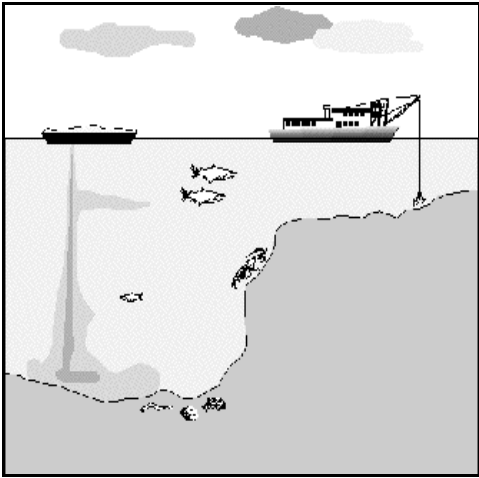
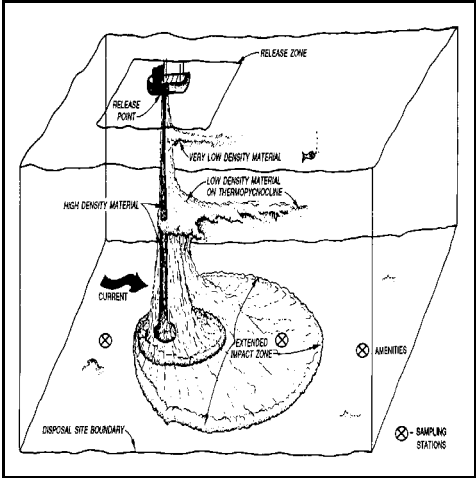
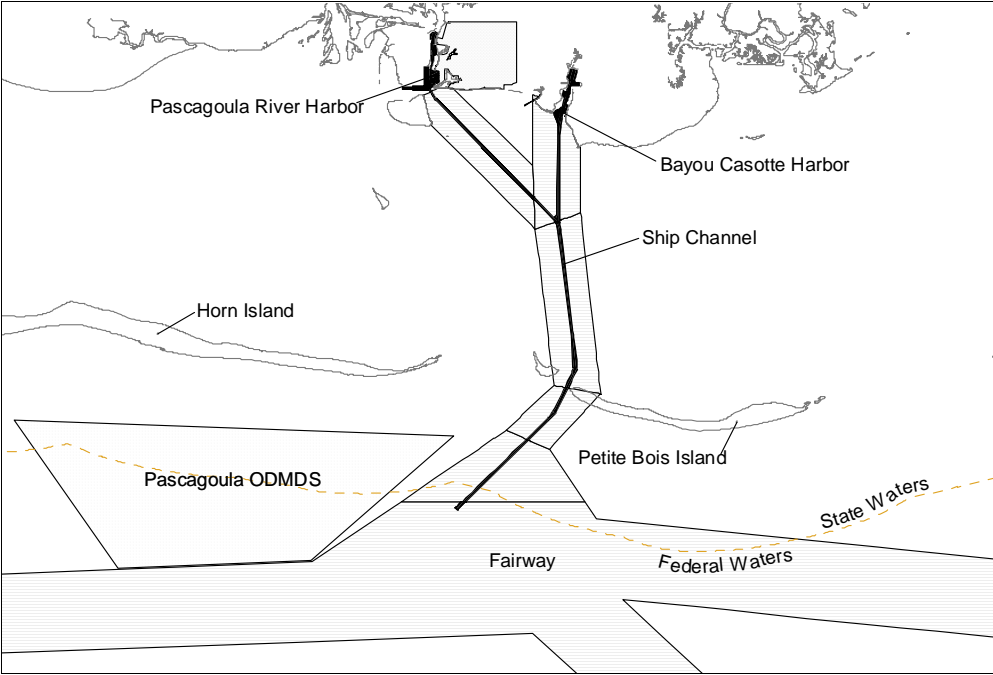


# PASCAGOULA OCEAN DREDGED MATERIAL DISPOSAL SITE



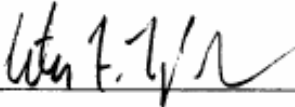
U.S. Army Corps  
of Engineers

# SITE MANAGEMENT AND MONITORING PLAN




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The following Site Management and Monitoring Plan (SMMP) for the Pascagoula Ocean Dredged Material Disposal Site (ODMDS) has been developed and agreed to pursuant to the Water Resources Development Act Amendments of 1992 (WRDA 92) to the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps).

 5/30/06

Pete Taylor  
Colonel, District Commander  
U.S. Army Corps of Engineers,  
Mobile District  
Mobile, Alabama

 MAY 18 2006

J. I. Palmer,  
Regional Administrator  
U.S. Environmental Protection Agency  
Region 4  
Atlanta, Georgia

This plan is effective from the date of signature for a period not to exceed 10 years. The plan shall be reviewed and revised more frequently if site use and conditions at the site indicate a need for revision.

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**PASCAGOULA ODMDS**  
**SITE MANAGEMENT AND MONITORING PLAN**

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**PASCAGOULA ODMDS  
SITE MANAGEMENT AND MONITORING PLAN**

**1.0 INTRODUCTION.**

It is the responsibility of the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) under the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 to manage and monitor each of the Ocean Dredged Material Disposal Sites (ODMDSs) designated by the EPA pursuant to Section 102 of MPRSA. A site management and monitoring plan (SMMP) was originally developed as part of the designation process and was published in July 1991 as part of the *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site Located Offshore Pascagoula, Mississippi* to specifically address the disposal of dredged material into the Pascagoula ODMDS. This plan is currently being revised to incorporate subsequent monitoring results and to comply with provisions of the Water Resources Development Act (WRDA) of 1992. This document serves as a revision to and supercedes the original plan. Upon finalization of this revised SMMP, these SMMP provisions shall be requirements for all dredged material disposal activities at the site. **All Section 103 (MPRSA) ocean disposal permits or evaluations shall be conditioned as necessary to assure consistency with the SMMP.**

This SMMP has been prepared in accordance with the *Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites* (EPA and COE 1996). This document provides a framework for the development of SMMPs required by MPRSA and WRDA 92. The SMMP may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process. The SMMP will be reviewed and revised as needed or every ten years, whichever time period is shorter.

**1.1 Site Management and Monitoring Plan Team.** An interagency SMMP team has been established to assist EPA and the Corps in finalizing this SMMP. The team consists of the following agencies and their respective representatives:

Corps, Mobile District Dr. Susan Rees & Ms. Jenny Jacobson	Jackson State Port Authority Mr. Allen Moeller
Mississippi Department of Environmental Quality Mr. Robert Seyfarth	EPA Region 4 Mr. Doug Johnson
National Oceanic and Atmospheric Administration Mr. Buck Sutter	U.S. Coast Guard District Commander
Mississippi Department of Marine Resources Mr. Jan Boyd	Mississippi Secretary of State, Land Division Anita German Conner

Other agencies, such as the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), and the Minerals Management Service (MMS) will be asked

to participate where appropriate. The SMMP team will assist EPA and the Corps in evaluating existing monitoring data, the type of disposal (i.e., operations and maintenance (O&M) vs. new work), the type of material (i.e., sand vs. mud), location of placement within the ODMDS, and quantity of material. The team will assist EPA and Corps on deciding on appropriate monitoring techniques, the level of monitoring, the significance of results and potential management options.

Specific responsibilities of EPA and the Corps, Mobile District are:

**EPA:** EPA is responsible for designating/designating MPRSA Section 102 ODMDSs, for evaluating environmental effects of disposal of dredged material at these sites and for reviewing and concurring on dredged material suitability determinations.

**Corps:** The Corps is responsible for evaluating dredged material suitability, issuing MPRSA Section 103 permits, regulating site use, and developing and implementing disposal-monitoring programs.



**2.0 SITE MANAGEMENT.**

ODMDS management involves a broad range of activities including regulating the schedule of use, the quantity, and the physical/chemical characteristics of dredged materials disposed of at the site. It also involves establishing disposal controls, conditions and requirements to avoid and minimize potential impacts to the marine environment. Finally, ODMDS management involves monitoring the site environs to verify that unanticipated or significant adverse effects are not occurring from past or continued use of the site and that permit conditions are met.

Section 228.3 of the Ocean Dumping Regulations (40 CFR 220 - 229) states that "management of a site consists of regulating times, rates, and methods of disposal and quantities and types of materials disposed of; developing and maintaining effective ambient monitoring programs for the site; conducting disposal site evaluation studies; and recommending modifications in site use and/or designation." The plan may be modified if it is determined that such changes are warranted as a result of information obtained through the monitoring process. MPRSA, as amended by WRDA 92, provides that the SMMP shall include but not be limited to:

- A baseline assessment of conditions at the site;
- A program for monitoring the site;
- Special management conditions or practices to be implemented at each site that are necessary for the protection of the environment;
- Consideration of the quantity and physical/chemical characteristics of dredged materials to be disposed of at the site;
- Consideration of the anticipated use of the site over the long-term; and
- A schedule for review and revision of the plan.

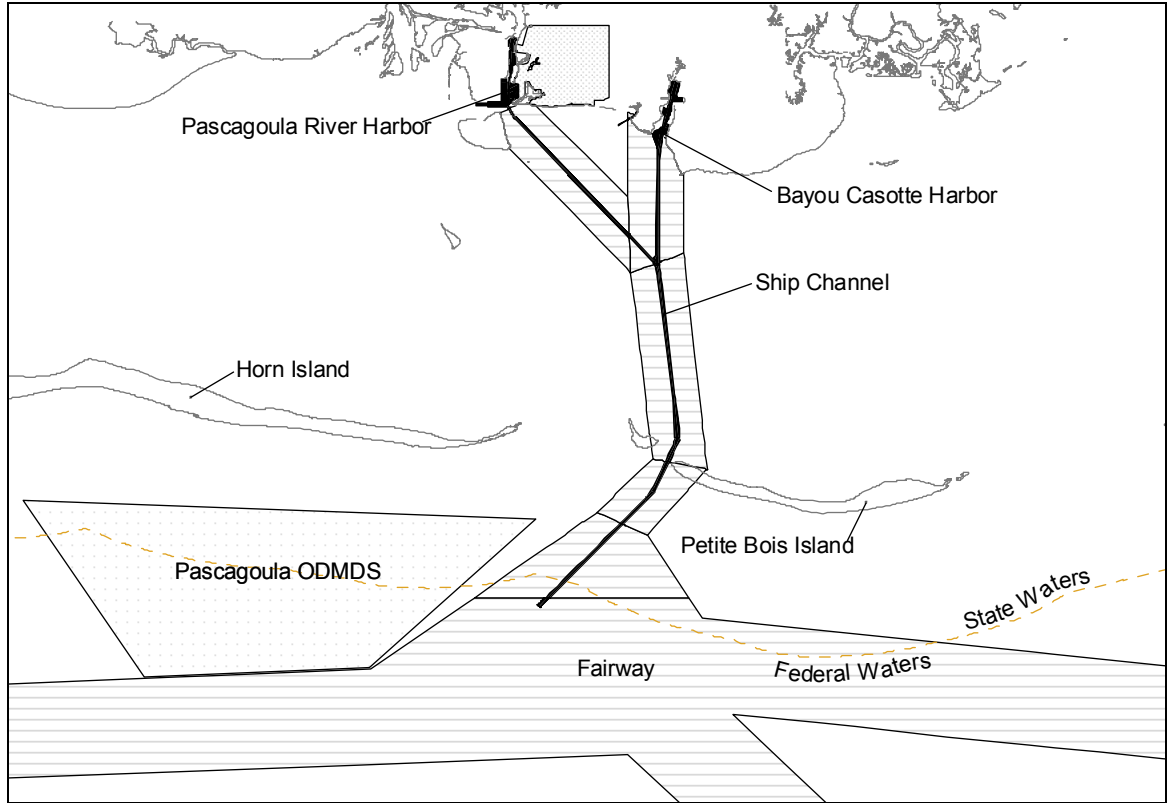
**2.1 Disposal Site Characteristics.** The Pascagoula ODMDS is located within the area surrounded by Horn Island to the north, the Pascagoula Ship channel to the east, the navigation safety fairway to the south, and a north-south line running through Dog Keys Pass to the west (**Figure 1**). The Pascagoula ODMDS encompasses an area of approximately 18.5 square nautical miles (nmi) ranging in depth from about 38 feet in the north to over 52 feet in the southern section. The center coordinates for the site are 30°10'09"N and 88°39'12"W. The boundary coordinates of the Pascagoula ODMDS are (NAD 27):

30°12'06" N	88°44'30" W
30°11'42" N	88°33'24" W
30°08'30" N	88°37'00" W
30°08'18" N	88°41'54" W

It is intended that the Pascagoula ODMDS will be utilized for maintenance and new work material from the Pascagoula Harbor Federal navigation project, for maintenance material from the channels and turning basin associated with Naval Station Pascagoula, and possibly by private entities, such as the Jackson County Port Authority (JCPA),

Northrop Grumman (formerly known as Ingalls Shipbuilding), and Chevron Refinery. Much of this use is projected to occur in the future and therefore the exact nature and quantity of the material, the time of disposal, and the type of equipment to be used are unknown. Physical and biological conditions at the ODMDS are described in the *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site located Offshore Pascagoula, Mississippi* (USEPA, 1991).

**Figure 1.** Pascagoula ODMDS Location



**2.2 Management Objectives.** There are three primary objectives in the management of the Pascagoula ODMDS:

- Protection of the marine environment, living resources, and human health and welfare;
- Documentation of disposal activities at the ODMDS and provision of information that is useful in managing the dredged material disposal activities;
- Beneficial use of dredged material whenever practical.

The objective of the SMMP is to provide guidelines in making management decisions necessary to fulfill mandated responsibilities to protect the marine environment as discussed previously. Risk-free decision-making is an impossible goal; however, an appropriate SMMP can narrow the uncertainty. The following sections provide the framework for meeting these objectives.

**2.3 Dredged Material Volumes.** It is intended that the Pascagoula ODMDS will be used for disposal of dredged material (both maintenance and construction or new work material) from the Pascagoula Harbor and vicinity. The primary user of the ODMDS will be the COE for maintenance of the Pascagoula Harbor Federal Project. In 1985, the Port of Pascagoula Special Management Area (SMA) Plan was prepared to implement a strategy for the management of the port. Included in this plan was a long-term plan for the disposal of dredged material from the maintenance of the Federal project and the JCPA facilities. In 1986, the plan was modified to include the need for ocean disposal of approximately 650,000 cubic yards of maintenance material from the Federally authorized navigation project every other year. The modification was made necessary due to construction of Naval Station Pascagoula at an area previously used for disposal of dredged material.

Also in 1985, the COE completed studies on the improvement of the Federal Deep-Draft Navigation channel at Pascagoula. These studies recommended improvements, which would result in approximately 14 million cubic yards of new work dredged material being transported to the Pascagoula ODMDS in the Gulf of Mexico for disposal. The WRDA 86 authorized these improvements.

In addition, the construction of the access channel and turning basin at Naval Station Pascagoula required the dredging of approximately 1 million cubic yards of material with subsequent maintenance of approximately 250,000 cubic yards every other year. Initially, this material was to be placed in the remaining disposal area on Singing River Island (SRI), the location of the station. However, due to the size and condition of this site, the materials from the Navy channels were not disposed of at SRI but rather at the ODMDS.

Due to the large size of this site (18 square miles) and the projected dredged material volumes (3-8 million cy) over the next 10 years, capacity is not a concern at this time. If volumes exceed projections by more than 25%, capacity will be considered. A small

portion of the ODMDS has historically been utilized for placement of dredged material as shown in **Table 1** and **Figure 2**.

<b>Table 1.</b> Dredged material placement at the Pascagoula ODMDS (NW=New Work; O&M= Operations & Maintenance; cy = cubic yards)			
<b>Year</b>	<b>Volume (cy)</b>	<b>Material Type</b>	<b>Project</b>
1992	168,200	O&M: Sand	Navy Channel
1993	1,161,000	O&M: Sand	Civil Works Channel
1995	2,650,000	NW: Silt/Clay	Civil Works Channel
1998	1,600,000	O&M: Silt/Clay	JCPA
1999	414,200	O&M: Sand	Civil Works Channel
2000	7,700,000	NW: Mixture	Civil Works Channel
2001	3,495,000	NW: Silt/Clay	Civil Works Channel
2002	630,000	O&M: Sand	Civil Works Channel
2003	741,000	O&M: Mixture	Civil Works Channel
	559,000	O&M: Mixture	Navy Channel
2004	1,009,000	O&M: Mixture	Civil Works Channel
2005	121,000	O&M: Mixture	Civil Works Channel

Future volumes and rates of disposal, from both Federal and private applicants, are expected to range around 1 million cubic yards per year. Short-term (5-year) projected disposal volumes are shown in **Table 2**. Civil works maintenance projects for Pascagoula Harbor are anticipated to account for approximately 75% of the total volume of material to be disposed at the ODMDS.

**Table 2.** Projected Volume of Dredged Material Disposed in the Pascagoula ODMDS (5-year estimates)

Year	Type of Action	Source	Volume (yd <sup>3</sup> )	Sponsor	Composition
2006	O&M	Civil Works Channel Navy Channel	450,000 225,000	JCPA Navy	Sands Silts/Clays/Sands
2007		None anticipated	na	na	na
2008	O&M	Civil Works Channel Navy Channel	450,000 225,000	JCPA Navy	Sands Silts/Clays/Sands
2009		None anticipated	na	na	na
2010	O&M	Civil Works Channel Navy Channel	450,000 225,000	JCPA Navy	Sand Silts/Clays/Sands

The Pascagoula ODMDS is believed to be a dispersive site, particularly during active hurricane seasons. However, the dispersiveness of the site and consequently the capacity of the ODMDS have yet to be determined. Future monitoring may be incorporated to address this issue, should mounding or effects outside the disposal site boundaries be observed.

**2.4 Material Suitability.** Maintenance and new work dredged material is expected to be placed at the site. This material will consist of mixtures of silts, clays, and sands in varying percentages. Sediments dredged from navigation channels in the Pascagoula Harbor include an ocean source (sandy, littoral materials), river source (fine-grained sands, silts, and clays derived from easily eroded soils from the upper Pascagoula River basin), and mixtures of both. Shoals occur where specific physical factors promote deposition or movement of sediments. These factors may vary spatially and temporally.

The disposition of any significant quantities of beach compatible sand from future projects will be determined on a project-by-project basis. Utilization of any significant quantities of beach compatible dredged material for beach nourishment is strongly encouraged and supported by the Corps and EPA. The Corps manages dredged material as a natural resource under its Regional Sedimentation Management initiatives. As part of this management tool, the dredging and disposal operations are evaluated based upon the entirety of the coastal system rather than individually. Disposition of non-beach quality sand should be planned to allow the material to be placed so that it will be within or accessible to the sand-sharing system, to the maximum extent practical, and following the provisions of the Clean Water Act.

There is no general restriction regarding the type of material that may be placed at the site. However, the suitability of dredged material for ocean disposal must be verified by the Corps and agreed to (concurred) by EPA prior to disposal. Verification will be valid for three years from the time last verified. Verification will involve the following:

- 1) A case-specific evaluation against the exclusion criteria (40 CFR 227.13(b));
- 2) A determination of the necessity for testing including bioassay (toxicity and bioaccumulation) testing for non-excluded material based on the potential for contamination of the sediment since last tested; and
- 3) Carrying out the testing (where needed) and determining that the non-excluded, tested material is suitable for ocean disposal.

Documentation of verification will be completed prior to use of the site. Documentation will be in the form of a MPRSA Section 103 Evaluation. The Evaluation and any testing will follow the procedures outlined in the *Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual* (USEPA/USACE, 1991 or most current revision), and the *Regional Implementation Manual (RIM)* (USEPA Region 4/USACE SAD, 1993 or most current revision). Only material determined to be suitable through the verification process by the Corps and EPA will be placed at the Pascagoula ODMDS.

**2.5 Timing of Disposal.** Between April 1 and November 30 monitoring and precautions necessary to protect sea turtles and Gulf sturgeon, as described in the next paragraph, are required on hopper dredges. Additionally, if new information indicates that endangered or threatened species are being adversely impacted, additional restrictions may be imposed.

**2.6 Disposal Techniques.** To protect sea turtles and Gulf sturgeon, the NMFS requires monitoring according to guidance outlined in the *Final Regional Biological Opinion for Hopper Dredging of Channels and Sand Mining Areas in the Gulf of Mexico by Galveston, New Orleans, Mobile, and Jacksonville Districts* (NOAA Fisheries, 2003). In addition, standard surveillance and evasive measures to protect sea turtles and marine mammals shall be employed during all disposal operations at the ODMDS.

Due to the predominant current regime in the area, the site is considered to be dispersive, so that erosion and off-site dispersion is expected to occur. Based on the results of the sediment mapping study and current studies, it is desirable to predetermine the disposal methodologies and locations within the ODMDS for disposal of dredged material, at least until sufficient monitoring information has been collected to provide assurance that dispersal does not result in adverse impacts. Since currents tend to be predominantly west-southwest or west-northwest in the proposed area, initial disposal of fine material will be made in the easternmost portions of the selected site, to the extent practical, in order to assure that the material does not migrate offsite.

It also appears, based on geology of the area and analysis of the sediment mapping data, that finer-grained material is more predominant in the central and southernmost portions of the proposed ODMDS. When possible, consideration should also be given to disposal of finer grained-material in this area, with coarser material being disposed in the northern portion of the ODMDS.

The benefits associated with the construction of a submerged berm, wave energy reduction and habitat creation, were investigated as part of the National Underwater Berm Demonstration Project at Mobile, Alabama. As a result, this type of disposal in the ODMDS proved to be beneficial; therefore, similar management practices are utilized to create relief at the ODMDS in order to increase habitat diversity.

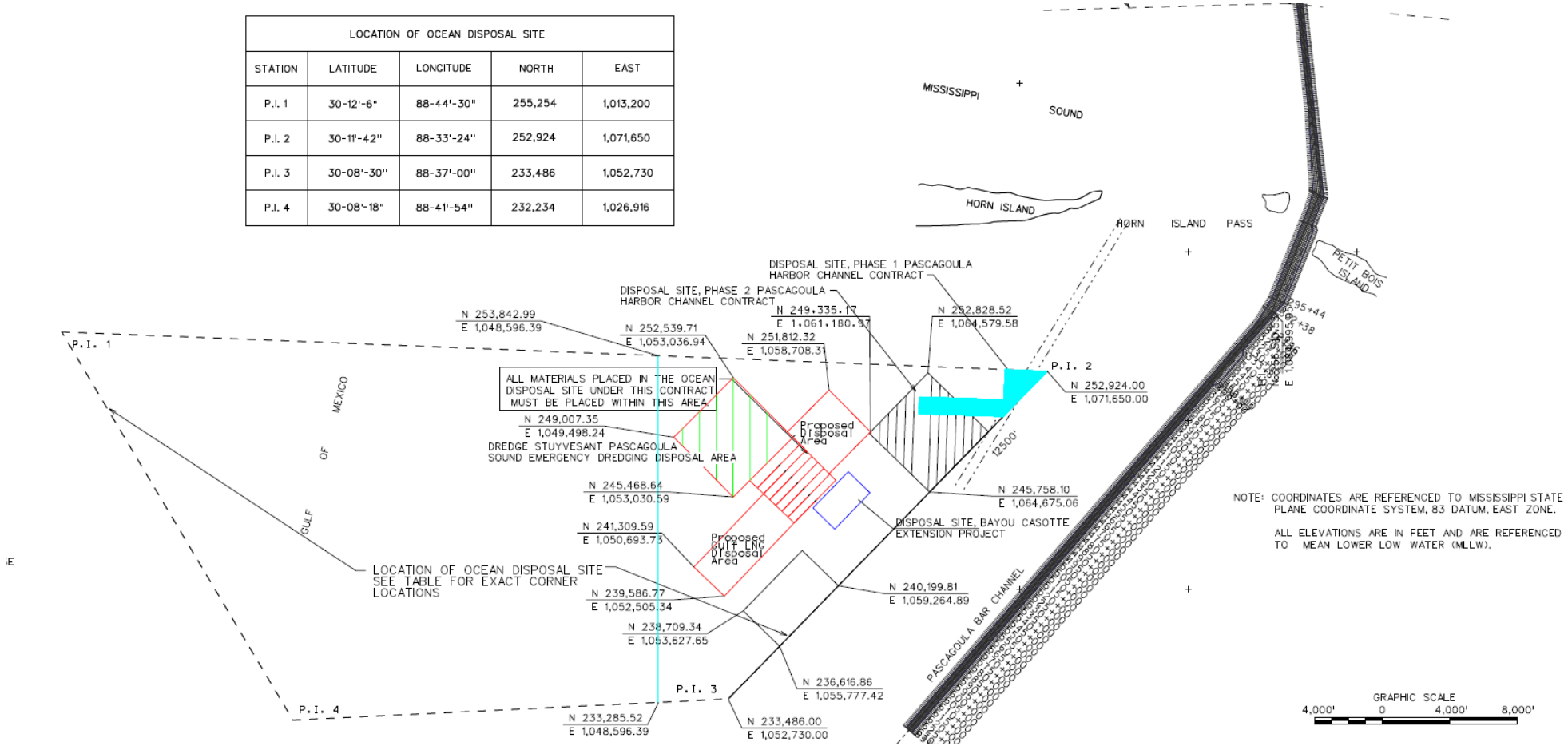
Another submerged structure is included in the Pensacola, FL offshore ODMDS management plan. In this instance the submerged structure is used to control the placement of fine-grained material within the site. A horseshoe shaped, 6-foot high berm is being constructed of sand and a sandy-mud mixture. The berm is open on the western end and fine-grained material will be placed in the eastern mid-section of the horseshoe. The management goal expected to be gained with this plan will be the restriction of movement of the fine-grained materials in the northerly or easterly direction. This goal was developed due to the nature of the resources north and east of the ODMDS. Although no significant resources have been identified in the vicinity of the Pascagoula ODMDS, this technique may prove beneficial if segregation of different types of material within the ODMDS is appropriate.

**2.7 Disposal Location.** Disposal shall occur no less than 330 feet (100 meters) inside the site boundaries to comply with 40 CFR §227.28. Although mounding is desirable at the Pascagoula ODMDS, placement methods shall prevent mounding of dredged materials from becoming an unacceptable navigation hazard. Dredged material shall be placed so that at no point will depths less than -25 feet mean lower low water (MLLW) occur (i.e., a clearance of 25 feet above the bottom will be maintained). To maximize ODMDS capacity and promote the desired mounding of material, the disposals shall be in specified disposal zones and placed repeatedly at one location; however, at no point shall this mounding obstruct navigation. When necessary, the Corps in consultation with EPA Region 4 will specify zones (**Figure 2**) within the ODMDS for dredged material from each specific ocean disposal activity. Depths at the time of disposal will be monitored to detect if adjustments of disposal methods are needed to prevent unacceptable mounding (navigation hazards). The physical removal or leveling of material above -25 feet MLLW is a management alternative should mounds greater than those elevations occur.

Additionally, while there are currently no active offshore oil and gas lease blocks within the Pascagoula ODMDS boundaries, there could be in the foreseeable future. In the event that a lease block is activated within the ODMDS boundaries, and exploration and/or extraction activities are initiated, all subsequent dredged material disposal zones will be specified so as to maintain a minimum 1,500-foot buffer from oil and gas rigs.



Figure 2. Pascagoula ODMDS Disposal Zones Map



**2.8 Permit and Contract Conditions.** The Pascagoula ODMDS is intended for use by a number of entities including the Corps, U.S. Navy, JCPA, Northrup Grumman, Chevron Refinery, etc. Each of these users will have different needs relative to quantity, type of material, timing, etc.; therefore partitioning of the site for specific users may be an appropriate management technique. This could facilitate monitoring and surveillance of individual disposal activities; however, it may not be the most appropriate management technique if beneficial results are desired as previously described.

The disposal monitoring and post-disposal monitoring requirements described under Site Monitoring will be included as permit conditions on all MPRSA Section 103 permits and will be incorporated in the contract language for all Federal projects. A summary of the management and monitoring requirements to be included are listed in **Table 3**. Appendix B contains a template for standard permit conditions for MPRSA 103 permits for the Canaveral ODMDS and Appendix C contains a template for standard contract conditions for civil works project use of the ODMDS.

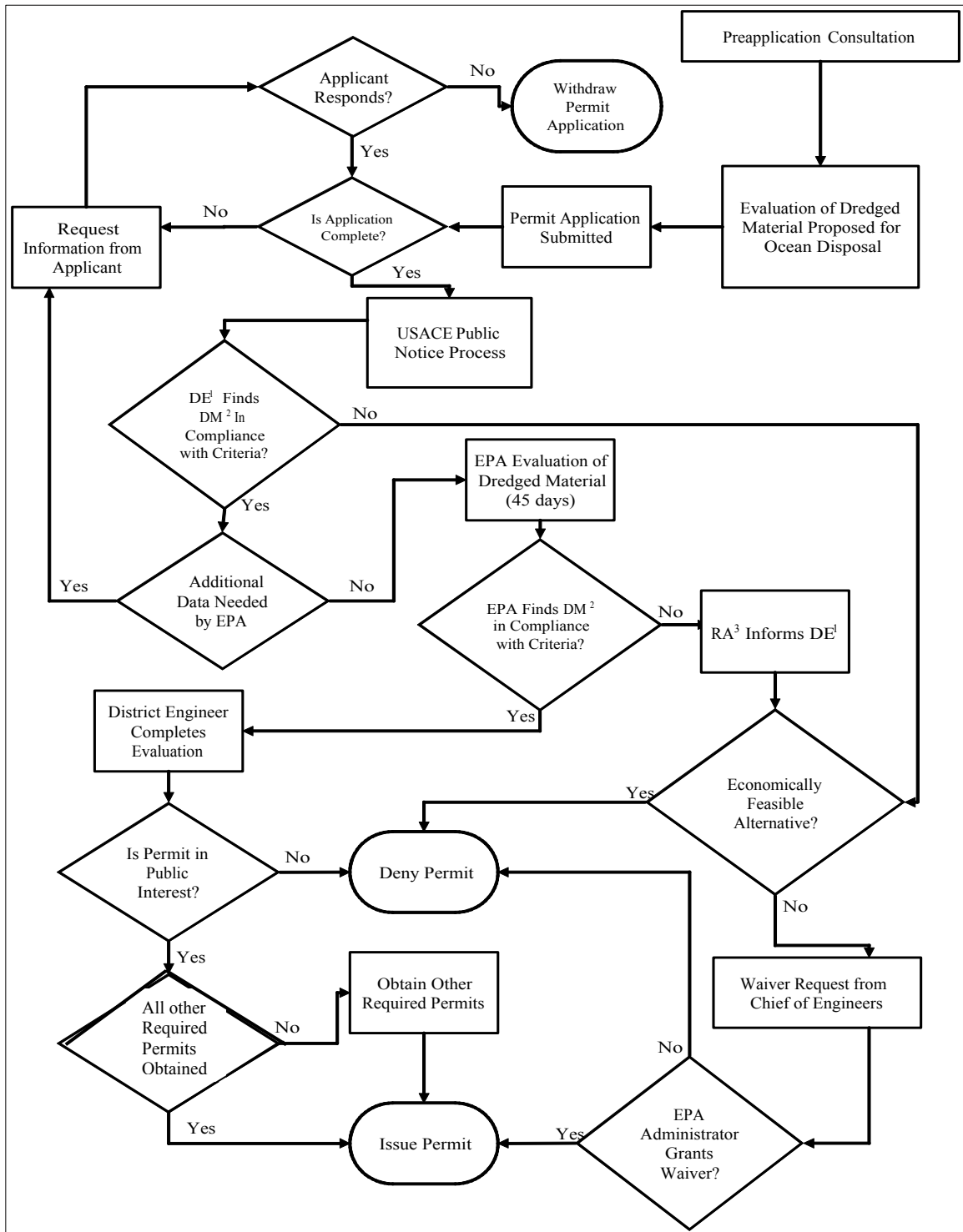
**Table 3.** Summary of Permit and Contract Conditions

Condition	Reference
Dredged Material Suitability and Term of Verification	Pascagoula ODMDS SMMP Section 2.4
Disposal within Appropriate Zones	Pascagoula ODMDS SMMP Section 2.7
Disposal Monitoring and Recording of Disposal Locations	Pascagoula ODMDS SMMP Section 3.2
Post Bathymetric Surveys within 30 days of Project Completion	Pascagoula ODMDS SMMP Section 3.3
Reporting Requirements: Daily & Monthly Operations Reports and Disposal Summary Reports within 90 Days of Project Completion	Pascagoula ODMDS SMMP Section 3.5

**2.9 Permit Process.** The permit process is outlined in **Figure 3** and consists of 10 main steps:

- **Pre-application Consultation:** Includes discussion of alternatives and the qualitative and quantitative information required by the District Engineer for use in evaluating the proposed dredged material.
- **Evaluation of Dredged Material Proposed for Ocean Disposal:** Includes development, approval, and implementation of sampling and analysis plan (see Section on Material Suitability). This step should include close coordination between EPA Region 4, the Corps, Mobile District, and the applicant.

- **Permit Application:** According to 33 CFR 325.1, a permit application must include the following:
  - ❖ A complete description of the proposed activity, including necessary drawings, sketches, or plans
  - ❖ The location, purpose, and need for the proposed activity; scheduling of the activity; names and addresses of adjoining property owners; location and dimension of adjacent structures
  - ❖ A list of authorizations required by other Federal, interstate, State, or local agencies for the work, including all approvals received or denials already made
  - ❖ The source of the material; the purpose of the disposal and a description of the type, composition, and quantity of the material (this includes information necessary to determine if the material is in compliance with the criteria); the method of transportation and disposal of the material; and the location of the disposal site.
- **Review of Application for Completeness:** Additional information is requested if the application is incomplete.
- **Public Notice:** Per 33 CFR 325.3, Public Notices issued by the Corps for dredged material disposal must include all of the information in 40 CFR 225.2(a) (see RIM). A supplemental, revised or corrected Public Notice will be issued if the District Engineer believes that the new information affects the review of the proposal.
- **EPA MPRSA Review:** Independent review of the information to determine whether the disposal activity complies with the criteria found in 40 CFR 227 and 228.
- **District Engineer Completes Evaluation:** The District Engineer addresses comments and holds public meeting if needed.
- **Corps Public Interest Review:** The Corps must consider all comments, suggestions, and concerns provided by all commenters and incorporate their comments into the administrative record of the application.
- **Permit Issued:** A decision to issue or deny a permit is discussed in either a Statement of Findings or Record of Decision.
- **Permit Public Notice:** A list of permit decisions is published and distributed to all interested parties each month



**Figure 3:** Permit Application/Evaluation Procedure  
 1-District Engineer; 2-Dredged Material, 3-Regional Administrator

**2.10 Information Management of Dredged Material Placement Activities.** As discussed in the following sections, a substantial amount of diverse data regarding use of the Pascagoula ODMDS and the effects of disposal is required from many sources (EPA, Corps, Navy, JCPA). If this information is readily available and in a useable format it can be used to answer many questions typically asked about a disposal site:

- What is being dredged?
- How much is being dredged?
- Where did the dredged material come from?
- Where was the dredged material placed?
- Was dredged material dredged correctly? placed correctly?
- What will happen to the environment at the disposal site?

As part of site management, EPA and the Corps will continue to investigate alternatives for appropriate data management. The Corps' GIS database incorporated the earlier Dredged Material Spatial Management Analysis and Record Tool (DMSMART) data management system. GIS enables the Corps and EPA to better manage the Pascagoula ODMDS by incorporating dredging project history and disposal site monitoring data. The Corps uses Silent Inspector to monitor dredging projects with some of this data being transmitted in real-time to the GIS database and EPA. This enables the Corps and EPA to account for multiple users of the site. In addition, the Engineering Research and Development Center (ERDC) compiles the Corps' Ocean Disposal Site Database. This database provides information on all of the ODMDSs in the United States with appropriate chemical, biological, and physical parameters of the proposed dredged material.

### **3.0 SITE MONITORING.**

The MPRSA establishes the need for including a monitoring program as part of the Site Management Plan. Site monitoring is conducted to ensure the environmental integrity of a disposal site and the areas surrounding the site are environmentally unharmed and to verify compliance with the site designation criteria, any special management conditions, and with permit requirements. Monitoring programs should be flexible, cost effective, and based on scientifically sound procedures and methods to meet site-specific monitoring needs. A monitoring program should have the ability to detect environmental change as a result of disposal activities and assist in determining regulatory and permit compliance. The intent of the program is to provide the following:

- (1) Information indicating whether the disposal activities are occurring in compliance with the permit and site restrictions; and/or
- (2) Information concerning the short-term and long-term environmental impacts of the disposal; and/or
- (3) Information indicating the short-term and long-term fate of materials disposed of in the marine environment.

The main purpose of a disposal site monitoring program is to determine whether the dredged material site management practices, including disposal operations, at the site need to be changed to avoid significant adverse impacts.

**3.1 Baseline Monitoring.** The Pascagoula ODMDS was designated in 1991. Biological, chemical, and physical studies of the Pascagoula ODMDS were conducted during the designation process. The results of investigations presented in the designation EIS and subsequent surveys listed in Table 4 will serve as the main body of data for the monitoring of the impacts associated with the use of the Pascagoula ODMDS.

**Table 4.** Surveys and Studies Conducted at the Pascagoula ODMDS

Survey/Study Title	Conducted By:	Date	Purpose	Results
<i>Analysis &amp; Synthesis of Oceanic Conditions in the Mississippi Sound Offshore Region</i>	Corps	March 1984	Determine the direction and amount of sediment transport from a dredged material disposal site.	Circulation patterns within the site are controlled by astronomical tides, winds, and freshwater discharges.
Field Survey of the Pascagoula ODMDS ( <i>Analysis &amp; Synthesis of Oceanic Conditions in the Mississippi Sound Offshore Region</i> )	Corps	March 1984	Video, Bathymetry, Hydrography, Water Quality, Sediment Benthic Survey, Tissue Analysis	-Baseline Survey
Sediment Mapping	UGA Center for Applied Isotopes for EPA	1987	Characterization of bottom sediments using continuous sediment sampling system	- Baseline Survey
Pascagoula ODMDS Benthic Communities Study	Corps	July 1991	Benthic community characterization	- Baseline analysis
Bathymetric Surveys	Corp		Monitor bathymetry changes	- Database
Post Disposal Sediment Mapping at the Pascagoula ODMDS	EPA/UGA Center for Applied Isotope Studies	1999	GIMS/CS3 Chemical Evaluation	- Database
Benthic Community Assessment	EPA	1999	Benthic community characterization	- Database - no significant changes observed
Sediment Quality Assessment for Lead	EPA	2001	Characterize Lead concentrations in ODMDS	- Database, Lead concentrations below 30 mg/kg
Western Area Sediment Characterization	EPA	2003	Physical/Chemical Characterization of Sediments in Western half of ODMDS	- Baseline Survey - no anomalies observed
Disposal Monitoring	Corps	During Each Event	-Compliance	- Database

**3.2 Disposal Monitoring.** For all disposal activities, the dredging contractor will be required to prepare and operate under an approved electronic verification plan for all disposal operations. As part of this plan, the contractor will provide an automated system that will continuously track (1 to 5 minute intervals) the horizontal location and draft condition (vertical) of the disposal vessel from the point of dredging to the disposal area, and return to the point of dredging. Required digital data are as follows:

- (a) Date;
- (b) Time;
- (c) Vessel Name;
- (d) Dump Number;
- (e) Map Number on which dump is plotted (if appropriate);
- (f) Beginning and ending coordinates of the dredging area for each load (source of dredged material);
- (g) Actual location (in degrees and minutes of longitude and latitude) at points of initiation and completion of disposal event;
- (h) Brief description of material disposed;
- (i) Volume of material disposed; and
- (j) Disposal technique used.

The user will be required to prepare and submit to the Corps daily reports of operations and a monthly report of operations for each month or partial month's work. The user is also required to notify the Corps and the EPA if a violation of the permit and/or contract conditions occur during disposal operations. In the case of large new work projects (>1 million cubic yards) where the material is expected to consist of stiff clays, it is recommended that mid-project bathymetric surveys be conducted of the disposal area to insure that mounding limits are not being exceeded.

**3.3 Post Discharge Monitoring.** The Corps or other site users will conduct a bathymetric survey within 30 days after disposal project completion. [Surveys will not be required for projects less than 50,000 cubic yards.] Surveys will conform to the minimum performance standards for COE hydrographic surveys for navigation and dredging support surveys- soft bottom as described in the Corps' Engineering Manual, EM1110-2-1003, *Hydrographic Surveying*, dated 1 January 2002 to the extent practicable. The number and length of transects required will be sufficient to encompass the area of the Pascagoula ODMDS currently being used (see Figure 2, eastern half of ODMDS) and a 500-foot wide area around the site. The survey area may be reduced on a case-by-case basis if disposal zones are specified and adhered to. The surveys will be taken along lines spaced at 200-foot intervals or less with a depth recording density of 20 to 70 feet. Depth precision of the surveys will be +/- 0.1 feet. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing either a microwave line of site system or differential global positioning system. Under ordinary conditions mean tidal range is 1.75 feet, and extreme range is 3.75 feet. Plane of reference is mean low water. The horizontal datum will be Mississippi State Plane (zone 2301 MS East) or Geographic (NAD 1983). Bathymetric surveys will be used to monitor the disposal mound to insure a navigation hazard is not



produced, to assist in verification of material placement, to monitor bathymetric changes and trends, to aid in environmental effects monitoring, and to insure that the site capacity is not exceeded, i.e., the mound does not exceed the site boundaries. Copies of these surveys shall be provided to EPA Region 4 when completed as part of the summary report (see Section 3.5).

**3.4 Material Tracking and Disposal Effects Monitoring.** Surveys can be used to address possible changes in bathymetric, physical, chemical, and biological aspects of the Pascagoula ODMDS and surrounding area as a result of the disposal of dredged material at the site.

**3.4.1 Summary of Results of Past Monitoring Surveys.** The *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site located Offshore Pascagoula, Mississippi* and **Table 4** provide the past surveys at the Pascagoula ODMDS. The results of investigations presented in the EIS, and subsequent surveys will serve as the main body of baseline data for the monitoring of the impacts associated with the use of the Pascagoula ODMDS. This baseline data includes the following surveys: benthic macroinvertebrates, fisheries, water and sediment chemistry, sediment mapping, physical oceanographic conditions, and bathymetry. No adverse impacts to benthic infauna within the ODMDS or surrounding area have been observed.

**3.4.2 Future Monitoring Surveys.** Based on the type and volume of material disposed and impacts of concern, various monitoring surveys can be used to examine if (and the direction) the disposed dredged material is moving, and what environmental effect the material is having on the site and adjacent areas. A tiered approach will be utilized to determine the level of monitoring effort required following each disposal event. At a minimum bathymetry will follow all disposal events. Bathymetric surveys will be the responsibility of the dredged material generator while EPA and/or Corps will be responsible for status and trends activities.

Within 30 days of completion of a disposal event, detailed bathymetric surveys of the placement area will be completed. Sediment mapping of the placement (disposal zone) and adjacent areas may be required. The interagency team will meet to review the results of these efforts and determine the need for additional information. This need will be based on observance of any anomalies or potential adverse impacts associated with a specific disposal event. If the results of the bathymetric and/or sediment mapping surveys do not indicate any anomalies or adverse impacts no additional monitoring will be required for the disposal event. Reassessment of the site may be undertaken, possibly every 10 years. At a minimum, this reassessment will include benthic macroinfaunal and sediment chemistry surveys. Additional surveys for water quality, sediment mapping, or the use of remote sensing equipment may also be required.

At the current time, no nearby biological resources have been identified that are of concern for potential impact. The Pascagoula ODMDS is at least one nautical mile from all known fish havens and artificial reefs. The site has been designated as a dispersive site. This means that it is expected that material will be moved outside the site boundaries. It is also expected that this material will not move in distinct mounds, but

instead will blend with the surrounding environment causing a progressive transition to sediments containing a higher percentage of silt and clay. Changes in sediment composition will likely alter the benthic community structure. However, based on previous benthic studies, it is unlikely that permanent or long-term adverse impacts will result due to changes in sediment composition.

Future surveys, as outlined in **Table 5**, will focus on determining the rate and direction of disposed dredged material dispersal and the capacity of the ODMDS. Should future disposal at the ODMDS result in unacceptable adverse impacts, further studies may be required to determine the persistence of these impacts, the extent of the impacts within the marine system, and/or possible means of mitigation. In addition, the management plan presented may require revision based on the outcome of any monitoring program.

**Table 5. ODMDS Monitoring Strategies and Thresholds for Action**

Goal	Technique	Sponsor	Rationale	Frequency	Threshold for Action	Management Options	
						Threshold Not Exceeded	Threshold Exceeded
Monitor Bathymetric Trends	Bathymetry	Site User	Determine the extent of the disposal mound and major bathymetric changes	Post disposal	Disposal mound occurs outside ODMDS boundaries	Continue Monitoring	-Modify disposal method/placement -Restrict disposal volumes -Enlarge site
Site Capacity	Information from Long Term Fate	EPA/ Corps/ Site Users	Determine dispersiveness of site and long and short term capacity	Prior to any project in excess of 10 million cubic yards	New work volumes exceed estimated capacity	Continue to use site without restrictions	Conduct Site Capacity Study
					Maintenance volumes exceed estimated capacity	Continue to use site without restrictions	Conduct Site Capacity Study
Insure Safe Navigation Depth	Bathymetry	Site User	Determine height of mound and any excessive mounding	Post disposal	Mound height > -35 feet mean lower low water (MLLW)	Continue Monitoring	-Modify disposal method/placement -Restrict disposal volumes
					Mound height > -25 feet MLLW	Continue Monitoring	- Physically level material
Compliance	Disposal Site Use Records  S.I. or EPA/COE approved equivalent	Site User	-Insure management requirements are being met -To assist in site monitoring	Daily during the project	Disposal records required by SMMP are not submitted or are incomplete	Continue Monitoring	-Restrict site use until requirements are met
					Review of records indicates a dump occurred outside ODMDS boundary	Continue Monitoring	-Notify EPA Region 4/COE, and investigate why egregious dump(s) occurred. Take appropriate enforcement action.  - Withhold payment from Contractor
					Review of records indicates a dump occurred in the ODMDS but not in target area	Continue Monitoring	-Direct placement to occur as specified.
Benthic Effects Monitoring	Sediment Mapping (Gamma/CS <sup>3</sup> )	EPA	Determine aerial influence of dredged material	Completed	Communities under the influence of dredged material outside the site have significant differences in diversity/ richness/biomass from those not under dredged material influence after one-year recovery period.	Discontinue monitoring unless disposal quantities, type of material or frequency of use significantly changes	-Limit quantity of dredged material to prevent impacts outside boundaries -Create berms to retard dredged material movement -Cease site use
	Benthic Survey	EPA	Determine impact of dredged material on benthic community	Completed			

**3.5 Reporting and Data Formatting.** The user will be required to prepare daily reports of operations and submit to the Corps a monthly report of operations for each month or partial month's work. Disposal monitoring data shall be delivered to the Corps on a weekly basis. Disposal monitoring reporting shall comply with the minimum requirements as specified in Silent Inspector, or equivalent system approved by EPA and COE. The user is also required to notify the Corps and the EPA within 24 hours if a violation of the permit and/or contract conditions related to MPRSA Section 103 or SMMP requirements occur during disposal operations.

The Corps shall provide disposal summary reports to EPA within 90 days after project completion. These should consist of dates of disposal, volume of disposal, approximate location of disposal and disposal bathymetric survey results in both hard and electronic formats. Other disposal monitoring data shall be made available upon request. In addition, EPA should be notified by the Corps 15 days prior to the beginning of a dredging cycle or project disposal.

Material tracking, disposal effects monitoring, and any other data collected shall be coordinated with and be provided to SMMP team members and Federal and State agencies as appropriate. Data will be provided to other interested parties requesting such data to the extent possible. Data will be provided for all surveys in a report generated by the action agency. The report should indicate how the survey relates to the SMMP and previous surveys at the Pascagoula ODMDS and should provide data interpretations, conclusions, and recommendations, and should project the next phase of the SMMP.

#### **4.0 ANTICIPATED SITE USE.**

It is anticipated that there will be a need for use of the Pascagoula ODMDS for many years. The anticipated site will be utilized to dispose of an excess of 1 million cubic yards of dredged material per year. This projection is based on past dredging records, currently available dredged material disposal options, and the Corps' planning documents. The estimate likely represents the high end of the potential range of quantities, as efforts are underway to develop alternative dredged material disposal methods, particularly for mid-river areas, i.e. the Pascagoula River Harbor Dredged Material Management Plan.

**5.0 MODIFICATION OF THE PASCAGOULA ODMDS SMMP.**

Should the results of the monitoring surveys or valid reports from other sources indicate that continued use of the ODMDS would lead to unacceptable effects, then the ODMDS management will be modified to mitigate the adverse effects. The SMMP will be reviewed and updated at least every 10 years. The SMMP will be reviewed and updated as necessary if site use changes significantly. For example, the SMMP will be reviewed if the quantity or type of dredged material placed at site changes significantly or if conditions at the site indicate a need for revision. The plan should be updated in conjunction with activities authorizing use of the site.

**6.0 IMPLEMENTATION OF THE PASCAGOULA ODMDS SMMP.**

This plan shall be effective from date of signature for a period not to exceed 10 years. The EPA and the Corps shall share responsibility for implementation of the SMMP. Site users may be required to undertake monitoring activities as a condition of their permit. The Corps will be responsible for implementation of the SMMP for Federal maintenance projects.

## **7.0 REFERENCES.**

Fredette, Thomas J., Nelson, David A., Clausner, James E., and Anders, Fred J. 1990. *Guidelines for Physical and Biological Monitoring of Aquatic Dredged Material Disposal Sites*, Technical Report D-90-12, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

NOAA Fisheries. 2003. *Final Regional Biological Opinion for Hopper Dredging of Channels and Sand Mining Areas in the Gulf of Mexico by Galveston, New Orleans, Mobile, and Jacksonville Districts*. NOAA Fisheries, St. Petersburg, Florida.

Pequegnat, Willis E., Gallaway, Benny J., and Wright, Thomas D., 1990. *Revised Procedural Guide for Designation Surveys of Ocean Dredged Material Disposal Sites*, Technical Report D-90-8, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Army Corps of Engineers (COE). 1994. *Hydrographic Surveying*. Engineering Manual 1110-2-1003, Department of the Army, Washington D.C.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal (Testing Manual)*, February 1991. Prepared by Environmental Protection Agency Office of Marine and Estuarine Protection and Department of Army United States Army Corps of Engineers under EPA Contract No. 68-C8-0105.

U.S. Environmental Protection Agency Region 4 and U.S. Army Corps of Engineers South Atlantic Division, 1993. *Regional Implementation Manual Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Material in Southeastern Atlantic and Gulf Coastal Waters*, May 1993.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, 1996. *Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites*, February 1996. Prepared by Environmental Protection Agency Office of Water and Department of Army United States Army Corps of Engineers.

U.S. Environmental Protection Agency Region 4, 1991. *Final Environmental Impact Statement for the Designation of an Ocean Dredged Material Disposal Site located Offshore Pascagoula, Mississippi*.

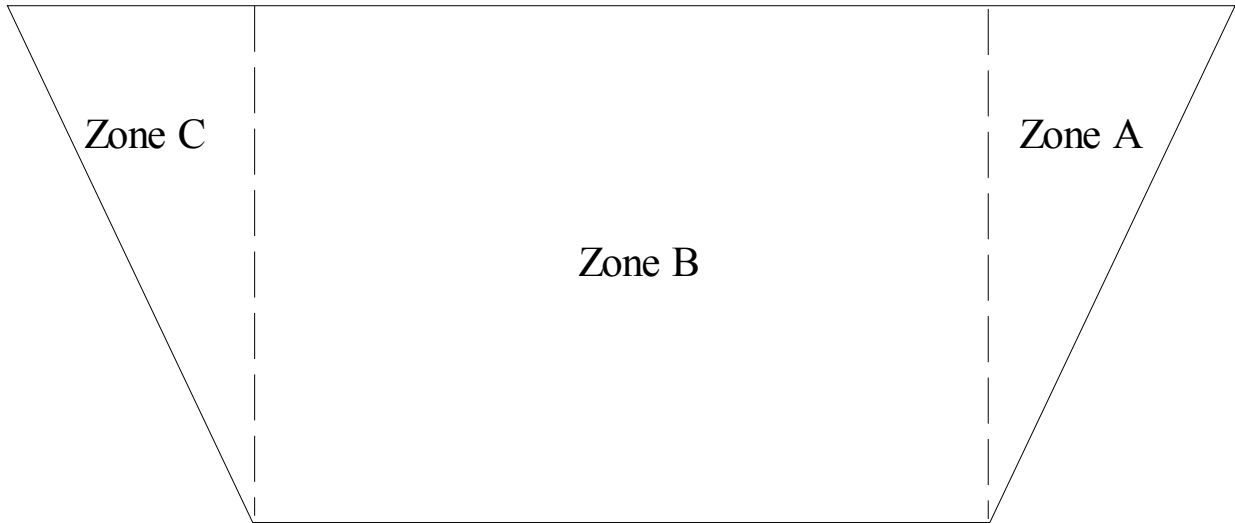


## **APPENDIX A**

# **WATER COLUMN EVALUATIONS NUMERICAL MODEL (STFATE) INPUT PARAMETERS**

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Pascagoula ODMDS  
STFATE Modeling Zones



Water Column Evaluations  
Numerical Model (STFATE) Input Parameters  
Pascagoula ODMDS Zone A

**SITE DESCRIPTION**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Number of Grid Points (left to right)	45	
Number of Grid Points (top to bottom)	45	
Spacing Between Grid Points (left to right)	500	ft
Spacing Between Grid Points (top to bottom)	500	ft
Constant Water Depth	44	ft
Roughness Height at Bottom of Disposal Site	.005 <sup>1</sup>	ft
Slope of Bottom in X-Direction	0	Deg.
Slope of Bottom in Z-Direction	0	Deg.
Number of Points in Ambient Density Profile Point	2	
Ambient Density at Depth = 5 ft	1.0174	g/cc
Ambient Density at Depth = 44 ft	1.0230	g/cc

**AMBIENT VELOCITY DATA**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Profile	2-Point at constant depth	
X-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
Z-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
X-Direction Velocity at Depth = 40 ft	-0.116	ft/sec
Z-Direction Velocity at Depth = 40 ft	+0.116	ft/sec

**DISPOSAL OPERATION DATA**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Location of Disposal Point from Top of Grid	8,500 <sup>2</sup>	ft
Location of Disposal Point from Left Edge of Grid	8,200 <sup>2</sup>	ft
Dumping Over Depression	0	

**INPUT, EXECUTION AND OUTPUT**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	2,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	2,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	21,500	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	20,500	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

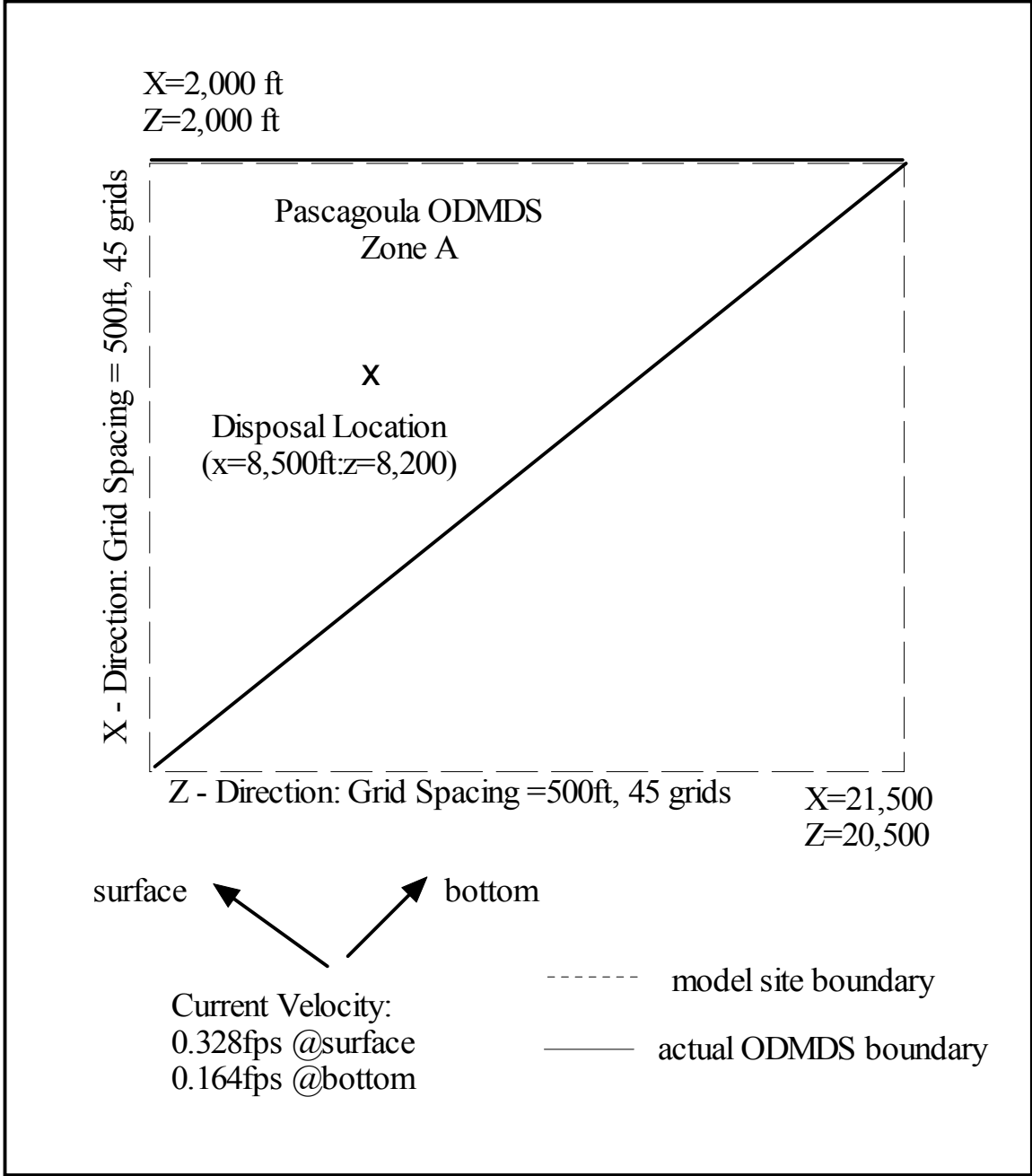
**COEFFICIENTS**

<b>Parameter</b>	<b>Keyword</b>	<b>Value</b>
Settling Coefficient	BETA	0.000 <sup>1</sup>
Apparent Mass Coefficient	CM	1.000 <sup>1</sup>
Drag Coefficient	CD	0.500 <sup>1</sup>
Form Drag for Collapsing Cloud	CDRAG	1.000 <sup>1</sup>
Skin Friction for Collapsing Cloud	CFRIC	0.010 <sup>1</sup>
Drag for an Ellipsoidal Wedge	CD3	0.100 <sup>1</sup>
Drag for a Plate	CD4	1.000 <sup>1</sup>
Friction Between Cloud and Bottom	FRICTN	0.010 <sup>1</sup>
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001 <sup>1</sup>
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250 <sup>1</sup>
Turbulent Thermal Entrainment	ALPHAO	0.235 <sup>1</sup>
Entrainment in Collapse	ALPHAC	0.100 <sup>1</sup>
Stripping Factor	CSTRIP	0.003 <sup>1</sup>

<sup>1</sup>Model default value

<sup>2</sup>Represents center of zone A. Dredged material requiring disposal in another location in order to meet the dilution criteria must be brought to the attention of EPA and the COE.

Typical dilution achieved after 4 hours = 500:1  
Plume does not reach site boundaries within 4 hours



Water Column Evaluations  
 Numerical Model (STFATE) Input Parameters  
 Pascagoula ODMDS Zone B

**SITE DESCRIPTION**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Number of Grid Points (left to right)	45	
Number of Grid Points (top to bottom)	45	
Spacing Between Grid Points (left to right)	600	ft
Spacing Between Grid Points (top to bottom)	600	ft
Constant Water Depth	46	ft
Roughness Height at Bottom of Disposal Site	.005 <sup>1</sup>	ft
Slope of Bottom in X-Direction	0	Deg.
Slope of Bottom in Z-Direction	0	Deg.
Number of Points in Ambient Density Profile Point	2	
Ambient Density at Depth = 5 ft	1.0174	g/cc
Ambient Density at Depth = 46 ft	1.0230	g/cc

**AMBIENT VELOCITY DATA**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Profile	2-Point at constant depth	
X-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
Z-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
X-Direction Velocity at Depth = 40 ft	-0.116	ft/sec
Z-Direction Velocity at Depth = 40 ft	+0.116	ft/sec

**DISPOSAL OPERATION DATA**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Location of Disposal Point from Top of Grid	13,500 <sup>2</sup>	ft
Location of Disposal Point from Left Edge of Grid	14,500 <sup>2</sup>	ft
Dumping Over Depression	0	

**INPUT, EXECUTION AND OUTPUT**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	2,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	2,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	25,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	27,000	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

**COEFFICIENTS**

<b>Parameter</b>	<b>Keyword</b>	<b>Value</b>
Settling Coefficient	BETA	0.000 <sup>1</sup>
Apparent Mass Coefficient	CM	1.000 <sup>1</sup>
Drag Coefficient	CD	0.500 <sup>1</sup>
Form Drag for Collapsing Cloud	CDRAG	1.000 <sup>1</sup>
Skin Friction for Collapsing Cloud	CFRIC	0.010 <sup>1</sup>
Drag for an Ellipsoidal Wedge	CD3	0.100 <sup>1</sup>
Drag for a Plate	CD4	1.000 <sup>1</sup>
Friction Between Cloud and Bottom	FRICTN	0.010 <sup>1</sup>
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001 <sup>1</sup>
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250 <sup>1</sup>
Turbulent Thermal Entrainment	ALPHAO	0.235 <sup>1</sup>
Entrainment in Collapse	ALPHAC	0.100 <sup>1</sup>
Stripping Factor	CSTRIP	0.003 <sup>1</sup>

<sup>1</sup>Model default value

<sup>2</sup>Represents center of zone A. Dredged material requiring disposal in another location in order to meet the dilution criteria must be brought to the attention of EPA and the COE.

Typical dilution achieved after 4 hours = 500:1  
Plume does not reach site boundaries within 4 hours



X=2,000 ft  
Z=2,000 ft

X - Direction: Grid Spacing = 600ft, 45 grids

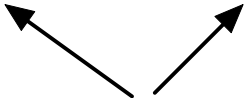
Pascagoula ODMDS  
Zone B

X

Disposal Location  
(x=13,500ft :z=14,500)

Z - Direction: Grid Spacing =600ft, 45 grids

X=25,000  
Z=27,000

surface  bottom

Current Velocity:  
0.328fps @5ft  
0.164fps @ 40ft

----- model site boundary

———— actual ODMDS boundary

Water Column Evaluations  
Numerical Model (STFATE) Input Parameters  
Pascagoula ODMDS Zone C

**SITE DESCRIPTION**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Number of Grid Points (left to right)	45	
Number of Grid Points (top to bottom)	45	
Spacing Between Grid Points (left to right)	400	ft
Spacing Between Grid Points (top to bottom)	600	ft
Constant Water Depth	47	ft
Roughness Height at Bottom of Disposal Site	.005 <sup>1</sup>	ft
Slope of Bottom in X-Direction	0	Deg.
Slope of Bottom in Z-Direction	0	Deg.
Number of Points in Ambient Density Profile Point	2	
Ambient Density at Depth = 5 ft	1.0174	g/cc
Ambient Density at Depth = 47 ft	1.0230	g/cc

**AMBIENT VELOCITY DATA**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Profile	2-Point at constant depth	
X-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
Z-Direction Velocity at Depth = 10 ft	-0.232	ft/sec
X-Direction Velocity at Depth = 40 ft	-0.116	ft/sec
Z-Direction Velocity at Depth = 40 ft	+0.116	ft/sec

**DISPOSAL OPERATION DATA**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Location of Disposal Point from Top of Grid	9,660 <sup>2</sup>	ft
Location of Disposal Point from Left Edge of Grid	11,200 <sup>2</sup>	ft
Dumping Over Depression	0	

**INPUT, EXECUTION AND OUTPUT**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	2,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	2,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	25,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	15,800	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

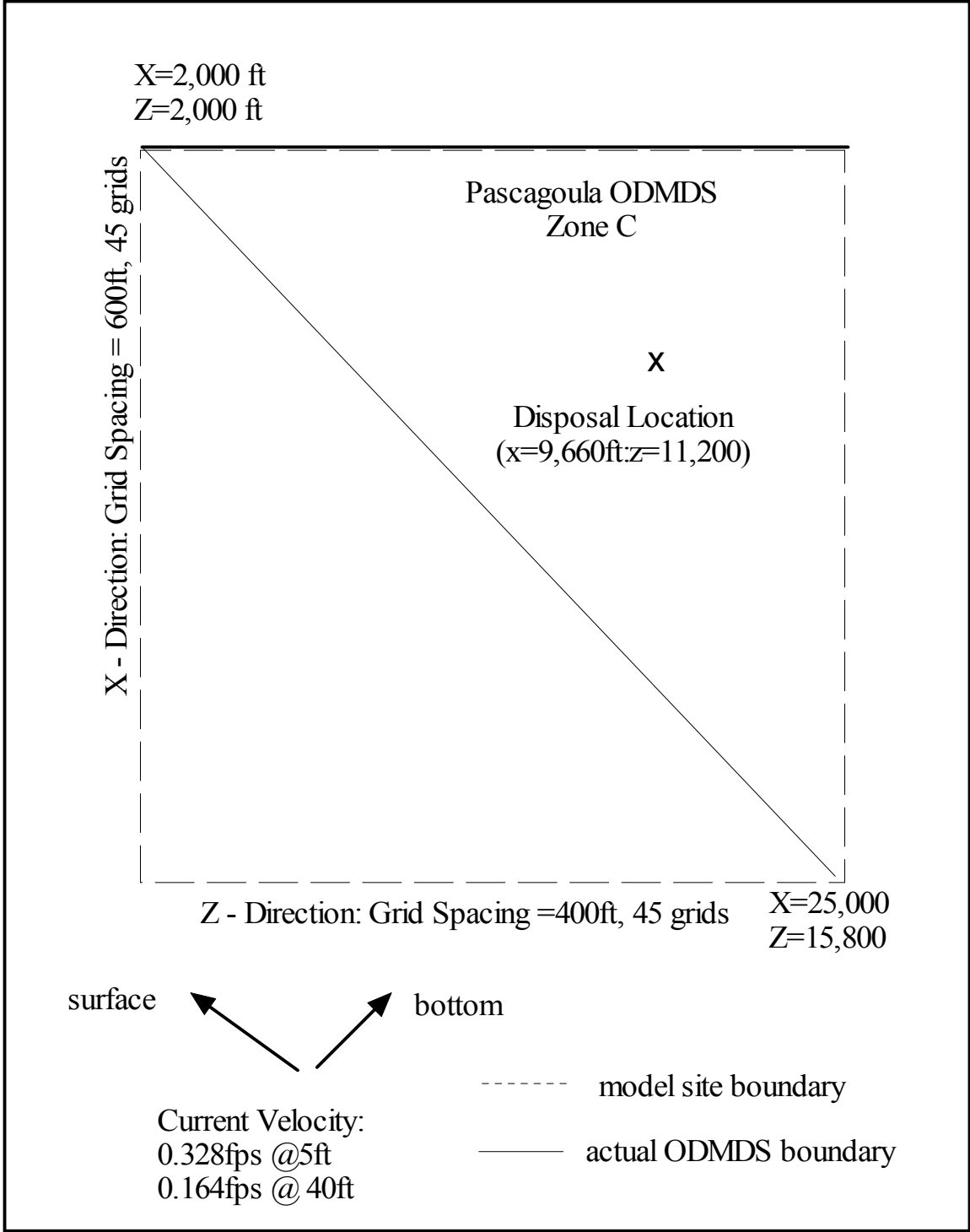
**COEFFICIENTS**

<b>Parameter</b>	<b>Keyword</b>	<b>Value</b>
Settling Coefficient	BETA	0.000 <sup>1</sup>
Apparent Mass Coefficient	CM	1.000 <sup>1</sup>
Drag Coefficient	CD	0.500 <sup>1</sup>
Form Drag for Collapsing Cloud	CDRAG	1.000 <sup>1</sup>
Skin Friction for Collapsing Cloud	CFRIC	0.010 <sup>1</sup>
Drag for an Ellipsoidal Wedge	CD3	0.100 <sup>1</sup>
Drag for a Plate	CD4	1.000 <sup>1</sup>
Friction Between Cloud and Bottom	FRICTN	0.010 <sup>1</sup>
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001 <sup>1</sup>
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250 <sup>1</sup>
Turbulent Thermal Entrainment	ALPHAO	0.235 <sup>1</sup>
Entrainment in Collapse	ALPHAC	0.100 <sup>1</sup>
Stripping Factor	CSTRIP	0.003 <sup>1</sup>

<sup>1</sup>Model default value

<sup>2</sup>Represents center of zone A. Dredged material requiring disposal in another location in order to meet the dilution criteria must be brought to the attention of EPA and the COE.

Typical dilution achieved after 4 hours = 500:1  
Plume does not reach site boundaries within 4 hours



**PASCAGOULA ODMDS SMMP  
APPENDIX B**

**TEMPLATE  
FOR MPRSA 103  
STANDARD PERMIT  
CONDITIONS**

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**TEMPLATE  
GENERIC SPECIAL CONDITIONS  
FOR MPRSA SECTION 103 PERMITS  
Pascagoula, MS ODMDS**

**I. DISPOSAL OPERATIONS**

A. For this permit, the term disposal operations shall mean: navigation of any vessel used in disposal of operations, transportation of dredged material from the dredging site to the Pascagoula ODMDS, proper disposal of dredged material at the disposal area within the Pascagoula ODMDS, and transportation of the hopper dredge or disposal barge or scow back to the dredging site.

B. The Pascagoula ODMDS is defined as the trapezoid with center coordinates of Geo NAD 27: 30 10 09 N 88 29 12 W; Geo NAD 83: 30 10 09.7 N 88 39 12.1 E; and MS State Plane EAST: 243468 N 1041125 E.

The corner coordinates are as follows:

Geo NAD 27	Geo NAD83	MS State Plane East
30 12 06 N 88 44 30 W	30 12 06.7 N 88 44 30.1 E	255254 N 1013200 E
30 11 42 N 88 33 24 W	30 11 42.7 N 88 33 24.1 E	252924 N 1071650 E
30 08 30 N 88 37 00 W	30 08 30.7 N 88 37 00.1 E	233487 N 1052731 E
30 08 18 N 88 41 54 W	30 08 18.7 N 88 41 54.1 E	232235 N 1026917 E

C. No more than [NUMBER] cubic yards of dredged material excavated at the location defined in [REFERENCE LOCATION IN PERMIT] are authorized for disposal at the Pascagoula ODMDS.

D. The permittee shall use an electronic positioning system to navigate to and from the Pascagoula ODMDS. For this section of the permit, the electronic positioning system is defined as: a differential global positioning system or a microwave line of site system. Use of LORAN-C alone is not an acceptable electronic positioning system for disposal operations at the Pascagoula ODMDS. If the electronic positioning system fails or navigation problems are detected, all disposal operations shall cease until the failure or navigation problems are corrected.

E. The permittee shall certify the accuracy of the electronic positioning system proposed for use during disposal operations at the Pascagoula ODMDS. The certification shall be accomplished by direct comparison of the electronic positioning system's accuracy with a known fixed point.

F. The permittee shall not allow any water or dredged material placed in a hopper dredge or disposal barge or scow to flow over the sides or leak from such vessels during transportation to the Pascagoula ODMDS.

G. A disposal operations inspector and/or captain of any tugboat, hopper dredge or other vessel used to transport dredged material to the Pascagoula, MS ODMDS shall insure compliance with disposal operation conditions defined in this permit.

1. If the disposal operations inspector or the captain detects a violation, he shall report the violation to the permittee immediately.
2. The permittee shall contact the U.S. Army Corps of Engineers, Mobile District's Regulatory Branch [TELEPHONE NUMBER] and EPA Region 4 at (404) 562-9386 to report the violation within twenty-four (24) hours after the violation occurs. A complete written explanation of any permit violation shall be included in the post-dredging report.

H. When dredged material is disposed, no portion of the hopper dredge or disposal barge or scow shall be outside of the boundaries of the Pascagoula ODMDS as defined in Special Condition B. Additionally, disposal shall occur within a specified disposal zone defined as [DEFINE COORDINATES AND SIZE OF DISPOSAL ZONE]. Disposal shall not occur closer than 1,500 feet to any oil and gas rigs that may be present within the site boundaries.

I. The permittee shall use an automated disposal verification system that will continuously track (1 to 5 minute intervals) the horizontal location and draft condition of the disposal vessel (hopper dredge or disposal barge or scow) to and from the Pascagoula ODMDS. This information shall be available in electronic format to the Mobile District Corps of Engineers and EPA Region 4 weekly basis utilizing SI specifications or approved (EPA and COE) requirements.

1. Required digitally recorded data are: date, time, vessel name, captain of vessel, beginning and ending coordinates of the dredging area for each load, location at points of initiation and completion of disposal, description of material disposed (sand, clay or silt), volume of load, and disposal technique. This information will be available to the Mobile District Corps of Engineers on a daily basis.
2. The permittee shall use Mississippi State Plane or latitude and longitude coordinates (North American Datum 1983). State Plane coordinates shall be reported to the nearest 0.10 foot and latitude and longitude coordinates shall be reported as degrees and decimal minutes to the nearest 0.01 minutes.

J. The permittee shall conduct a bathymetric survey of the Pascagoula ODMDS within 30 days following project completion.

1. The number and length of the survey transects shall be sufficient to encompass the defined disposal zone within the Pascagoula ODMDS and a 500 foot wide area around the disposal zone. The transects shall be spaced at 500-foot intervals or less with a depth recording density of 20 to 70 feet.



2. Vertical accuracy of the survey shall be  $\pm 0.1$  feet. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing either microwave line of site system or differential global positioning system. The vertical datum will be referenced to prescribed NOAA Mean Lower Low Water (MLLW) datum. MLLW is 1.8 feet below NGVD 1929. The horizontal datum will be Mississippi State Plane (zone 2301 MS East) or Geographic (NAD 1983). State Plane coordinates shall be reported to the nearest 0.10 foot and latitude and longitude coordinates shall be reported as degrees and decimal minutes to the nearest 0.01 minutes.

K. The permittee has read and agrees to assure that they are in compliance with the requirements of the Pascagoula ODMDS Site Management and Monitoring Plan.

## **II. REPORTING REQUIREMENTS**

A. The permittee shall send the U.S. Army Corps of Engineers, Mobile District's Regulatory Branch and EPA Region 4's Wetlands, Coastal and Watersheds Branch (61 Forsyth Street, Atlanta, GA 30303) a notification of commencement of work at least fifteen (15) days before initiation of any dredging operations authorized by this permit.

B. The permittee shall submit to the U.S. Army Corps of Engineers weekly disposal monitoring reports. These reports shall contain the information described in Special Condition I.1.

C. The permittee shall develop and send one (1) copy of the disposal summary report to the Mobile District's Regulatory Branch and one (1) copy of the disposal summary report to EPA Region 4 documenting compliance with all general and special conditions defined in this permit. The disposal summary report shall be sent within 90 days after completion of the disposal operations authorized by this permit. The disposal summary report shall include the following information:

1. The report shall indicate whether all general and special permit conditions were met. Any violations of the permit shall be explained in detail.
2. The disposal summary report shall include the following information: Corps permit number, actual start date and completion date of dredging and disposal operations, total cubic yards disposed at the Pascagoula, MS ODMDS, locations of disposal events, and post disposal bathymetric survey results (in hard and electronic formats).

## **APPENDIX C**

# **MOBILE DISTRICT CORPS OF ENGINEERS GENERIC CONTRACT SPECIFICATION LANGUAGE**

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## Mobile District Corps of Engineers Contract Specification Language

### I. Offshore Disposal

- A. Dredged material shall be placed within designated ocean disposal areas or zones, as shown on contract drawings.
- B. The use of bottom dump barges and dredges and hydraulic unloading barges and hopper dredges to dispose of dredged material in the offshore disposal area will be permitted. Water and excavated material shall not be permitted to overflow or spill out of barges, dump scows, or hopper dredges while in route to the disposal site. Failure to repair leaks or change the method of operation, which is resulting in overflow or spillage, will result in suspension of excavation operations and require prompt repair or change of operation to prevent overflow or spillage as a prerequisite to the resumption of excavation. Material shall be placed in the offshore disposal area below the -25 MLW level, and within [XX]feet of the center of the defined disposal area or zone.

### II. Electronic Tracking System (ETS) for Ocean Disposal Vessels

The Contractor shall furnish an ETS for surveillance of the movement and disposition of dredged material during [excavation and ocean disposal] [excavation and disposal (nearshore and ocean)]. This ETS shall be established, operated and maintained by the Contractor to continuously track in real-time the horizontal location and draft condition of the disposal vessel for the entire dredging cycle, including dredging area and disposal area. The ETS shall be capable of displaying and recording in real-time the disposal vessel's draft and location.

#### A. ETS Standards

The Contractor shall provide automated (computer) system and components to perform in accordance with EM 1110-1-2909. A copy of the EM can be downloaded from the following website: <http://www.usace.army.mil/inet/usace-docs/eng-manuals/em.htm>. Horizontal location shall have an accuracy equal to or better than a standard DGPS system, equal to or better than plus/minus 10 feet (horizontal repeatability). Vertical (draft) data shall have an accuracy of plus/minus 0.5 foot. Horizontal location and vertical data shall be collected in sets and each data set shall be referenced in real-time to date and local time (to nearest minute), and shall be referenced to the same state plane coordinate system used for the survey(s) shown in the contract plans. The ETS shall be calibrated, as required, in the presence of the COR at the work location before disposal operations have started, and at 30-day intervals while work is in progress. The COR shall have access to the ETS in order to observe its operation. Disposal operations will not commence until the ETS to be used by the Contractor is certified by the COR to be operational and within acceptable accuracy. It is the Contractor's responsibility to select a system that will operate properly at the work location. The complete system shall be subject to the COR's approval.

#### B. Data Requirements and Submissions

1. The ETS for each disposal vessel shall be in operation for all dredging and disposal activities and shall record the full round trip for each loading and disposal cycle. [Note: A dredging and disposal

cycle constitutes the time from commencement of dredging to complete discharge of the material.] The COR shall be notified immediately in the event of ETS failure and all dredging operations for the vessel shall cease until the ETS is fully operational. Any delays resulting from ETS failure shall be at the contractor's expense.

2. All data shall be collected and stored on 3 1/2 inch disk or CD-ROM(s) in ASCII format using IBM compatible MS-DOS 5.0 or later version. Each dredging and disposal cycle will be a separate and distinct ASCII file, labeled by the trip number. More than one file may be stored on the disk(s) or CD-ROM(s).

3. Data shall be collected, during the dredging and disposal cycle, every 500 feet (at least) during travel to the disposal area, and every minute or every 200 feet, whichever is smaller, while approaching within 1,000 feet and within the disposal area.

4. The required digital data to be collected for each dredging and disposal cycle includes the following:

- (1) Trip Number
- (2) Date
- (3) Time
- (4) Vessel ID
- (5) Vessel Captain
- (6) State Plane X Coordinate - in accordance with c. above
- (7) State Plane Y Coordinate - in accordance with c. above
- (8) Vessel Draft
- (9) Type of Disposal Vessel
- (10) Exact State Plane X & Y coordinate at start of dump
- (11) Volume of Material Disposed

5. Plot Reporting (2 types):

(a) Tracking Plot - For each disposal event, data collected while the disposal vessel is in the vicinity of the disposal area shall be plotted in chart form, in 200-foot intervals, to show the track and draft of the disposal vessel approaching and traversing the disposal area. Each plot will be attached to the corresponding ascii data table when submitted.

(b) Scatter Plot - Following completion of all disposal events, a single and separate plot will be prepared to show the exact disposal locations of all dumps. Every plotted location shall coincide with the beginning of the respective dump. Each dump will be labeled with the corresponding Trip Number and shall be at a small but readable scale. To accompany the Scatter Plot, a single and separate table will be prepared of the corresponding ETS data for every dump location. The volume of material disposed for each trip will be included in this table.

6. All digital ETS data shall be furnished to the COR within 24 hours of collection. The digital plot files should be in an easily readable format such as Adobe Acrobat PDF file, Microstation DGN file, JPEG, BMP, TIFF, or similar. The hardcopy of the ETS data and tracking plots shall be both maintained onboard the vessel and submitted to the COR on a weekly basis.