

SITE MANAGEMENT AND MONITORING PLAN FOR SF-DODS (extracted from 1994 Final Rule):

(iii) Site monitoring. Data shall be collected in accordance with a three-tiered site monitoring program which consists of three interdependent types of monitoring for each tier: physical, chemical and biological. In addition, periodic confirmatory monitoring concerning potential site contamination shall be performed.

Specific guidance for site monitoring tasks required by this paragraph shall be described in a Site Management and Monitoring Implementation Manual (SMMP Implementation Manual) developed by EPA. The SMMP Implementation Manual shall be reviewed periodically and any necessary revisions to the Manual will be issued for public review under an EPA Public Notice.

(A) Tier 1 monitoring activities. Tier 1 monitoring activities shall consist of the following:

(1) Physical monitoring. Tier 1 Physical Monitoring shall consist of a physical survey to map the area on the seafloor within and in the vicinity of the disposal site where dredged material has been deposited (the footprint). Such a survey shall use appropriate technology (for example, sediment profile photography) to determine the areal extent and thickness of the disposed dredged material, and to determine if any dredged material has deposited outside of the disposal site boundary.

(2) Chemical monitoring. Tier 1 Chemical Monitoring shall consist of collecting, processing, and preserving boxscore samples of sediments so that such sediments could be subjected to sediment chemistry analysis in the appropriate tier. Samples shall be collected within the dredged material footprint, outside of the dredged material footprint, and outside of the disposal site boundaries. Samples within the footprint shall be subjected to chemical analysis in annual Tier 1 activity. Samples from outside of the footprint and outside of the disposal site boundaries shall be archived and analyzed only when the criteria requiring Tier 2 as specified in paragraph (b)(70)(iv) are met. A sufficient number of samples shall be collected so that the potential for adverse impacts due to elevated chemistry can be assessed with an appropriate time-series or ordinal technique.

(3) Biological monitoring. Tier 1 Biological Monitoring shall have two components: monitoring of pelagic communities and monitoring of benthic communities.

(i) Pelagic communities. Tier 1 Biological Monitoring shall include regional surveys of seabirds, marine mammals and mid water column fish populations appropriate for evaluating how these populations might be affected by disposal site use. A combination of annual regional and periodic (random) shipboard surveys of seabirds and marine mammals will be used. The regional survey designs for each category of biota shall be similar to that used for the regional characterization studies referenced in the Final Environmental Impact Statement for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California (August 1993) with appropriate realignments to accommodate transects within and in the vicinity of the SF-DODS. The periodic shipboard surveys shall be performed from vessels involved in dredged material disposal operations at the SF-DODS as specified in permit conditions imposed pursuant to paragraph (b)(70)(ii)(A)(12). The minimum number of surveys must be sufficient to characterize the disposal operations for each project, and, as practicable, provide seasonal data for an assessment of the potential for adverse impacts for the one-year period. An appropriate time-series (ordinal) and community analysis shall be performed using data collected during the

current year and previous years.

(ii) Benthic communities. Tier 1 Biological Monitoring shall include collection and preservation of boxscore samples of benthic communities so that such samples could be analyzed as a Tier 2 activity.

(4) Annual reporting. The results of the annual Tier 1 studies shall be compiled in an annual report which will be available for public review.

(B) Tier 2 monitoring activities. Tier 2 monitoring activities shall consist of the following:

(1) Physical monitoring. Tier 2 Physical Monitoring shall consist of oceanographic studies conducted to validate and/or improve the models used to predict the dispersion in the water column and deposition of dredged material on the seafloor at the SF-DODS. The appropriate physical oceanographic studies may include: the collection of additional current meter data, deployment of sediment traps, and deployment of surface and subsurface drifters.

(2) Chemical monitoring. Tier 2 Chemical Monitoring shall consist of performing sediment chemistry analysis on samples collected and preserved in Tier 1 from outside of the footprint and outside of the disposal site boundaries.

(3) Biological monitoring. Tier 2 Biological Monitoring shall involve monitoring of pelagic communities and monitoring of benthic communities.

(i) Pelagic communities. Tier 2 Biological Monitoring for pelagic communities shall include supplemental surveys of similar type to those in Tier 1, or other surveys as appropriate.

(ii) Benthic communities. Tier 2 Biological Monitoring for benthic communities shall include a comparison of the benthic community within the dredged material footprint to benthic communities in adjacent areas outside of the dredged material footprint. An appropriate time-series (ordinal) and community analysis shall be performed using data collected during the current year and previous years to determine whether there are adverse changes in the benthic populations outside of the disposal site which may endanger the marine environment.

(4) Annual reporting. The results of any required Tier 2 studies shall be compiled in an annual report which will be available for public review.

(C) Tier 3 monitoring activities. Tier 3 monitoring activities shall consist of the following:

(1) Physical monitoring. Tier 3 physical monitoring shall consist of advanced oceanographic studies to study the dispersion of dredged material in the water column and the deposition of dredged material on the seafloor in the vicinity of the SF-DODS. Such physical monitoring may include additional, intensified studies involving the collection of additional current meter data, deployment of sediment traps, and deployment of surface and subsurface drifters. Such studies may include additional sampling stations, greater frequency of sampling, more advanced sampling methodologies or equipment, or other additional increased study measures compared to similar studies conducted in Tiers 1 or 2.

(2) Chemical monitoring. Tier 3 Chemical Monitoring shall consist of analysis of tissues of appropriate field-collected benthic and/or epifaunal organisms to determine bioaccumulation of contaminants that may be associated with dredged materials deposited at the SF-DODS. Sampling and analysis shall be designed and implemented to determine whether the SF-DODS is a source of adverse bioaccumulation in the

tissues of benthic species collected at or outside the SF-DODS, compared to adjacent unimpacted areas, which may endanger the marine environment. Appropriate sampling methodologies for these tests will be determined and the appropriate analyses will involve the assessment of benthic body burdens of contaminants and correlation with comparison of the benthic communities inside and outside of the sediment footprint.

(3) Biological monitoring. Tier 3 biological monitoring shall have two components: Monitoring of pelagic communities and monitoring of benthic communities.

(i) Pelagic communities. Tier 3 Biological Monitoring shall include advanced studies of seabirds, marine mammals and mid water column fish to evaluate how these populations might be affected by disposal site use. Such studies may include additional sampling stations, greater frequency of sampling, more advanced sampling methodologies or equipment, or other additional increased study measures compared to similar studies conducted in Tiers 1 or 2. Studies may include evaluation of sub-lethal changes in the health of pelagic organisms, such as the development of lesions, tumors, developmental abnormality, decreased fecundity or other adverse sub-lethal effect.

(ii) Benthic communities. Tier 3 Biological Monitoring shall include advanced studies of benthic communities to evaluate how these populations might be affected by disposal site use. Such studies may include additional sampling stations, greater frequency of sampling, more advanced sampling methodologies or equipment, or other additional increased study measures compared to similar studies conducted in Tier 2. Studies may include evaluation of sub-lethal changes in the health of benthic organisms, such as the development of lesions, tumors, developmental abnormality, decreased fecundity or other adverse sub-lethal effect.

(4) Reporting. The results of any required Tier 3 studies shall be compiled in a report which will be available for public review.

(D) Periodic confirmatory monitoring. At least once every three years, the following confirmatory monitoring activities will be conducted and results compiled in a report which will be available for public review: Samples of sediments taken from the dredged material footprint shall be subjected to bioassay testing using one or more appropriate sensitive marine species consistent with applicable ocean disposal testing guidance ('`Green Book'' or related Regional Implementation Agreements), as determined by the Regional Administrator, to confirm whether contaminated sediments are being deposited at the SF-DODS despite extensive pre-disposal testing. In addition, near-surface arrays of appropriate filter-feeding organisms (such as mussels) shall be deployed in at least three locations in and around the disposal site for at least one month during active site use, to confirm whether substantial bioaccumulation of contaminants may be associated with exposure to suspended sediment plumes from multiple disposal events. One array must be deployed outside the influence of any expected plumes to serve as a baseline reference.

(iv) Site management actions. Once disposal operations at the site begin, the three-tier monitoring program described in paragraphs (b)(70)(iii) (A) through (C) of this section shall be implemented on an annual basis, through December 31, 1996, independent of the actual volumes disposed at the site. Thereafter, the Regional Administrator may establish a minimum annual disposal volume (not to exceed 10 percent of the designated site capacity at any time) below which this monitoring program need not be fully implemented. The Regional Administrator shall promptly review monitoring reports for the SF-DODS

along with any other information available to the Regional Administrator concerning site monitoring activities. If the information gathered from monitoring at a given monitoring tier is not sufficient for the Regional Administrator to base reasonable conclusions as to whether disposal at the SF-DODS might be endangering the marine ecosystem, then the Regional Administrator shall require intensified monitoring at a higher tier. If monitoring at a given tier establishes that disposal at the SF-DODS is endangering the marine ecosystem, then the Regional Administrator shall require modification, suspension or termination of site use.

(A) Selection of site monitoring tiers.

(1) Physical monitoring. Physical monitoring shall remain limited to Tier 1 monitoring when Tier 1 monitoring establishes that no significant amount of dredged material has been deposited or transported outside of the site boundaries. Tier 2 monitoring shall be employed when Tier 1 monitoring is insufficient to conclude that a significant amount of dredged material as defined in paragraph (b)(70)(iv)(A)(4) of this section has not been deposited or transported outside of the site boundaries.

(2) Chemical monitoring. (i) Chemical monitoring shall remain limited to Tier 1 Chemical Monitoring when the results of Physical Monitoring indicate that a significant amount of dredged material as defined in paragraph (b)(70)(iv)(A)(4) of this section has not been deposited or transported off-site, and Tier 1 Chemical Monitoring establishes that dredged sediments deposited at the disposal site do not contain levels of chemical contaminants that are significantly elevated above the range of chemical contaminant levels in dredged sediments that the Regional Administrator and the District Engineer found to be suitable for disposal at the SF-DODS pursuant to 40 CFR part 227.

(ii) Tier 2 monitoring shall be employed when the results of Physical Monitoring indicate that a significant amount of dredged material as defined in paragraph (b)(70)(iv)(A)(4) of this section has been deposited off-site, and Tier 1 Chemical Monitoring is insufficient to establish that dredged sediments deposited at the disposal site do not contain levels of chemical contaminants that are significantly elevated above the range of chemical contaminant levels in dredged sediments that the Regional Administrator and the District Engineer found to be suitable for disposal at the SF-DODS pursuant to 40 CFR part 227. The Regional Administrator may employ Tier 2 monitoring when available evidence indicates that a significant amount of dredged material as defined in paragraph (b)(70)(iv)(A)(4) of this section has been deposited near the SF-DODS site boundary.

(iii) Tier 3 monitoring shall be employed within and outside the dredged material footprint when Tier 2 Chemical Monitoring is insufficient to establish that dredged sediments deposited at the disposal site do not contain levels of chemical contaminants that are significantly elevated above the range of chemical contaminant levels in dredged sediments that the Regional Administrator and the District Engineer found to be suitable for disposal at the SF-DODS pursuant to 40 CFR part 227.

(3) Biological monitoring.

(i) Pelagic communities. Biological monitoring for pelagic communities shall remain limited to Tier 1 monitoring when Tier 1 monitoring establishes that disposal at the SF-DODS has not endangered the monitored pelagic communities. When Tier 1 monitoring is insufficient to make reasonable conclusions whether disposal at the

site has endangered the monitored pelagic communities, then Tier 2 monitoring of pelagic communities shall be employed. When Tier 2 monitoring is insufficient to make reasonable conclusions whether disposal at the site has endangered the monitored pelagic communities, then Tier 3 monitoring of pelagic communities shall be employed.

(ii) Benthic communities. Biological monitoring for benthic communities shall remain limited to Tier 1 monitoring when physical monitoring establishes that a significant amount of dredged material has not been deposited outside of the site boundaries. If physical monitoring indicates that a significant amount of dredged material has been deposited or transported outside of the site boundaries, then Tier 2 analysis of benthic communities shall be performed. If Chemical Monitoring establishes that there is significant bioaccumulation of contaminants in organisms sampled from the within or outside the dredged material footprint, then Tier 3 Biological Monitoring of the disposal site shall be employed. Tier 3 Biological Monitoring may replace Tier 3 Chemical Monitoring if observed biological effects are established as surrogate indicators for bioaccumulation of chemical contaminants in sampled organisms.

(4) Definition of significant dredged material accumulation. For purposes of this paragraph (b)(70)(iv)(A) of this section, dredged material accumulation on the ocean bottom to a thickness of five centimeters shall be considered to be a significant amount of dredged material. The Regional Administrator may determine that a lesser amount of accumulation is significant if available evidence indicates that a lesser amount of off-site accumulation could endanger marine resources.

(B) Modification, suspension or termination of site use.

(1) If the results of site monitoring or other information indicate that any of the following are occurring as a result of disposal at the SF-DODS, then the Regional Administrator shall modify, suspend, or terminate site use overall, or for individual projects as appropriate:

(i) Exceedance of Federal marine water quality criteria within the SF-DODS following initial mixing as defined in 40 CFR 227.29(a) or beyond the site boundary at any time;

(ii) Placement or movement of significant quantities of disposed material outside of site boundaries near or toward significant biological resource areas or marine sanctuaries;

(iii) Endangerment of the marine environment related to potentially significant adverse changes in the structure of the benthic community outside the disposal site boundary;

(iv) Endangerment to the health, welfare, or livelihood of persons or to the environment related to potentially significant adverse bioaccumulation in organisms collected from the disposal site or areas adjacent to the site boundary compared to the reference site;

(v) Endangerment to the health, welfare, or livelihood of persons related to potentially significant adverse impacts upon commercial or recreational fisheries resources near the site; or

(vi) Endangerment to the health, welfare, or livelihood of persons or to the environment related to any other potentially significant adverse environmental impacts.

(2) The Regional Administrator shall modify site use, rather than suspend or terminate site use, when site use modification will be sufficient to eliminate the adverse environmental impacts referred to in paragraphs (b)(70)(iv)(B)(1)(i) or (ii) of this section or the endangerment to human health, welfare or livelihood to the environment referred to in paragraphs (b)(70)(iv)(B)(1)(iii) through (vi) of this section. Notwithstanding the provisions of any permit or federal

project authorization authorizing site use, the Regional Administrator shall order, following opportunity for public comment, any of the following modifications to site use that he or she deems necessary to eliminate the adverse environmental effect or endangerment to human health, welfare, or livelihood or to the environment:

(i) Change or additional restrictions upon the permissible times, rates and total volume of disposal of dredged material at the SF-DODS;

(ii) Change or additional restrictions upon the method of disposal or transportation of dredged materials for disposal; or

(iii) Change or additional limitations upon the type or quality of dredged materials according to chemical, physical, bioassay toxicity, or bioaccumulation characteristics.

(3) The Regional Administrator shall suspend site use when site use suspension is both necessary and sufficient to eliminate any adverse environmental effect or endangerment to human health, welfare, or livelihood or to the environment referred to in paragraph

(b)(70)(iv)(B)(1) of this section. Notwithstanding the provisions of any permit or federal project authorization authorizing site use, the Regional Administrator shall order, following opportunity for public comment, site use suspension until an appropriate management action is identified or for a time period that will eliminate the adverse environmental effect or endangerment to human health, welfare, or livelihood or to the environment.

(4) Notwithstanding the provisions of any permit or federal project authorization authorizing site use, the Regional Administrator shall order, following opportunity for public comment, site use permanently terminated if this is the only means for eliminating the adverse environmental impacts referred to in paragraphs (b)(70)(iv)(B)(1)(i) or (ii) of this section or the endangerment to human health, welfare or livelihood to the environment referred to in paragraphs (b)(70)(iv)(B)(1)(iii) through (vi).