

US Army Corps
of Engineers
Baltimore District

CONSTRUCTION SPECIFICATIONS

MAINTENANCE DREDGING

BONUM CREEK, WESTMORELAND COUNTY, VIRGINIA

INVITATION NO. **W912DR-04-B-0006**

CONTRACT NO.

DATE: **DEC 18, 2003**

MAINTENANCE DREDGING, BONUM CREEK, WESTMORELAND COUNTY, VIRGINIA

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AND
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SECTION 1 - SPECIAL CLAUSES

1. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK: The Contractor shall be required to commence work under this contract within 10 calendar days after the date of receipt by him/her of Notice to Proceed, to prosecute said work diligently and to complete the entire work ready for use not later than 75 calendar days after the date of receipt by him of notice to proceed. All dredging shall be completed within 30 days of Notice to Proceed. Should the total quantity of material to be paid for and actually removed under the contract exceed the limit established in the Special Contract Requirement VARIATIONS IN ESTIMATED QUANTITY, additional time will be allowed at the rate of one calendar day for each 2,000 cubic yards in excess of the established limit. The time stated for completion shall include final clean-up of the premises.

2. ESTIMATED QUANTITIES: The total estimated quantities of material necessary to be removed from within the specified limits, as shown on the contract drawings exclusive of allowable overdepth, to complete the work is 6,585 cubic yards place measurement. The maximum amount of allowable overdepth dredging is estimated to be 9,043 cubic yards place measurement. Quantities for the various reaches are tabulated as follows:

3. PHYSICAL DATA: Information and data furnished or referred to below are furnished for information only and it is expressly understood that the Government will not be responsible for any interpretation or conclusion drawn therefore by the Contractor.

3.1 Physical Conditions: The physical conditions indicated on the contract drawings and in the specifications are the result of site investigations by surveys and probing. Records of previous dredging of the existing Federal channel indicate that the material to be removed by maintenance dredging consists principally of sand, silt, shell, clay, mud, gravel, debris, trash and combinations thereof.

3.2 Weather Conditions: Complete weather records and reports may be obtained from the U.S. Weather Bureau. The Contractor shall satisfy himself as to the hazards likely to arise from weather conditions during the dredging period. The site of work is exposed, and suspension of work may at times be necessary during extreme storm periods. Tidal currents may have an adverse effect on dredging operations. The mean range tide is 1.6 feet, with greater fluctuations occurring during high winds and storm periods.

3.3 Transportation Facilities: The Contractor shall make his own investigation of transportation facilities in the vicinity of the work.

3.4 Conditions of Channel: The best information available as to the present conditions of the Federal channel in Bonum Creek is shown on the contract drawings. The Federal channel was last dredged in 1993. The Contractor shall coordinate with the local utility companies for locations of under water utility cables which will obstruct dredging operation. The Contractor shall report any possible obstructions to the Contracting Officer for instruction prior to starting work.

3.5 Channel Traffic: Channel traffic consists of commercial vessels, commercial seafood boats, recreational craft, etc. and may cause minor delays to the dredging operations.

3.6 Obstruction of Channel: The Government will not undertake to keep the channel free from vessels or other obstructions, except to the extent of such regulations, if any, as may be prescribed by the Secretary of the Army,

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in accordance with the provisions of Section 7 of the River and Harbor Act approved 8 August 1917. The Contractor shall be required to conduct the work in such manner as to obstruct navigation as little as possible, and in case the Contractor's plant so obstructs the channel as to make difficult or endanger the passage of vessels, said plant shall be promptly moved on the approach of any vessels to such an extent as may be necessary to afford a safe practicable passage. Upon completion of the work the Contractor shall promptly remove his plant, including ranges, buoys, piles, and other marks placed by him under the contract in navigable waters or on shore.

3.7 Navigation Aids: The Contractor shall not relocate or move any aids to navigation that have been established by the U.S. Coast Guard. If it becomes necessary to have any aid to navigation moved by the Contractor in order to complete dredging operations under this contract, the Contractor shall notify the Fifth U.S. Coast Guard District, Office of Aids to Navigation, Portsmouth, Virginia 23705, ATTN: Mr. John Walters (757) 398-6230, in writing with a copy to the Contracting Officer or his authorized representative not less than 21 days prior to such need for movement. The Contractor shall notify the U.S. Coast Guard of the approximate time the navigation aid may be relocated to its original position.

3.8 Laying of Submerged Pipe Lines and Obstruction of Channel: Should it become necessary in the performance of this contract to use a submerged pipeline across a navigable channel the Contractor shall notify the Contracting Officer in writing to be received in the District Office at least 15 working days prior to the desired closure date. This notification shall furnish the following:

- (a) Location (Channel Centerline Stationing) and depth (over the top of the pipeline) at which the submerged line will be placed.
- (b) The desired length of time the channel is to be closed.
- (c) The date and hour placement or removal will commence.
- (d) The date and hour of anticipated completion.

3.9 Notice To Mariners: Should the Contractor, during dredging operations, encounter any objects on the channel bottom which could be a hazard to navigation, he shall immediately notify the Contracting Officer or his authorized representative as to the location of said object and any other pertinent information necessary for the Contracting Officer or his authorized representative to put out a Notice to Mariners.

3.10 Bridge-to-Bridge Radio Communication: In order that radio communication may be made with passing vessels, all dredges engaged in work under this contract shall be equipped with bridge to bridge radio telephone equipment.

The Contractor is required to monitor both channels 13 and 16.

Channel 13: The master, operator, or designated pilot of the vessel must maintain a listening watch on the designated bridge-to-bridge frequency while underway on the navigable waters of the United States. The designated frequency is VHF-FM Channel 13. The person maintaining the watch also must be able to communicate in English.

Channel 16: In addition to the Channel 13 watch, vessels must keep a continuous watch on VHF-FM Channel 16 (International Distress and Calling Channel) while underway, except when transmitting or receiving traffic on

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other VHF-FM channels (e.g., vessels may switch to other channels to pass traffic, listen to weather reports, etc.) or when participating in and monitoring a VTS channel. While not required to have a VHF-FM radio onboard (Voluntary Ship Stations), vessels not subject to the bridge-to-bridge regulations must maintain a watch on Channel 16 whenever the radio, if onboard, is operating (i.e., energized) and is not being used to communicate on other channels.

3.11 Notification of the Coast Guard: Prior to commencement of work on this contract, the Contractor shall notify the Commander, Fifth U.S. Coast Guard District of his intended operations to dredge and request that it be published in the Local Notice to Mariners. This notification must be given in sufficient time so that it appears in the Notice to Mariners at least one week prior to the commencement of this dredging operation.

3.12 Shellfish Areas: Shellfish areas exist in the vicinity of the area to be dredged. Dredging operations shall be conducted in such a manner as to avoid possible damage to these grounds. The Contractor is advised to exercise caution in his dredging and any other operations attendant with dredging (such as the construction of trestles; the movement and anchoring of barges, vessels, or other equipment; the placing or moving of anchors, and leaking pipelines) to prevent damage to all oyster grounds.

4. LAYOUT OF WORK: CENABEN 1984 APR

4.1 The Contractor shall be responsible for the layout of his work. The Government will furnish the channel centerline coordinates and bearings at the beginning point, at each point where the channel changes direction, and at the ending point; and the channel toe coordinates and bearings of both sides of the channel at the beginning point, at each point where the channel changes direction, and at the ending point. The Government will furnish the coordinates and the monument descriptions of the existing horizontal and vertical control within the project area. The Contractor shall be responsible, by utilizing this data, to dredge within the dredging prisms that are shown on the contract drawings. The Contractor shall maintain, preserve, repair or replace, at his own expense, any gages or location markers that are lost, damaged or destroyed for any reason subsequent to their initial establishment by the Contracting Officer until authorized to remove them. The Contractor may, at his option, establish offset stakes, back-up stakes, and gages to be utilized in re-establishing any baseline, ranges and gages that are lost, damaged or destroyed. The contract completion time will not be increased due to work delays that result from the failure of the Contractor to maintain, repair or replace the Government established baselines, ranges and gages.

4.2 The Contractor shall give the Contracting Officer or his authorized representative adequate advance notice of the commencement of work in order to assure the timely completion of the before dredging survey and the establishment of necessary dredging layouts. The notice shall be furnished at least 15 days prior to mobilization of the dredge plant to the work site. It is understood that the survey made in response to this notice will constitute the before dredging survey and any subsequent surveys occasioned through Contractor delays may be charged against the Contractor at a rate of \$1,200.00 per day. If the Contractor fails to provide adequate advance notice, the Contracting Officer will not be responsible for any delays in the commencement of work caused by incomplete dredging layouts.

4.3 Datum and Bench Marks: The plane of reference MLLW (NOS), mean lower low water as established by National Ocean Survey, shall be used in these specifications for dredging operations.

4.4 Horizontal Control: Horizontal control data will be provided to the Contractor on request. This request should be made to the Hydrographic Survey Team, Navigation Branch, telephone number (410) 962-6031.

5. SIGNAL LIGHTS:

5.1 The Contractor shall display lights and conduct his operations in accordance with the General Regulations of the Department of the Army and of the Coast Guard governing lights and day signals to be displayed by towing vessels with tows on which no signals can be displayed, vessels working on wrecks, dredges, and vessels engaged in laying cables or pipe or in submarine or bank protection operations, lights to be displayed on dredge pipe lines, and day signals to be displayed by vessels of more than 65-feet in length moored or anchored in a fairway or channel, and the passing by other vessels of floating plant working in navigable channels, as set forth in Commandant U.S. Coast Guard Instruction M16672.2, Navigation Rules: International-Inland (Comdtinst M16672.2), or 33 CFR 81 Appendix A (International) and 33 CFR 84 through 33 CFR 89 (Inland) as applicable. (DAEN-PRP-1984 JUL)

5.2 Marking of Floating Dredge Pipeline: The Contractor shall mark and maintain the floating dredge pipeline in accordance with U.S. Coast Guard navigation rules, inland - NX5-88.15. As a minimum the Contractor shall mark the pipeline with amber lights visible on all points of the horizon for 2 miles on a clear night. The lights shall flash at 50-70 times per minute and be placed between 1 and 3.5 meters above the water. Spacing shall be sufficient to clearly show the pipeline length and course. Where the pipeline crosses a navigable channel spacing shall be every 10 meters. Two red lights, visible on all points of the horizon, shall be displayed at each end of the floating pipeline. They shall be arranged vertically 1 meter apart with the lower light at the same elevation as the amber lights.

6. ACCOMMODATIONS AND MEALS FOR INSPECTORS: (1965 APR OCE)

6.1 The Contractor shall furnish to inspectors a suitable room for an office. The room shall be fully equipped and maintained to the satisfaction of the Contracting Office; it shall be properly heated, ventilated, and lighted and they shall have a desk which can be locked, a comfortable bed and chair for each inspector, and washing conveniences. The entire cost to the Contractor for furnishing, equipping, and maintaining the foregoing accommodations shall be included in the contract price. If the Contractor fails to meet these requirements, the facilities referred to above will be secured by the Contracting Officer, and the cost thereof will be deducted from payments to the Contractor.

6.2 If the Contractor maintains on this work establishment for the subsistence of his own employees, he shall, when required, furnish to inspectors employed on the work and to all Government agents who may visit the work on official business, meals of a quality satisfactory to the Contracting Officer. The meals furnished will be paid for by the Government at a rate of \$3.50 per person for each meal.

7. CONTRACTOR QUALITY CONTROL: Contractor Quality Control is the means by which the Contractor verifies that his construction/dredging complies with the requirements of the contract specifications. Contractor Quality Control shall be adequate to cover all construction/dredging operations including both onsite and offsite fabrication and will be keyed to the proposed construction/dredging sequence.

7.1 General: The Contractor shall provide and maintain an effective quality control program that complies with the Special Contract Requirement

INSPECTION OF CONSTRUCTION. The Contractor's Quality Control Program through inspection, testing, equipment/system operation, and reporting shall demonstrate and document the extent of compliance of all work with the standards and quality established by the contract documents. Inspection and test reports shall make reference to specific drawing and/or specification requirements and shall state inspection/test procedures with both expected and actual results.

The burden-of-proof of contract compliance is placed on the Contractor and not assumed by the Government. The Contractor's Quality Control will not be accepted without question.

7.2 Quality Control Plan: Within 7 calendar days after receipt of Notice to Proceed the Contractor shall furnish his Quality Control Plan and three copies thereof to the Contracting Officer or his authorized representative for review and approval. The plan shall cover in detail each feature of the project including dredging and disposal operations. Copies of the Quality Control Plan shall be made available on the dredge and at the disposal area. The Quality Control Plan the Contractor proposes to implement shall identify the personnel, procedures, instructions, records, and forms, and as a minimum, shall include:

- (a) A description of the quality management organization.
- (b) The number, classifications, qualifications, duties, responsibilities and authorities of personnel. A copy of the letter signed by an authorized official of the firm, which describes the responsibilities and delegates the authorities of the system manager, shall be furnished.
- (c) Procedures for processing reports, samples and other submittals.
- (d) Quality control activities to be performed, including those of subcontractors.
- (e) Compliance inspections recorded on the Daily Quality Control Report and the Dredging Report, a sample of which is shown at the end of these specifications.

Construction or dredging will be permitted to begin only after approval of the Quality Control Plan, or approval of that portion of the plan applicable to the particular feature of work to be started.

As an additional measure to the implementation of the Quality Control Plan, the Contractor shall meet with representatives of the Contracting Officer as soon as practicable after receipt of Notice to Proceed and before start of construction or dredging to discuss the Contractor's quality control system. The meeting shall develop a mutual understanding relative to details of his Quality Control Program including the forms for recording the quality control operations; control activities, testing, administration of the system for both onsite and offsite, and the interrelationship of Contractor and Government control and surveillance. Minutes of the meeting shall be prepared, signed by both the Contractor and the Contracting Officer or his authorized representative and shall become a part of the contract file. There may also be occasions when subsequent conferences will be called to reconfirm understandings.

7.2.1 Notification of Changes: After approval of the Quality Control Plan, the Contractor shall notify the Contracting Officer or his authorized representative in writing of any proposed change.

7.2.2 Work Deficiencies: The Contractor shall not build upon or conceal any work containing uncorrected defects. If deficiencies indicate that the Contractor's quality control system is not adequate or does not produce the desired results, corrective actions in both the quality control system and the work shall be taken by the Contractor. If the Contractor does not promptly make the necessary corrections, the Contracting Officer may issue an order stopping all or any part of the work until satisfactory corrective action has been taken. Payment for deficient work will be withheld until work as been satisfactorily corrected or other action is taken pursuant to the Special Contract Requirement INSPECTION OF CONSTRUCTION.

If the above does not obtain effective improvement in the Contractor's quality control system, the Contracting Officer or his authorized representative may direct changes be made in the quality control system and/or organization, including but not limited to the removal and replacement of unsatisfactory quality control representatives at any level or the addition of quality control personnel or services. Any additional cost to the Government for providing quality control services that are not satisfactorily performed by the Contractor, will be deducted from payment due the Contractor.

If recurring deficiencies in an item or items indicate that the quality control system is not adequate, such corrective actions shall be taken as directed by the Contracting Officer or his authorized representative.

7.3 Quality Control Organization:

7.3.1 System Manager: The Contractor shall identify an individual within his organization at the site of the work, who shall be responsible for overall management and have the authority to act in all Contractor quality control matters for the Contractor.

7.3.2 Personnel: A staff shall be maintained under the direction of the system manager to perform all quality control activities. The actual strength of the staff during any specific work period may vary to cover work phase needs, shifts, and rates of dredging. At least one full-time Contractor quality control person fully alert and awake shall be present on the disposal area at all times pumping operations are in progress. The personnel of this staff shall be fully qualified by experience and technically trained to perform their assigned responsibilities.

7.4 Control: The Contractor's quality control system shall include at least the following three phases of control and management for definable features of work:

(a) Preparatory: Twenty-four hours in advance of beginning any definable features of work, the Contractor's quality control manager shall review with the Government inspector(s) the applicable provisions of the specifications and Quality Control Plan and confirm the methods to assure compliance.

(b) Initial: This phase of control must be accomplished at the time of arrival of disposal area and dredging personnel on site to accomplish a definable feature of work and at any time new workmen or crews arrive for assignment to the work. The Contractor's control system must permit the transfer of information on quality requirements specified in this contract to each workman before he starts, demonstration from each workman that he can provide the specified quality of work, and motivate him to continue. It is also during this phase that control testing to prove the adequacy of the Contractor's control procedures shall be initiated and verified. The Contracting Officer or his authorized representative shall be notified at

least 24 hours in advance of each initial activity.

(c) Follow-up: The follow-up phase shall be performed continuously to verify that control procedures are providing an end product which complied with contract requirements. Adjustments to control procedures may be required based upon the results of this phase and compliance inspections.

7.5 Completion: At the completion of the work, the Contractor's quality control representative shall conduct a joint completion review with the Government inspector(s). During this review the work shall be examined, quality control shall be reviewed, and a list shall be developed of work not properly completed or not conforming to plans and specifications. This list shall be included in the quality control documentation with an estimated date for correction of each deficiency. The Contractor shall make sure that deficiencies have been corrected prior to the specified completion date. Payment will be withheld for defective or deficient features until they are satisfactorily corrected except as otherwise provided in the Special Contract Requirement INSPECTION OF CONSTRUCTION.

7.6 Quality Control Records:

7.6.1 The Contractor shall maintain current records, on an appropriate approved form, of quality control operations, activities, and tests performed including the work of suppliers and subcontractors. These records shall include factual evidence that the required activities or tests have been performed, including but not limited to the following:

- (a) Type and number of control activities and compliance inspections.
- (b) Results of control activities or inspections.
- (c) Nature of defects, causes for rejection, etc.
- (d) Proposed remedial action.
- (e) Corrective actions taken.

7.6.2 These records shall cover both conforming and defective or deficient features and shall include a statement that supplies and materials incorporated in the work comply with the contract. The Contractor shall submit legible, daily quality control reports to the Government inspector on the day following the report period. The records shall cover development of the disposal area(s), related piping, and dredging performed during the time period for which the records are furnished. These records shall be verified by person so designated by the Contractor. Failure to follow these procedures will be considered a breach of the Quality Control Program and portions of the progress payment may be withheld until it is demonstrated by the Contractor that the construction activities covered by the delinquent reports meet the requirements of the plans and specifications.

7.7 Measurement and Payment: No separate measurement and payment will be made for the work performed in Contractor Quality Control, specified herein, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor, and shall be included in the overall cost of the work.

8. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (EFARS 52.0231.5000 (OCT 1995))

- (a) This clause does not apply to terminations. See 52.249-5000,

Basis for settlement of proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable conditions owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual costs data for each piece of equipment or groups of similar serial and services for which the government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs can not be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP1110-1-8 Construction Equipment Ownership and Operating Expenses Schedule, Region East. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d) (ii) and Far 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established proactive of leasing the same or similar equipment to unaffiliated leasees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet. CENAB-CT/SEP 95 (EFARS 52.231-5000)

9. SAFETY:

9.1 General: The Contractor shall comply with the Contract Clause ACCIDENT PREVENTION. EM 385-1-1, September 1996, subject: Safety and Health Requirements Manual, is a part of these specifications.

9.1.1: The Contractor shall comply with the provisions of EM 385-1-1. If the Contractor is a currently accepted participant in the Dredging Contractors of America (DCA)/United States Army Corps of Engineers (USACE) Dredging Safety Management Program (DSMP), as determined by the DCA/USACE Joint Committee, and holds a current valid Certificate of Compliance for both the Contractor Program and the Dredge(s) to be used to perform the work required under this contract, the Contractor may, in lieu of the submission of an Accident Prevention Plan (APP),

(1) make available for review, upon request, the Contractor's current Safety Management System (SMS) documentation,

(2) submit to the Contracting Officer the current valid Company Certificate of Compliance for its SMS,

(3) submit the current dredge(s) Certificate of Compliance based on third party audit, and

(4) submit for review and acceptance, site-specific addenda to the SMS

as specified in the solicitation.

9.2 Accident Prevention Program: Within 7 calendar days after receipt of Notice to Proceed the Contractor shall furnish his Accident Prevention Program and three copies thereof to the Contracting Officer or his authorized representative for review and approval. The program shall be prepared in the following format:

(a) Administrative Plan

(b) Job Hazard Analysis

(c) A copy of company policy statement of accident prevention and any other guidance statements normally provided new employees.

(d) When marine plant and equipment are in use the Contractor shall assure that oil transfer operations to or from his plant comply with all Federal, State, county, and Municipal laws, codes and regulations. Particular attention is invited to 33 CFR Subchapter 0, POLLUTION. The Contractor shall incorporate in his accident prevention program, submitted in compliance with Contract Clause ACCIDENT PREVENTION, sufficient information to demonstrate that all fuel transfers will be made in accordance with 33 CFR 156 and any other applicable laws, codes and regulations. (CENABEN 1984 APR)

(e) The Contractor shall not commence physical work at the project site until the program has been approved by the Contracting Officer or his authorized representative. As an additional measure to implementation of the Accident Prevention Program, the Contractor shall meet with representatives of the Contracting Officer as soon as practicable after receipt of Notice to Proceed and before start of work to discuss and develop a mutual understanding relative to administration of the overall safety program. Minutes of the meeting shall be prepared, signed by the Contractor and the Contracting Officer or his authorized representative. At the Contracting Officer's discretion, the Contractor may submit his Job Hazard Analysis only for the phases of construction. All remaining phases shall be submitted and accepted prior to the beginning of work in each phase. EM 385-1-1, Section 1.

9.3 Accident Investigation and Reporting: Accidents shall be investigated by immediate supervisor of the employee(s) involved and reported to the Contracting Officer or the Government inspector within one working day after the accident. Paragraph 01.D, EM 385-1-1.

(a) The Contractor shall insure that all accidents which involve loss of life, occupational disease of the employee, injury incapacitating any person for normal work beyond the day of injury, or damage to property, materials, supplies, or equipment, of \$1,000.00 or more, and which relate to the dredge, any attendant plant, the dredge working area, or the disposal area, shall be recorded, investigated, and reported to the Contracting Officer or his authorized representative.

(b) Each accident shall be verbally reported to the Government inspector at the earliest practicable time, but within 24 hours. Each accident involving loss of life or traumatic injury to any person shall be reported to the Government inspector verbally, telephonically, or by radio immediately.

(c) The Contractor shall promptly investigate each accident and submit a written, signed report on ENG Form 3394 to the Government inspector within 48 hours.

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(d) A factual record of each accident shall be entered in the Contractor's official daily log book.

9.4 Daily Inspections: The Contractor shall institute a daily inspection program to assure all safety requirements are being fulfilled. Reports of daily inspections shall be maintained in the Contractor's official daily log book. The reports shall be records of the daily inspections and resulting actions. Each report shall include, as a minimum, the following:

(a) Phase(s) of construction underway during the inspection.

(b) Locations of areas inspections were made.

(c) Results of inspection, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

9.5 Means of Escape for Personnel Quartered or Working on Floating Plant: Two means of escape shall be provided for assembly, sleeping, and messing areas on floating plants. For areas involving 10 or more persons, both means of egress shall be through standard size doors opening to different exit routes. Where 9 or fewer persons are involved, one of the means of escape may be a window (minimum dimensions 24-inch by 36-inch) which leads to a different exit route. EM 385-1-1, Section 19.

9.6 Emergency Alarms and Signals:

9.6.1 Alarms. Emergency alarms shall be installed and maintained on all floating plant requiring a crew where it is possible for either a passenger or crewman to be out of sight or hearing from any other person. The alarm system shall be operated from the primary electrical system with standby batteries on trickle charge that will automatically furnish the required energy during an electrical-system failure.

9.6.2 Signals:

(a) Fire Alarm Signals: The general fire alarm signal shall be in accordance with paragraph 97.13-15b of the Coast Guard Rules and Regulations for Cargo and Miscellaneous Vessels, Subchapter I, 1 Sep 77 (CG 257)

(b) Abandon Ship Signals: The signal for abandon ship shall be in accordance with paragraph 97.13-15c of referenced cited in (a) above.

(c) Man-Overboard Signal: Hail and pass the word to the bridge. All personnel and vessels capable of rendering assistance shall respond.

9.7 Mooring Lines: Eye loops on mooring lines shall be equipped with brackets or handling ropes to protect the hands of deckhands.

10. FUEL USAGE: The Contractor shall furnish the Contracting Officer a report, to be received on or before the last day of the calendar month, listing the totals of fuels consumed by the dredging plant and supporting vessels. The report shall list the quantities of different fuels separately. The report shall cover the period from the 25th of the preceding month to the 25th of the current month. This information may be included in the Contractor's Daily Report of Operations.

11. ENVIRONMENTAL LITIGATION: (1974 NOV OCE)

(a) If the performance of all or any part of the work is suspended,

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delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the Contract Clause SUSPENSION OF WORK. The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

12. WORK AT NIGHT: For night operations the Contractor shall provide and maintain, at his expense, two light towers equipped with a 3 KW generator (minimum) at the dredged material placement site. Each light tower shall have metal halide bulbs (1000 watt) or equivalent, capable of giving off a minimum of 200,000 lumens. No work will be permitted after dusk without the aid of both light towers.

13. RADIO COMMUNICATIONS: At all times pumping operations are in progress, the Contractor is responsible and required to provide any and all equipment necessary to maintain 24-hour oral communication between the dredge operator, Quality Control System Manager, and the Corps of Engineers' inspector on site. For this purpose, the Contractor shall provide and maintain at his expense a marine band walkie-talkie radio for use by the Government inspector(s). The Contractor is responsible for any and all circumstances not conforming to the plans and specifications resulting from the inadequate operation of the equipment.

14. PROGRESS SCHEDULING AND REPORTING: (JUN 1975) In accordance with the Contract Clauses, the Contractor, shall within 5 days or as otherwise determined by the Contracting Officer, after date of commencement of work, submit for approval a practicable progress schedule showing the manner in which he intends to prosecute the work. ENG Form 2454 ("Construction Progress Chart") will be furnished upon request for use in preparing this schedule. If a Contractor form is used, the same information as shown in the ENG Form 2454 shall be provided. Preparation and updating of the schedule shall be as follows:

14.1 Preparation: The progress schedule shall be prepared in the form of time-scaled summary network diagram graphically indicating the sequence proposed to accomplish each work activity or operation, and appropriate interdependencies between the various activities. The chart shall show the starting and completion dates of all activities on a linear horizontal time scale beginning with the dates of Notice to Proceed and indicating calendar days to completion. Each activity in the construction shall be represented by an arrow and shall have a beginning and ending node (event). The entire project shall have only one beginning node and one ending node. The arrangement of arrows shall be such that they flow from the left to right. Each arrow representing an activity shall be annotated to show the activity description, duration and cost. The Contractor shall indicate on the chart the important work activities that are critical to the timely overall

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completion of the project. Key dates for important features or portions of work features are milestone dates and shall be so indicated on the chart. Based on this chart, the Contractor shall prepare an earnings-time curve (S Curve) showing the rate of progress in terms of money and percent completion.

Schedule progress may not include the value of materials or equipment delivered to the job site but not yet incorporated into the work. This schedule shall be the medium through which the timeliness of the Contractor's construction effort is appraised.

14.2 Updating: The Contractor shall update the schedule by entering actual progress thereon at monthly intervals. The status of activities completed or partially completed as of the end of each period shall be shown, as well as the percentage of work completed. In computing actual progress, the value of material and equipment on site but not incorporated into the work may not be considered. When changes are authorized that result in contract time extensions, the Contractor shall submit a modified chart for approval by the Contracting Officer. The Contract Clause SCHEDULES FOR CONSTRUCTION CONTRACTS with reference to overtime, extra shifts, etc., may be invoked when the Contractor fails to start or complete work activities or portions of same by the date indicated on the approved progress chart, or when it is apparent to the Contracting Officer from the Contractor's actual progress that these dates will not be met. (CENABCO-E)

15. CONTINUITY OF WORK: No payment will be made for work done in any area designated by the Contracting Officer until the full depth required under the contract is secured in the whole of such area, unless prevented by ledge rock, nor will payment be made for excavation in any area not adjacent to and in prolongation of areas where full depth has been secured except by decision of the contracting officer. Should any such nonadjacent area be excavated to full depth during the operations carried on under the contract, payment for all work therein may be deferred until the required depth has been made in the area intervening. The Contractor may be required to suspend dredging at any time when for any reason the gages or ranges cannot be seen or properly followed.

16. MISPLACED MATERIAL: Should the Contractor during the progress of the work, lose, dump, throw overboard, sink, or misplace any material, plant machinery, or appliance, which in the opinion of the Contracting Officer may be dangerous to or obstruct navigation, the Contractor shall recover and remove the same with the utmost dispatch. The Contractor shall give immediate notice, with description and location of such obstructions, to the Contracting Officer or inspector, and when required shall mark or buoy such obstructions until the same are removed. Should he refuse, neglect, or delay compliance with the above requirements, such obstructions may be removed by the Contracting Officer, and the cost of such removal may be deducted from any money due or to become due to the Contractor, or may be recovered under his bond. The liability of the Contractor of the removal of a vessel wrecked or sunk without fault or negligence shall be limited to that provided in Section 15, 19, and 20 of the River and Harbor Act of March 3, 1899 (33 U.S.C. 410 et seq.).

17. INSPECTION: The Government inspector(s) will direct the maintenance of the gauges, ranges, location marks and limit marks in proper order and position; but the presence of the Government inspector(s) shall not relieve the Contractor of responsibility for the proper execution of the work in accordance with the specifications. The Contractor shall be required:

(a) To furnish, on the request of the Contracting Officer, any Government inspector, or authorized representative, the use of such boats, boatmen, laborers, and material forming a part of the ordinary and usual

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equipment and crew of the dredging plant as may be reasonably necessary in inspecting and supervising the work. However, the Contractor will not be required to furnish such facilities for the surveys prescribed in the Special Clause FINAL EXAMINATION AND ACCEPTANCE.

(b) To furnish, on the request of the Contracting Officer, any Government inspector, or authorized representative, suitable transportation from all points on shore designated by the Contracting Officer to and from the various pieces of plant, and to and from the disposal site.

(c) Should the Contractor refuse, neglect, or delay compliance with these requirements, the specific facilities may be furnished and maintained by the Contracting Officer, and the cost thereof will be deducted from any amounts due or to become due the Contractor.

18. FINAL EXAMINATION AND ACCEPTANCE:

(a) As soon as practicable after the completion of the entire work or any section thereof (if the work is divided into sections) as in the opinion of the Contracting Officer or his authorized representative will not be subject to damage by further operations under the contract, such work will be thoroughly examined at the cost and expense of the Government by sounding or by sweeping, or both, as determined by the Contracting Officer or his authorized representative. Should any shoals, lumps, or other lack of contract depth be disclosed by this examination the Contractor shall be required to remove same by dragging the bottom or by dredging at the contract rate for dredging, but if the bottom is soft and the shoal areas are small and form no material obstruction to navigation, the removal of such shoal may be waived by the discretion of the Contracting Officer or his authorized representative. The Contractor or his authorized representative will be notified when soundings and/or sweepings are to be made, and will be permitted to accompany the survey party. When the area is found to be in a satisfactory condition, it will be accepted finally. Should more than two sounding or sweeping operations by the Government over an area be necessary by reason of work for the removal of shoals disclosed at a prior sounding or sweeping, the cost of such third and any subsequent sounding or sweeping operations will be charged against the Contractor at the rate of \$1,200.00 per day for each day in which the Government plant is engaged in sounding or sweeping and/ or is enroute to or from the site or held at or near the said site for such operations.

(b) Final acceptance of the whole or a part of the work and the deductions or corrections of deductions made thereon will not be reopened after having once been made, except on evidence of collusion, fraud, or obvious error, and the acceptance of a completed section shall not change the time of payment of the retained percentages of the whole or any part of the work.

19. SHOALING:

19.1 If, before the contract is completed, shoaling occurs in any section previously accepted, including shoaling in the finished channel, because of the natural lowering of the side slopes, redredging at contract price, within the limit of available funds, may be done if agreeable to both the Contractor and the Contracting Officer.

19.2 If before dredging survey indicates shoaling in the channel immediately adjacent to the channel to be dredged, the Contractor shall be required to dredge the additional shoaling at the contract unit price if directed by the Contracting Officer.

20. ENVIRONMENTAL PROTECTION:

20.1 General: The Contractor shall furnish all labor, materials and equipment, to perform all work required for the prevention of environmental pollution during, and as the result of, construction/dredging operations under this contract except for those measures set forth in the technical Provisions of these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; or affect other species of importance to man. The control of environmental pollution requires consideration of air, water, and land.

20.2 Applicable Regulations: The Contractor and his subcontractors in the performance of this contract, shall comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement in effect on the date of this solicitation, as well as the specific requirements stated elsewhere in the contract specifications.

20.3 Notification: The Contracting Officer or his authorized representative will notify the Contractor of any noncompliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. If the Contractor fails or refuses to comply promptly, the Contracting Officer or his authorized representative may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of time lost due to any such stop order shall be made subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

20.4 Subcontractors: Compliance with the provisions for environmental protection by subcontractors shall be the responsibility of the Contractor.

20.5 Protection of Water Resources: The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acid construction wastes, or other harmful materials. All work under this contract shall be performed in such a manner that objectionable conditions will not be created in streams through or adjacent to the project area. The Contractor shall take special positive protective measures to prevent spillage of potential pollutant materials such as fuel, emulsion materials, chemicals etc., from storage containers or equipment into public waters. Such positive protective measures may include, but not limited to the following:

- (a) A berm enclosure of sufficient capacity to contain such materials.
- (b) Security measures to prevent acts of vandalism which could result in spillage of such materials (fences, guards, etc.).
- (c) Storage of such materials in an area where the terrain would preclude leakage into public waters.
- (d) Utilization of secure Government storage areas if the Contracting Officer indicates such space is available. No storage past immediate needs (2 days) without the consent of the Contracting Officer or his authorized representative.

20.6 Burning: Burning shall be in compliance with Federal, State, and local laws. The Contractor shall be responsible for obtaining all required burning permit approvals.

20.7 Dust Control: The Contractor shall maintain all work areas free from dust which would contribute to air pollution. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be permitted to control dust. Sprinkling, where used, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

20.8 Protection of Land Resources:

20.8.1 General: It is intended that land resources within the project boundaries and outside the limits of the permanent work performed under this contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. Insofar as possible, the Contractor shall confine his construction activities to areas defined by the plans and specifications or to be cleared for other operations. The following additional requirements are intended to supplement and clarify the requirements of the CONTRACT CLAUSES.

20.8.2 Protection of Trees Retained:

(a) The Contractor shall be responsible for the protection of the tops, trunks, and roots of all existing trees that are to be retained on the site. Protection shall be maintained until all work in the vicinity has been completed and shall not be removed without the consent of the Contracting Officer or the authorized representative of the contracting officer. If the Contracting Officer or his authorized representative finds that the protective devices are insufficient, additional protection devices shall be installed.

(b) Heavy equipment, vehicular traffic, or stockpiling of any materials shall not be permitted within the drip line of trees to be retained.

(c) No toxic materials shall be stored within 100 feet from the drip line of trees to be retained.

(d) Except for areas shown on the contract drawings to be cleared, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without special authority. Existing nearby trees shall not be used for anchorage unless specifically authorized by the Contracting Officer or his authorized representative. Where such special emergency use is permitted, the Contractor or his authorized representative shall first adequately protect the trunk with a sufficient thickness of burlap over which softwood cleats shall be tied.

(e) No protective devices, signs, utility boxes or other objects shall be nailed to trees to be retained on the site.

20.9 Restoration of Landscape Damage: Any tree or other landscape feature scarred or damaged by the Contractor's operations shall be restored as nearly as possible to its original condition at the Contractor's expense. The Contracting Officer or his authorized representative will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of. All scars made on trees, designated on the plans to remain, and all cuts for the removal of limbs larger than 1 inch in diameter shall be coated as soon as possible with an approved tree-wound dressing. All trimmings or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted. Where tree climbing is necessary, the use of climbing

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spurs will not be permitted. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Contracting Officer or his authorized representative, shall be immediately removed and replaced with a nursery-grown tree of the same species. Replacement trees shall measure no less than 2 inches in diameter at 6 inches above the ground level.

20.10 Location of Storage and Service Facilities: The location on Government property of the Contractor's storage and service facilities, required temporarily in the performance of the work, shall be upon cleared portions of the jobsite or areas to be cleared. The preservation of the landscape shall be an imperative consideration in the selection of all sites.

20.11 Temporary Excavation and Embankments: If the Contractor proposes to construct temporary roads, embankments, or excavations for plant and/or work areas, he shall submit a plan for approval prior to scheduled start of such temporary work.

20.12 Waste Disposal: Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to the work site shall not be permitted. If waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed of as directed by the Contracting Officer, replaced with suitable fill material, compacted and planted as required to reestablish vegetation.

20.13 Toilet Facilities: The Contractor shall provide on-shore toilet facilities, in accordance with paragraph 02.B, EM 385-1-1, at the dredged material disposal site. Dredge plant toilet facilities may not be substituted for on-shore facility requirements.

20.14 Corrective Action: The Contractor shall, upon receipt of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless it was later determined that the Contractor was in compliance.

20.15 Measurement and Payment: No separate measurement and payment will be made for the work performed in Environmental Protection, specified herein, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor and shall be included in the overall cost of the work.

21. SUBCONTRACTS: In accordance with Section 00100, Instructions, Conditions, and Notices to Bidders, NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY, the Contractor shall, within 10 working days following award of any construction subcontract by the Contractor or a Subcontractor, deliver to the Contracting Officer or his authorized representative a completed DD form 1565.

22. CONTRACTOR'S RESPONSIBILITY: (ECI, APP.A) The Contractor shall be responsible that his employees strictly comply with all Federal, State, and municipal laws that may apply to operations under the contract; and it is understood and agreed that the Contractor assumes full responsibility for the safety of his employees, plant, and materials, and for any damage or injury done by or to them from any source or cause, except damage caused to the plant

or equipment by acts of the Government, its officers, agents or employees, in which event such damages will be the responsibility of the Government in accordance with applicable Federal laws. For the purpose of this clause, the terms "officers, agents or employees" of the Government shall not include persons who are employed by the Contractor and whose services have been furnished to the Government pursuant to this or any other contract. (See also FAR 52.236-7 and FAR 52.236-13)

22.1 Responsibility For Contractor Plant and Government Property: The Government will not be responsible for the dredge and attendant plant, any Government property aboard the dredge and attendant plant, or any accidental damage thereto during the period of the contract. The Contractor shall release the Government and its officers and agents from all responsibility for damages to dock facilities, submerged and aerial crossings, bridges, moored vessels, or other damages ordinarily covered by fire and marine insurance. (See also FAR 52.236-9)

22.2 Warranty: The Contractor warrants to the Government the quiet and peaceable use of the aforesaid property, and in case of any disturbance, by suit or otherwise, will defend the same free of charge to the Government in or before the proper State or United States courts.

22.3 Delays: If the Contractor refuses or fails to make delivery of the property within the time specified or any extension thereof, as provided in specifications, or to maintain the property in serviceable condition and diligently and competently to conduct the specified operations, the Government may, by written notice terminate the right of the Contractor to proceed with delivery or with further performance under the contract or such parts or parts thereof affected by the contract or otherwise and the Contractor shall be liable to the Government for any excess cost occasioned thereby.

22.4 Disclaimer: The Contractor shall hold and save harmless the United states, its officers and employees, from all claims that may arise resulting from the Contractor's negligence in connection with the work to be performed under the contract, or from noncompliance by the Contractor with the provisions of the contract, contract drawings, and specifications and/or the instructions of the Contracting Officer or his authorized representative. (See also FAR 52.236-10)

End of Section 1

SECTION 2 - TECHNICAL PROVISIONS

1. WORK COVERED BY CONTRACT PRICE:

1.1 Payment Item No. 0001: All costs connected with the mobilization and demobilization of the Contractor's dredging plant and equipment furnished for Bonum Creek, Westmoreland County, Virginia as defined below shall be included in the contract lump-sum price for Item No. 0001 "Mobilization and Demobilization" as listed in the Unit Price Schedule.

1.1.1 Mobilization shall include all costs for operations accomplished prior to commencement of actual dredging operations, i.e. transfer of dredge, attendant plant, and equipment to site; initial installation of pipe, and disposal area preparation required; and any other work that is necessary in advance of the actual dredging operations.

1.1.2 Demobilization shall include general preparation for transfer of plant to its home base, removal of pipelines, disposal area cleanup, and transfer of plant to its home base.

1.2 Payment Item No. 0002: The contract price per cubic yard for the maintenance dredging of the Bonum Creek channel shall include the costs of removal and disposal of all material as specified herein or as indicated on the contract drawings exclusive of mobilization and demobilization costs as defined in paragraphs 1.1, 1.1.1, and 1.1.2. Payment will be made in accordance with Item No. 0002 "Maintenance Dredging - Bonum Creek" as listed in the Unit Price Schedule which shall be full compensation for the work performed.

1.3 Payment Item No. 0003: All costs associated with the purchase, delivery, and placement of 2,000 cubic yards of shell material on the dredged material placement site, after the dredging, to act as a base material for the cultch (oyster shell), as specified herein or as indicated on the contract drawings exclusive of mobilization and demobilization costs as defined in paragraphs 1.1, 1.1.1, 1.1.2 above. The shell material shall consist of hard clam shell (*Mercenaria mercenaria*) and/or surf clam shell (*Spisula solidissima*). Payment will be made at the contract unit price in accordance with Item No. 0003 "Clean Shell (Clam)" as listed in the Unit Price Schedule which shall be full compensation for the work performed.

1.4 Payment Item No. 0004: All costs associated with the purchase, delivery, and placement of, inclusive of equipment to properly dispense, 2,000 cubic yards of cultch (oyster shell) on the 6 inches of hard and/of surf clam shell material, within the dredged material placement site, after the base shell placement, as specified herein or as indicated on the contract drawings exclusive of mobilization and demobilization costs as defined in paragraphs 1.1, 1.1.1, 1.1.2 above. Payment will be made in accordance with Item No. 0004 "Oyster Shell" as listed in the Unit Price Schedule which shall be full compensation for the work performed.

1.5 Payment Item No. 0005: All costs associated with ordering, obtaining, delivering and distribution of 3,000,000 live spat on shell across the placement site. Payment will be made in accordance with Item No. 0005 "Spat" as listed in the Unit Price Schedule which shall be full compensation for the work performed.

2. ORDER OF WORK: The order of dredging the channel shall be up to the Contractor. However the Contractor should only be in Virginia waters as little as possible.

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(a) The Contractor shall furnish, deliver, and operate one cutterhead, hydraulic, pipeline dredge with attendant plant capable of performing dredging, as defined in this specifications, for Bonum Creek Westmoreland County, Virginia. The Government reserves the right to inspect the plant prior to award of the contract. If the plant is found insufficient to accomplish the scope of the work, this may be used to consider the Contractor non-responsive and ineligible for award of this contract.

(b) The Contractor shall deliver the dredge and attendant plant ready for operation at the project site within 10 calendar days prior to the initiation of dredging. Upon arrival of the dredge and all attendant plant at the project site in Bonum Creek, Westmoreland County, Virginia, the Contracting Officer's appointed inspector(s) will inspect the plant to determine whether any deficiencies have occurred subsequent to the time the plant was brought into compliance pursuant to the pre-award inspection. The Contractor will be notified of acceptance or rejection of the plant within 24 hours after delivery.

(c) Upon Contractor notification and at least 24 hours prior to the commencement of dredging operations the Contractor and Government inspector(s) shall conduct a joint inspection of the completed disposal area operations. No dredging will be permitted to begin until all deficiencies identified by the Government inspector(s) have been satisfactorily corrected by the Contractor.

(d) No dredging shall be permitted unless the Contractor appointed quality control person is present at the disposal area while pumping operations are in progress.

(e) The dredged material shall be deposited in the placement areas designated on the contract drawings. Certain channel material may be designated for specific placement sites.

3. PLANT: Plant and equipment employed on the work shall be in satisfactory operating condition and capable of safely and efficiently performing the work under exposed environmental conditions and as set forth in the specification and shall be subject to inspection by the Contracting Officer at all times. Pipeline for hydraulic machines shall be kept in good condition at all times, any leaks or breaks along their length shall be promptly and properly repaired. No reduction in the capacity of the plant employed on the work shall be made except by written permission of the Contracting Officer. The measure of the "Capacity of Plant" shall be its actual performance on the work to which these specifications apply. All floating pipelines used as accessways shall be equipped with walkways and guardrail conforming to paragraph 19.B.05 of Corps of Engineers Manual EM 385-1-1.

4. CHARACTER OF MATERIALS: The maintenance material to be removed to restore the depth within the limits shown on the contract drawings, is that composing the shoaling that has occurred since the channel was last dredged. The channel was previously dredged in 1993 to a required depth of 6 plus 2 feet of allowable overdepth. It is believed that the material to be removed will consist principally of sand, silt, shell, clay, mud, gravel, debris, trash and combinations thereof. Minor variations in the subsurface materials are to be expected and, if encountered, shall not be considered as being materially different within the purview of the Contract Clause DIFFERING SITE CONDITIONS. Bidders are expected to examine the site of the work, and decide for themselves the character of the materials. The physical data for the Federal channels is located at the end of the specifications.

5. DISPOSAL OF EXCAVATED MATERIAL:

5.1 The Contractor shall use the designated Government-furnished open-water placement site. Within 7 days after receipt of Notice to Proceed, the Contractor shall furnish his plan for the dredging and disposal operations to the Contracting Officer for review and approval. This plan shall include a description of all proposed dredging, transporting, and re-handling equipment to be utilized in performance of the contract work, and shall also include placement area layout plans indicating the locations of the dredged material discharge pipeline. Dredging will not be permitted to commence until this plan is approved by the Contracting Officer or his authorized representative.

5.2 Misplaced Excavated Material: Any material that is deposited elsewhere than in places designated or approved by the Contracting Officer or his authorized representative will not be paid for and the Contractor may be required to remove such misplaced material and deposit it where directed at his expense. Misplaced excavated material may constitute a violation of applicable Federal, State, and Local statutes and the Contractor shall be liable for any civil and/or criminal penalties imposed by these statutes. A copy of the State of Maryland, Water Quality Certification is included as part of these specifications.

6. GOVERNMENT FURNISHED DISPOSAL AREA:

6.1 The Contractor shall use the designated Government-furnished open-water placement site designated as "Oyster Bar Creation Site" on the contract drawings. The material shall be excavated by hydraulic dredge and discharged by pipeline vertically downward through a diffuser at the end of the discharge pipe. The Contractor is required to furnish the diffuser in accordance with the attached specification at the end of this section.

6.2 Marking the Disposal Area: Before placing material in the placement site, the area shall be plainly marked by the Contractor with four (4) lighted, orange colored buoys to be placed and maintained by him at locations designated by the Contracting Officer and under permit from the U.S. Coast Guard. Unless authorized by the Contracting Officer, no disposal of material shall occur at night, without at least three (3) of the buoys lighted, or in areas with depths less than -12 feet MLLW. The Contractor shall provide the Baltimore District (Mr. Steve Golder (410) 962-6031, GPS coordinates for the four corners prior to placement of dredged material.

6.3 The material excavated shall be transported, deposited, and retained in the area designated as "Oyster Bar Creation Site" on the contract drawings. The placement of the dredged material shall start along the G - J line at the northeastern border of the placement site as shown on the drawings. The Contractor shall place the material in the disposal site to raise the bottom elevation from 3 to 5 feet, but not greater than elevation - 12 feet MLLW. If the area where the discharge pipe is located reaches that elevation, the discharge pipe must be relocated. The location of the discharge pipe must be approved by the Contracting Officer or his authorized representative and confined within the limits of the designated disposal area. The dredged material must be discharged beneath the water surface using a diffuser to help control mounding and lateral spread. The Contractor shall use either the diffuser design that is attached at the end of these specifications, or an equivalent design, as approved by the Contracting Officer's Representative. The Contractor shall not fill any portion of the disposal site to a depth greater than elevation - 12 feet MLLW. If fine-grained material is encountered it must be capped by the sandier material, therefore, the discharge pipe may have to be moved before the elevation of -12

feet MLLW is reached and then moved back so that capping can occur. When an area is brought up to the required elevation and width, the discharge pipe shall be moved in the downstream direction.

6.4 In the event any leaks occur in the dredge pipeline line, the Contractor shall immediately discontinue dredging operations until such leaks in the line, or breaks are remedied at the Contractor's expense. The Contractor shall also, at his expense, recover and remove any material misplaced by such leaks, or breaks.

6.5 Restoration of Landscape Damage. Any tree, grassed area or other landscape scarred or damaged by the Contractor's equipment shall be restored as nearly as possible to its original condition at the Contractor's expense. The Contracting Officer shall determine the methods of restoration to be used.

6.6 Base Material: Upon completion of the dredging and disposal within the designated disposal area, the Contractor will allow a period of thirty (30) days to lapse so the dredged material can settle. After the thirty days, the Contractor shall be required to place at least 6 inches of base material on the area used for the dredged material placement. This 6-inch layer of base material shall consist of hard clam shell (*Mercenaria mercenaria*), and/or surfclam shell (*Spisula solidissima*). This material can be obtained from the J. H. Miles Seafood Processing Plant, which is located in Norfolk, Virginia. The contact is Sam Locklear at (757) 622-9264 extension 223. The Contractor may use their own source for the required shell material. The Project Manager shall be notified of the exact dates that the shell material base will be placed.

6.7 Cultch Material: Upon completion of the base material placement within the disposal area, the Contractor shall place at least 6 inches of cap material on the area used for the dredged material placement. This 6-inch layer must be oyster shell cultch. The 6 inches of oyster shell cultch shall conform to the same specifications used by the Maryland Department of Natural Resources, as appropriate. The Project Manager shall be notified of the exact dates that the cultch (oyster shell) will be placed.

6.8 Spat: Upon completion of the two shell layers, the Contractor will allow the shell to settle for a period of two weeks (unless authorized by the Contracting Officer's Representative) before placing spat across the created site. The Contractor shall purchase, deliver, and spread evenly on top, 3,000,000 (on shell) disease free live oyster spat (*Crassostrea virginica*) on the shell previously placed to created the shell mound. Spat can be purchased from the Oyster Recovery Partnership, Mr. Charles Frenz (410-990-4970) or any other reputable source. The number, vitality, and health of the oysters should be documented and provided to the Corps.

6.9 The Contractor shall provide the actual GPS coordinates for the area where the dredged material, base shell material, oyster shell, and spat are placed.

7. OMIT:

8. OMIT:

9. NONCOMPLIANCE: The Contracting Officer or his authorized representative will notify the Contractor in writing of any noncompliance with the foregoing provisions. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. Within 24 hours after the receipt of such notice, the Contractor shall mail, or personally deliver to the Contracting Officer or

his authorized representative, a complete proposal of the prompt correction of the noncompliance. The Contracting Officer or his authorized representative will review the proposal and return it to the Contractor approved, subject to such changes or conditions, as he finds necessary to assure correction of noncompliance. Immediately upon receipt of such approval, the Contractor shall begin the corrective work and shall carry it to completion. If the Contractor fails or refuses to submit his proposal or to proceed with the corrective work, the Contracting Officer or his authorized representative may suspend all or any part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such suspension shall be made the subject of a claim for extension of time nor for excess costs or damages by the Contractor. If he so elects the Contracting Officer or his authorized representative may cause the corrective work to be accomplished by others, in which event the cost thereof shall be chargeable against any monies otherwise due the Contractor from the Government.

10. INSPECTION AND TESTING:

10.1 Inspection: The work will be conducted under the general direction of the District Engineer and will be subject to inspection by his appointed inspector(s) to insure strict compliance with the specifications. The Government inspector(s) will direct the maintenance of the gages, ranges, location marks, and limit marks in proper order. Portable lighting shall be provided upon request of the Government inspector(s) for more detailed inspection of potential trouble areas.

10.2 The Government inspector(s) will direct suspension of operations at any unit of work where the Contractor upon request does not correct a safety hazard that is so grave as to endanger life, limb, or property or cause serious damage to the work. This includes, but is not limited to, a failure on the part of the Contractor (1) to have a full-time quality control person present and fully alert and awake on the disposal area at all times pumping operations are in progress or (2) provide and maintain the required marine band radio for use by Government inspector(s) at all times while pumping operations are in progress and/or (3) provide and maintain the approved lighting on the disposal area for safe night operations are all basis for Government inspector direct suspension of work.

11. OVERDEPTH AND SIDE SLOPES:

11.1 Overdepth: To cover inaccuracies of the dredging process, material actually removed from within the specific areas to be dredged to a depth of not more than 2-feet below the required depth will be calculated and paid for at the contract price.

11.2 Side slopes: Material actually removed, within limits approved by the Contracting Officer, to provide for final side slopes not flatter than 1 vertical on 3 horizontal, but not in excess of the amount originally lying above this limiting side slope will be calculated and paid for, whether dredged in original position or by dredging space below the pay slope plane at the bottom of the slope for upslope material capable of falling into the cut.

In computing the limiting amount of sideslope dredging, an over-depth of 2-feet, measured vertically will be used.

11.3 Excessive dredging: Material taken from beyond the limits as extended in the provisions of paragraphs 11.1 and 11.2 above will be deducted from the total amount dredged as excessive overdepth dredging, or excessive sideslope dredging for which payment will not be made. Nothing herein shall be construed to prevent payment for the removal of shoals performed in accordance with the applicable provisions of the Special Clauses FINAL

MAINTENANCE DREDGING, BONUM CREEK, WESTMORELAND COUNTY, VIRGINIA
EXAMINATION AND ACCEPTANCE or SHOALING.

12. MEASUREMENT AND PAYMENT:

12.1 Mobilization and Demobilization: Mobilization and demobilization shall include all costs in connection with the development and maintenance of the placement areas including but not limited to: obtaining the necessary permits and approvals for the work specified in accordance with the Contract Clause PERMITS AND RESPONSIBILITIES; full reimbursement for the premiums actually paid for performance and payment bonds, moving the Contractor's dredging plant and equipment to the site; initial laying of pipelines; maintenance of the placement areas, and the removal of all dredging plant, equipment, fencing and pipelines from the site upon completion of the work. Payment shall be made in accordance with Item No. 0001, "Mobilization and Demobilization" of the Unit Price Schedule which shall be full compensation for the work performed.

12.2 Dredging: The total amount of material removed and to be paid for under the contract, will be measured by the cubic yard in place by computing the volume between the bottom surface shown by soundings of the last survey made before dredging and the bottom surface shown by the soundings of a survey made as soon as practicable after the entire work specified has been completed and included within the limits of the overdepth and side slopes described in the Technical Provision paragraph OVERDEPTH AND SIDE SLOPES less any deductions that may be required for misplaced material described in the Technical Provision paragraph MISPLACED MATERIAL. Payment shall be made in accordance with Item No. 0002, "Maintenance Dredging - Bonum Creek" of the Unit Price Schedule which will be full compensation for the work performed.

12.3 Placement of Hard and/or Surf Clam Shell Material: The total amount of base shell material placed and to be paid for under the contract, will be measured by the cubic yard. This amount shall be determined by certified documentation or by direct measurements.

12.4 Placement of Cultch (Oyster Shell): The total amount of cultch placed and to be paid for under the contract, will be measured by the cubic yard. This amount shall be determined by certified documentation or by direct measurements.

12.5 Placement of Spat: The total amount of spat placed and to be paid for under the contract will be a lump sum. The amount will be determined by certified documentation.

12.6 The maps and/or drawings already prepared are believed to represent accurately conditions existing on the date shown on the contract drawing(s). Determination of quantities removed and the deductions made therefrom to determine quantities by place measurement to be paid in the area specified, after having once been made, will not be reopened except on evidence of collusion, fraud, or obvious error.

12.7 Monthly partial payments for dredging will be based on approximate quantities determined by soundings or sweepings taken behind the dredge and/or approximate quantities reported in the Daily Reports of Operations, or amount of shell placed. Payment for shell placement will be determined on certified documentation of delivery.

12.8 Should the Contractor in conjunction with work under this contract perform dredging for third parties adjacent to the specified area to be

dredged, payment will be made by the Government only for material removed from the contract area within a vertical plane at the contract unit lines at the location work is performed for such third parties.

13. WORK IN THE VICINITY OF STRUCTURES AND UTILITY CROSSINGS:

13.1 The Contractor shall exercise caution when working in the vicinity of structures and utility crossings or adjacent to the channel or disposal areas. Repair of any damage resulting from excessive or improper excavation in the bottom or side slopes of the channel shall be the responsibility of the Contractor. Where dredging to the required elevation might endanger any structure, the Contracting Officer or his authorized representative may reduce the required excavation in the vicinity of such structure.

13.2 The Contractor shall provide at least project channel dimensions over all utility crossings. The Contractor shall submit for approval by the Contracting Officer or his authorized representative a detailed plan of operation at each pipeline or utility crossing where construction surveys indicated project channel does not exist. The plan shall contain emergency measures to be taken in the event of an accident. The Contractor shall notify the owners of pipelines or utilities at least three calendar days prior to operating within 150 feet of a pipeline or utility. The Government will not be responsible for any damage to structure or utilities due to the Contractor's deviation from the approved plan.

13.3 Any unidentified pipelines or structures which may be found within the limits of work shall not be disturbed nor shall dredging or the disposal of dredged material be performed at these locations unless, and until, approved by the Contracting Officer.

14. QUALITY CONTROL:

14.1 The Contractor shall establish a Quality Control system to assure compliance with contract requirements and shall maintain records of his quality control for all construction and dredging operations as required in the QUALITY CONTROL paragraphs in the Special Clauses.

14.2 Copies of laboratory test reports and/or certificates submitted shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements. (CENAB)

End of Section 2

DAILY QUALITY CONTROL REPORT

Contract No.: _____ **Date:** _____ **Rpt. No.:** _____

Project Title & Location:

Weather: Clear P. Cloudy Cloudy Rainfall in (% of workday)

Temperature during workday: High degrees F. Low degrees F.

1. WORK PERFORMED BY CONTRACTORS/SUBCONTRACTOR(S)

	No. of Workers	Crafts	Hrs	Description of Work

2. OPERATING EQUIPMENT DATA (Not hand tools)

Equipment	Date of arrival/ departure	Owned or Rented	Hours Used	Hours Idle	Hours of Rep./Main

3. WORK PERFORMED TODAY: (Indicate location and description of work performed by prime and/or subcontractors).

DAILY REPORT OF OPERATIONS				CONTRACT NO.		DATE		RCS ENKW-37 (Feeder)		
DREDGE				CONTRACTOR						
LOCATION OF WORK (Range, Stationing, Longitudinal position)						CHARACTER OF WORK () Maintenance () New				
DISPOSAL AREA OR REHANDLING BASIN				LENGTH OF DISCHARGE PIPELINE: Total Length Ft.		Pontoon Ft.		Shore Ft. Submerged Ft.		
CHARACTER OF MATERIAL AND PERCENTAGE OF EACH Gravel Sand Clay Mud Silt Hardpan Stone Others										
AVERAGE DEPTH (Feet and Tenths) Before Dredging After Dredging Payment Depth						WEATHER				
VELOCITY OF DISCHARGE Feet Per Second		AVERAGE VACUUM Inches		AVERAGE DISCHARGE PRESSURE Lbs.		IN PLACE DENSITY G/L				
DENSITY OF RIVER WATER		DENSITY OF WATER DISCHARGING OVER SLUICE WEIR				HEIGHT OF DISCHARGE OVER SLUICE WEIR				
NUMBER OF MEN		MAN HOURS				MAN HOURS TO DATE				
WORK PERFORMED					DISTRIBUTION OF TIME					
ITEM	UNIT	AMOUNT		EFFECTIVE WORKING TIME		HOURS	MINUTES			
		GROSS	NET	Dredging						
Av. width of cut	Feet	[Pattern]		Percentage of total time						
Area dredged	Sq. Ft.		NON-EFFECTIVE TIME		[Pattern]	[Pattern]				
Distance advanced this period	Feet		Handling pipe lines							
Distance advanced previously	Feet		Handling swinging lines							
Distance advanced to date	Feet		Clearing pump and pipe line							
Scows loaded	Number		Clearing cutter or suction head							
Av. load per scow	Cu. Yds.		Taking fuel and supplies							
Amt. dredged pumping hr.	Cu. Yds.		Changing location of plant on job							
Amt. dredged this period	Cu. Yds.		Loss due to opposing natural elements							
Amt. dredged previously	Cu. Yds.		Loss due to passing vessels							
Total amt. dredged to date	Cu. Yds.		Minor operating repairs							
Av. pump speed	R. P. M.		Waiting for attendant plant							
Av. discharge lift	Feet		Preparations							
				Transferring plant between works						
ATTENDANT PLANT				Lay time off shift						
ITEM	NAME	HOURS		Sundays and Holidays						
Tugboat				Waiting for scows						
Tugboat				Fire and boat drills						
Launch				Miscellaneous (Explain in remarks)						
Barges				Total Non-effective Time						
Barges				Percentage of Total Time						
Scows				LOST TIME (Not chargeable to cost of work)		[Pattern]	[Pattern]			
Derrick				Repair time (8 consecutive hours or more)						
				Collisions						
COMMODITIES CONSUMED				Out of commission						
ITEM	UNIT	QUANTITY		Miscellaneous (Explain in remarks)						
Fuel oil	Gals.			Total Lost Time						
Lubricants	Gals.			Percentage of total time						
Lubricants	Pounds			TOTAL TIME IN PERIOD						
Water	Gals.									
No. of Supervisory Inspections: By field personnel					By office personnel					
REMARKS (Attach additional sheet, if necessary)										



MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore MD 21230

410-537-3000 • 1-800-633-6101

Robert L. Ehrlich, Jr.
Governor

Kendl P. Philbrick
Acting Secretary

Michael S. Steele
Lt. Governor

WATER QUALITY CERTIFICATION

NABOP – NN-03-04

CERTIFICATION 03-WQ-006

PUBLIC NOTICE DATE August 12, 2003

TO: Operations Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715
Attn: Mr. Robert Blama

RE: Maintenance Dredging – Bonum Creek,
Virginia. To remove approximately
16,000 cubic yards of material and to
use the material to create an oyster bar
in the Potomac River just downstream of
the entrance to Bonum Creek.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 - 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the construction of this facility and its subsequent operation as noted herein will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The applicant shall comply with the conditions marked (X) below:

(X) (1) The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify this department ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

(X) (2) The proposed project shall be constructed in accordance with the plan and its revisions as approved by the:

- (X) (a) Corps of Engineers
- () (b) Water Management Administration

(X) (3) All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

(X) (4) The applicant shall notify this Department upon transferring this ownership or responsibility for compliance with these conditions to another person. The new owner/operator shall request transfer of this water quality certification to his/her name.

(X) (5) The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

Page Two Water Quality Certification

() (6) Construction of any bulkhead shall be completed prior to filling behind the bulkhead. The bulkhead shall be constructed in such a manner so as to prevent the loss of fill material to waters of this State. Only clean fill, which is free of organic, metallic, toxic or deleterious materials shall be used.

() (7) The disturbance of the bottom of the water and sediment transport into the adjacent State waters shall be minimized. The applicant shall obtain and certify compliance with a grading and sediment control plan which has been approved by the:

- () (a) _____ Soil Conservation District or
- () (b) Erosion and Control Representative, Division of Environmental Services, Bureau of Highways, Department of Public Works of the City of Baltimore or
- () (c) The Department of the Environment, Water Management Administration or
- () (d) Montgomery County Department of Environmental Protection.

The approved plan shall be available at the project site during all phases of construction.

() (8) The spoil disposal area(s), including dikes where applicable, shall be constructed to limit the suspended solids content in the discharge to the waters of this State to four hundred (400) parts per million or less.

() (9) _____ shall be done only in the period _____.

() (10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated and maintained in accordance with the requirements of the applicable approving authority.

() (11) _____ shall provide to the Water Management Administration a stormwater management plan including cross-sections which incorporates effective pollutant removal strategies in uplands to treat a minimum of the first one-half inch of runoff from impervious surfaces prior to release of stormwater into State waters or wetlands. There shall be no discharge of untreated stormwater to State waters or wetlands. The plan shall be provided by _____ and shall be implemented by _____.

() (12) _____ shall provide to the Water Management Administration a mitigation plan for the construction of - _____ acre(s) of _____ wetland for review and approval by _____. The plan shall be implemented by _____.

- The plan shall show:
- the source of hydrology for the constructed wetland
 - the source and amount of soil to be used in constructing the wetland
 - the species, size and density of vegetation to be planted in the constructed wetland and a planting schedule.
 - a monitoring/maintenance plan.

() (13) _____ shall monitor the mitigation site for a period of five years and shall determine whether the wetland construction has been successful. A successful mitigation project shall result in: _____ plants/acre and 85% survivability of plants in forested and scrub/shrub wetlands and plants covering 85% of the area for emergent wetlands. If these standards are not met,

_____ shall determine the reason(s) for failure, the problem(s) shall be corrected, and the area(s) shall be replanted and monitored.

Page Three Water Quality Certification

() (14) The mitigation site shall be constructed in accordance with the plan, dated _____.

() (15) _____ shall provide a _____ plan for review and approval by _____ . This plan shall be implemented by _____ .

() (16) At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

() (17) Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity no greater than four feet per second for the two year storm in order to prevent erosion in the receiving waterway or wetland.

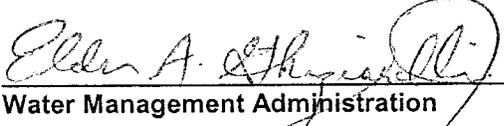
() (18) Future stormwater discharges to certified pond(s) are prohibited unless the first one half inch of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

() (19) Authorized stormwater detention ponds shall have a maximum detention time of _____ hours.

() (20) _____ shall restore and revegetate all temporarily disturbed waters and wetlands to original contours upon completion of construction.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the applicant in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

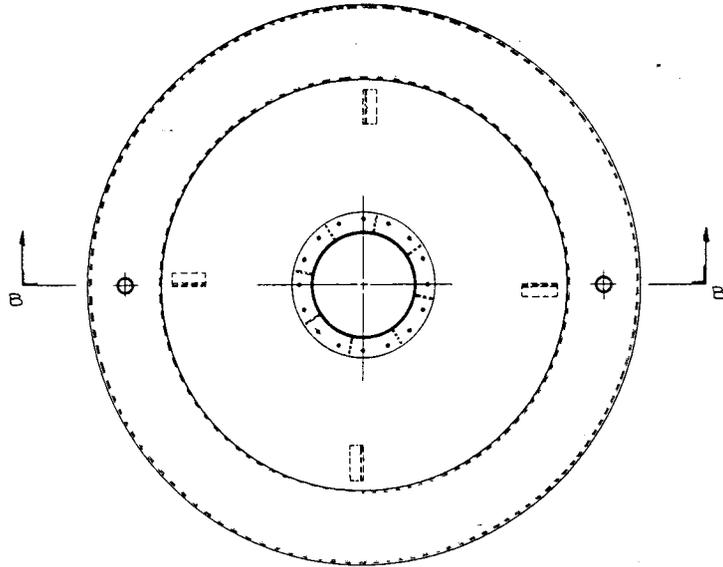
CERTIFICATION APPROVED


Water Management Administration

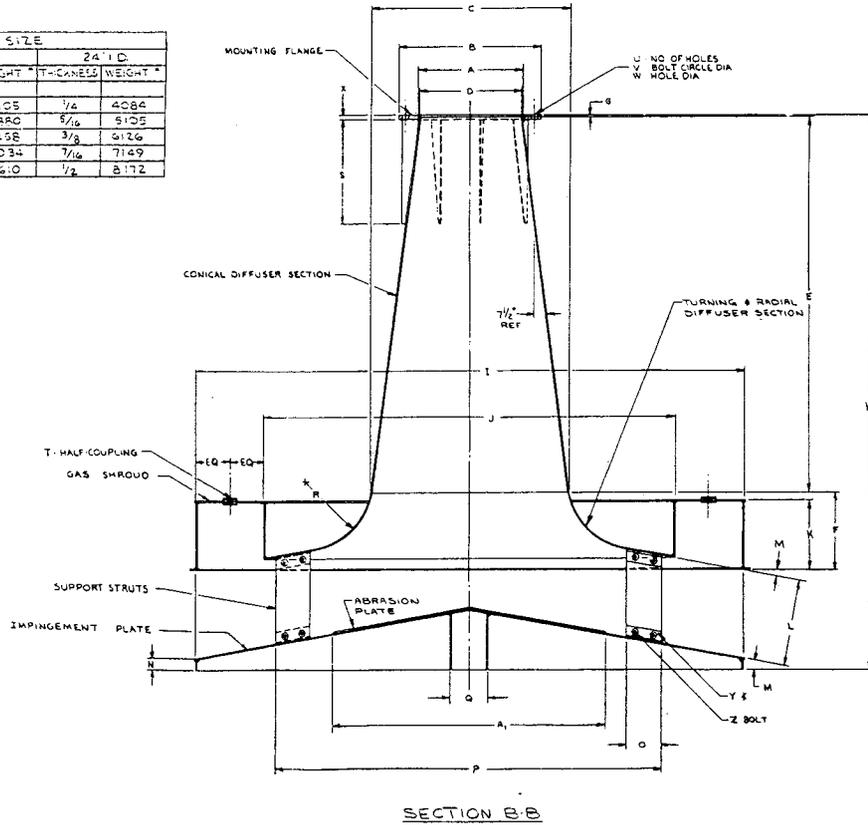
11/17/06
Expiration Date

DIFFUSER PROCESSOR DESIGN

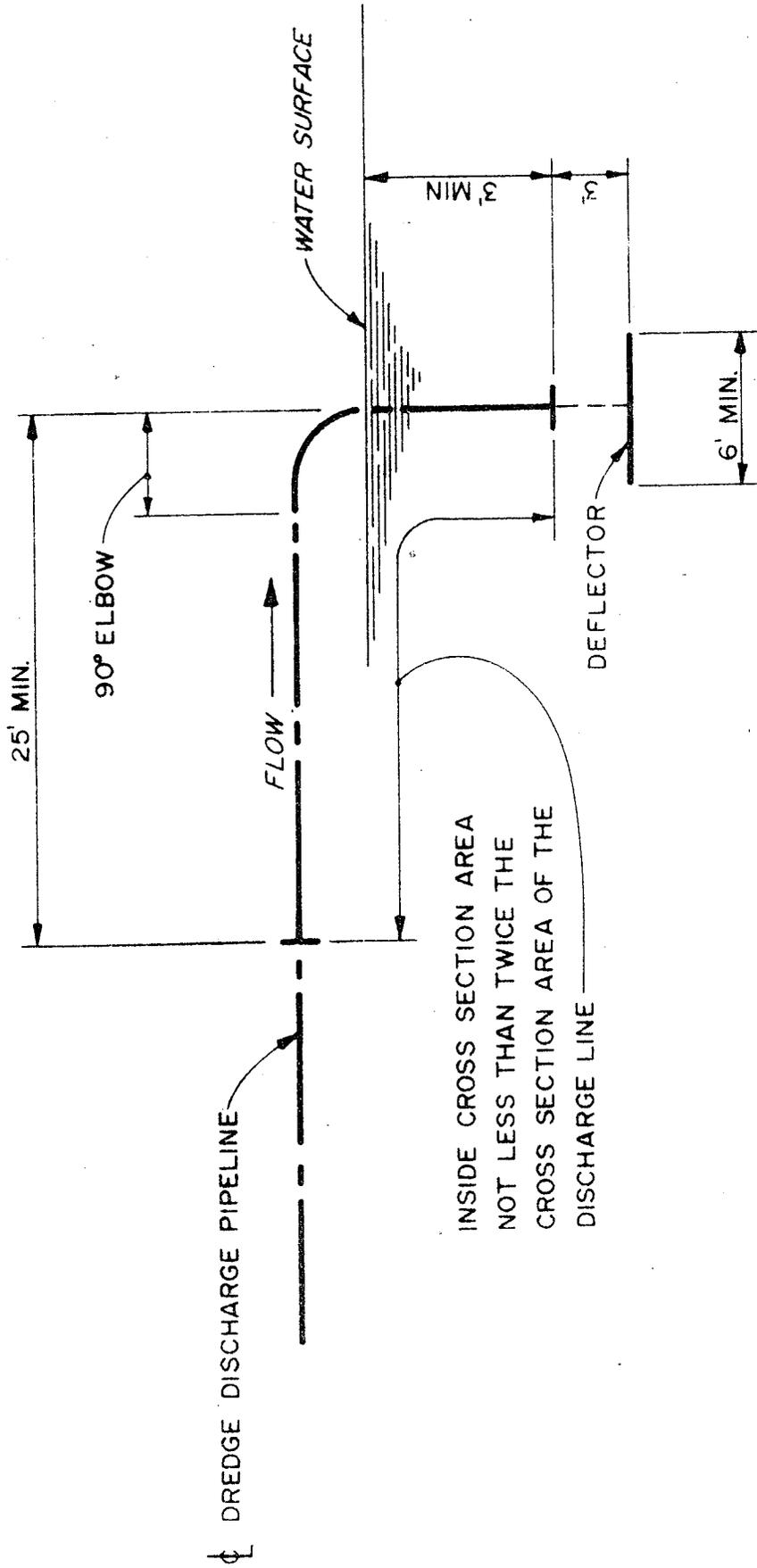
DIMENSION	12'	18'	24'
A	12 3/16	18 3/8	24 3/8
B	19	25	32
C	23 3/8	35 3/8	44 1/8
D	12 3/16	18 1/4	24 3/16
E	45.4	65	86 1/8
F	9 3/16	13 3/16	18 3/16
G	1 7/32	9/32	9/32
H	64 1/8	96 1/16	127 3/8
I	64 1/8	96	127 1/2
J	48 1/16	72	95 1/16
K	B	12	15 1/8
L	10	15	19 1/8
M	10"	10"	10"
N	1 3/8	2	2 3/4
O	4	6	8
P	45 3/8	68	90 1/8
Q	4 1/2 (NPT)	6 3/8 (NPT)	8 3/8
R	8	12	15 7/8
S	12	18	24
T	1 1/2 NPT	2 NPT	2 1/2 NPT
U	12	16	20
V	17	22 3/4	29 1/2
W	1"	1 1/4	1 3/8
X	1 1/16	3/4	1"
Y	1 1/2 + 1 1/2 + 3/4	2 + 2 + 3/8	2 1/2 + 2 1/4 + 3/4
Z	3/8 - 16	1/2 - 13	5/8 - 11
A ₁	32"	48"	64"

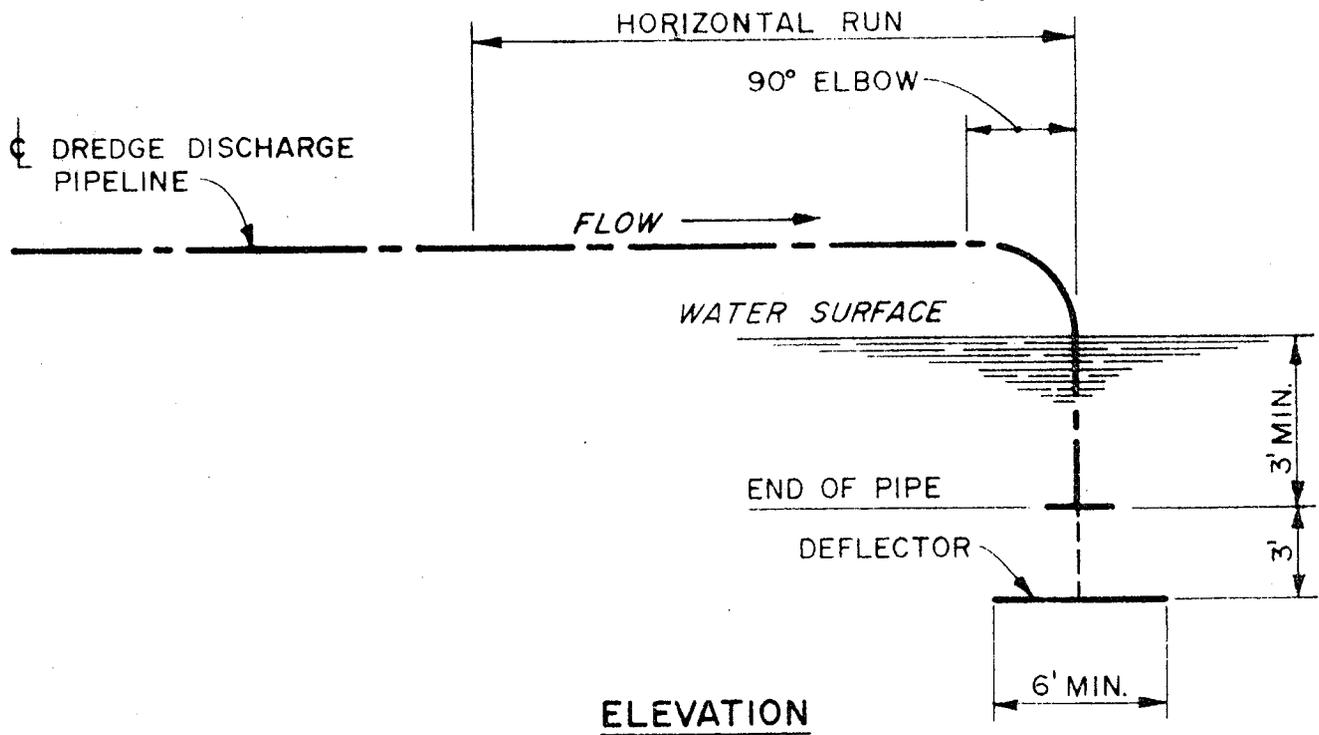
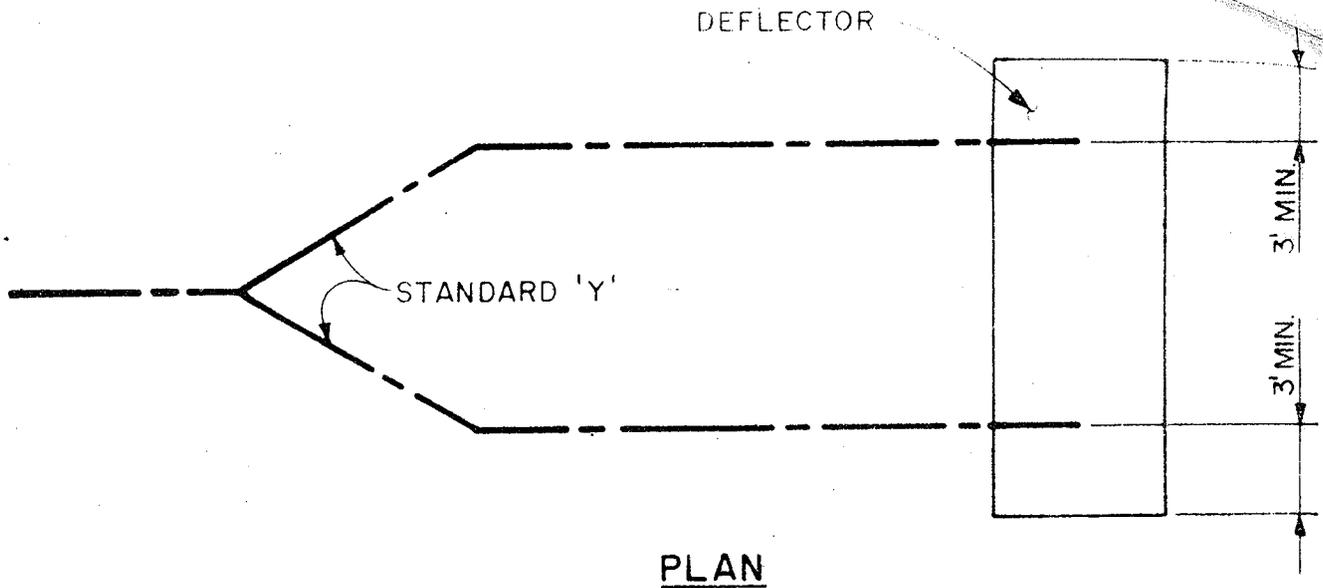


DREDGE PIPE SIZE					
12" I.D.		18" I.D.		24" I.D.	
THICKNESS	WEIGHT	THICKNESS	WEIGHT	THICKNESS	WEIGHT
3/16	800	1/8	2305	1/4	4084
1/4	1040	3/16	2880	1/2	5105
5/16	1332	1/2	3458	3/8	6126
3/8	1596	3/4	4034	7/16	7149
		1/2	4610	1/2	8172



REFERENCE: Neal, Robert w, et al., 1978. Evaluation of the submerged discharge of dredged material slurry during pipeline dredge operations, Technical Report D-78-44, U.S. Army Engineer Waterways Experiment Station, Corps of Engineers, Vicksburg, Mississippi. page 43





NOTES:

1. ALL PIPE THE SAME DIAMETER
2. THE DEFLECTOR PLATE MAY BE FABRICATED AS ONE PLATE OR TWO PLATES, MINIMUM SIZE 6' x 6'.