Preparing Activity: USACE New

UNIFIED FACILITIES GUIDE SPECIFICATIONS

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UNIFIED FACILITIES GUIDE SPECIFICATIONS

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SECTION 35 20 23.33

NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM - PIPELINE HYDRAULIC DREDGE
02/22

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NOTE: This guide specification covers the requirements for the National Dredging Quality Management Program for pipeline hydraulic dredging.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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PART 1 GENERAL

1.1 DESCRIPTION

The work under this contract requires use of the National Dredging Quality Management Program (DQM)to monitor the dredge's status at all times during the contract and to manage data history.

This performance-based specification section identifies the minimum required output and the precision and instrumentation requirements. The requirements may be satisfied using equipment and technical procedures selected by the Contractor.

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions

in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

National Dredging Quality Management Program Certification, [_____] District; G[, [_____]]

1.3 PAYMENT

Separate payment for installation, operation, and maintenance of the DQM-certified system as specified herein for the duration of the dredging operations is not allowed; all costs in connection therewith are considered a subsidiary obligation of the Contractor and are covered under the contract unit price for dredging in the bidding schedule.

1.4 NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM CERTIFICATION

The Contractor is required to have a current certification from the DQM Program for the cutter/suction head hydraulic dredge instrumentation

system to be used under this contract. Standard Operating Procedures (SOP) and criteria for certification are presented on the DQM website at https://dqm.usace.army.mil.

1.5 DREDGE PLANT INSTRUMENTATION PLAN (DPIP)

The Contractor must have a digital copy of the Dredge Plant Instrumentation Plan (DPIP) on file with the DQM Support Center. While working on site, the Contractor must also maintain on the dredge a copy of the DPIP, which is easily accessible to Government personnel at all times. This document must accurately describe the sensors used, the configuration of the system, how sensor data will be collected, how quality control on the data will be performed, and how the sensors/data-reporting equipment will be calibrated and repaired if it fails. A description of the computed dredge-specific data and how the sensor data will be transmitted to the DQM database will also be included. Prior to the start of work, the Contractor must submit to the DQM Support Center any addendum or modifications made to the plan subsequent to its original submission. Requirements and a template for the DPIP are available on the DQM website at https://dqm.usace.army.mil.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 REQUIREMENTS FOR REPORTED DATA

Provide, operate, and maintain all hardware and software to meet these specifications. The Contractor is also responsible for the replacement, repair, and calibration of the sensors and other necessary data acquisition equipment needed to supply the required data. Document and complete the procedure to complete a repair as soon as practical. If repair is not possible within two business days of any sensor failure, submit a plan and timeline to complete the repair. Upon completion of a repair, replacement, installation, modification, or calibration, notify the Contracting Officer's Representative (COR). The COR may request recalibration of the sensors or other hardware components at any time during the contract as deemed necessary.

Keep a log of sensor repair, replacement, installation, modification, and calibration in the dredge's onboard copy of the DPIP. The log must contain a three-year history of sensor maintenance, including the time of the sensor failures (and subsequent repairs), the time and results of sensor calibrations, the time of sensor replacements, and the time that backup sensor systems were initiated to provide the required data. It must also contain the name of the person responsible for the sensor work. Install sensors that are capable of collecting parameters within the specified accuracies and resolutions indicated in the following subparagraphs and transmit these parameters to the DQM database. Transmit all data in JSON message bundles. Each bundle can contain multiple message types. Transmit sensor data as work event messages, and transmit data which relates to the operational state of the dredge or its sensors as state event messages. (See paragraph PARAMETER TRANSMISSION TO THE WEB SERVICE.)

3.1.1 Message Bundle Data

Every message bundle must contain descriptive data that relates the message to a given dredge plant and date/time. Identify the start of a message bundle by the tag "DQM_data".

3.1.1.1 Messages

Messages contain operational data that populates the DQM database for a dredge plant. A message must consist of an event type and its associated data (as defined in paragraph DREDGE EVENTS - WORK EVENT and paragraph DREDGE EVENTS - STATE EVENT), a date/time stamp indicating when the event occurred or started, and a comment providing clarification or metadata about the situation. There are multiple event types, but they all fall into one of two categories - work events and state events.

3.1.1.1.1 Message Time

In a work event message, message time is the date and time that the data is collected from the sensors; in a state event message, message time is the date and time that the state event begins. Report and reference the message time to the nearest second and to Coordinated Universal Time (UTC) time based on a 24-hour format (*YYYY-MM-DD HH:MM:SS*). In order to ensure accuracy and reliability, synchronize the time stamp to UTC format from an accurate, unchangeable source (for example, a GPS National Marine Electronics Association [NMEA] datastring). Identify message time by the tag "msg_time".

3.1.1.1.2 Comment

Comments concerning the work event or state event messages being transmitted provide descriptive information that relates to the data. An example of a comment for work event data is information about a sensor issue; an example of a comment for state event data is a description of operations. Identify a comment by the introductory tag "comment", and the comment must not consist of more than 250 characters.ext

3.1.1.2 Dredge Events - Work Event

There are two types of dredge event messages - work event messages and state event messages. Work event messages contain data that are instantaneously collected or calculated from sensors and are logged as a series of events. Work events are triggered by a time interval change (as described in paragraph WORK EVENT MESSAGES). Initiate all work event messages by the header tag "work_event".

3.1.1.2.1 Vertical Correction

Obtain the variation of the water level from the vertical datum for the river stage or tidal gage described in the state events using appropriate equipment to give the water level with an accuracy of plus or minus 0.1 ft. Enter vertical correction values above project datum described in the dredging specification with a positive sign and those below with a negative sign. The tag for vertical correction is "vert_correction".

3.1.1.2.2 Cutter/Suction Head Location and Movement

Monitor the X, Y, and Z components of the cutter/suction head location. Additional calculations made from the observed values determine the rates

of movement to track the progress of the dredge.

3.1.1.2.2.1 Cutter/Suction Head Horizontal Position

Obtain the forwardmost point of the cutter/suction head using a positioning system operating with a minimum accuracy level of 3-10 feet horizontal Circular Error Probable (CEP). Report it as Latitude/Longitude WGS 84 in decimal degrees with West Longitude and South Latitude values reported as negative. Identify position values by the tags "ch_latitude" and "ch_longitude".

3.1.1.2.2.2 Cutter/Suction Invert Depth

Cutter/suction invert depth is the depth of the invert of the suction mouth relative to the surface of the water. Instrumentation must be capable of reporting to an accuracy of plus or minus 0.5 foot and a resolution to the nearest 0.1 foot with no tidal adjustments. Minimum accuracies are conditional to relatively calm water. Use the tag "ch_depth" to identify the cutter/suction head depth.

3.1.1.2.2.3 Cutter/Suction Head Heading

The cutter/suction head heading is the angle of the centerline of the cutter/suction head and dredge ladder measured relative to true north. Provide all headings using industry-standard equipment. The heading must be accurate to within 5 degrees and reported to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention. Use the tag "ch_heading" to identify the cutter/suction head heading.

3.1.1.2.3 Dredge Activity

Monitor dredge activity using a combination of the following parameters.

3.1.1.2.3.1 Slurry Velocity

Use a flow-metering device, calibrated according to the manufacturer's specifications, to record the slurry velocity to the nearest 0.01 fps with an accuracy of plus 0.5 fps. If the manufacturer does not specify a frequency of recalibration, conduct calibration prior to the commencement of work. Measure the slurry velocity for the same pipeline inside diameter as that used for the slurry density measurement. Associate the tag "slurry_velocity" with this value.

3.1.1.2.3.2 Slurry Density

Use a density-metering device, calibrated according to the manufacturer's specifications, to record the slurry density to the nearest 0.01 g/cc. It is understood that the accuracy of this sensor can vary based on several factors, including the type of material, the magnitude of the cut, and the length of time since calibration. If the manufacturer does not specify a frequency of recalibration, conduct calibration prior to the commencement of work. Continuous monitoring of this sensor ensures that drift and other factors inherent in the dredging process can be accounted for in monitoring dredge activity. Associate the tag "slurry_density" with this value.

3.1.1.2.3.3 Pump RPM

The pump rpm is the number of revolutions per minute measured for the slurry pump shaft. Measure the shaft revolution rate (rev/min) with the highest level of accuracy that is standard on the vessel's operational displays either at the bridge or in the engine room. Identify this value by the tag "rpm".

3.1.1.2.3.4 Pump Vacuum

Measure the vacuum pressure of the dredge pump(s) (inches of mercury) as near to the eye as practicable in the pump's suction pipe with the highest level of accuracy that is standard on the vessel's operational displays either at the leverman's controls or in the engine room. Identify vacuum pressure by the tag "vacuum".

3.1.1.2.3.5 Pump Outlet Pressure

Measure the pump outlet pressure in the discharge line on the pump side of the flap valve in terms of pounds per square inch (psi) on a gauge. Identify pump outlet pressure by the tag "outlet_psi".

3.1.1.2.4 Outfall Information (Open Water/Spill Barge Disposal)

Monitor the X and Y position of the terminal end of the outfall pipe continuously and report the position as part of the work event string.

3.1.1.2.4.1 Discharge Horizontal Position

Obtain the horizontal position of the outfall end of the discharge pipe using a positioning system operating with a minimum accuracy level of 3-10 feet horizontal Circular Error Probable (CEP). Report it as Latitude/Longitude WGS 84 in decimal degrees with West Longitude and South Latitude values being reported as negative. Identify position values by the tags "outfall_latitude" and "outfall_longitude".

3.1.1.3 Dredge Events - State Event

There are two types of dredge event messages - work event messages and state event messages. State event messages provide information about the current state of the dredge equipment or operations. They are created and sent only when a state changes. Since state events often cannot be collected in real time, state events are tagged with a date time stamp (referenced to Coordinated Universal Time [UTC]) that indicates when the state change happened relative to the work event message tag. This data is considered to be "true" until another state event tag of the same type is received. Indicate each type of state event message by a specific header tag as enumerated in the following subparagraphs. State events can be transmitted along with work event message bundles directly by the contractor using the indicated format, or they can be entered on the "State" tab in the DQM-provided software. However, they should be sent only if the state value changes.

3.1.1.3.1 Message Time

The state event time is the date and time that the event starts. Enter the leverman's time to the nearest second as local time and automatically convert to and report in UTC based on a 24-hour format (YYYY-MM-DD HH:MM:SS). Identify message time by the tag "msg_time".

3.1.1.3.2 Contract Event

Report information concerning the contract under which dredging is being performed at the start and completion of each contract using the header tag "contract_event".

3.1.1.3.2.1 Contract Number

Report the USACE-assigned contract number for the project using the tag "contract_number".

3.1.1.3.2.2 Contract Start and End

Report the start and end of a contract using the tag "event_type" with the appropriate value of "start" or "end".

3.1.1.3.3 Tide Station/River Stage Gage Event

Group together properties associated with the vertical correction (see paragraph VERTICAL CORRECTION) for the tide station/river stage gage under the header tag "station_event". This information must be sent at the start of the contract and each time the dredge has moved enough to change the station being used.

3.1.1.3.3.1 Station Name

The station name is a concise name defining the tide station/river stage gage begin referred to. It must be introduced by the tag "station_name", and it must not consist of a descriptor of more than 25 characters.

3.1.1.3.4 Length of Pipe Event

Report the leverman's estimate of the length of pipe downflow from the dredge pump, measured to the nearest whole foot, under the header tag "pipe_length_event". This information must be sent at the start of the contract and at the completion of each 24-hour period ending at midnight local time.

3.1.1.3.4.1 Floating Pipe

Report the total length of floating pipe with the tag "length_floating".

3.1.1.3.4.2 Submerged Pipe

Report the total length of floating pipe with the tag "length_submerged".

3.1.1.3.4.3 Shore Pipe

Report the total length of shore pipe with the tag "length_land".

3.1.1.3.5 Booster Pump

Include information concerning the booster pumps being used under the header tag "booster_pump_event". A message must be sent to indicate any change in the status of the booster pumps being used.

3.1.1.3.5.1 Number of Booster Pumps

Upon the addition or removal of a booster pump, report the total number of booster pumps being used with the tag "booster_total".

3.1.1.3.6 Dredge Advance

Measure the dredge advance, the total forward progress of the dredge relative to the centerline of the cut, to the nearest whole foot and cumulatively calculate over a 24-hour period from midnight to midnight local time. Identify it by the tag "advance_daily". Report in Greenwich Mean Time (GMT)the msg_time associated with this tag as the first timestamp of the following 24-hour period (based on the local time) rather than as midnight of the day for which the value was calculated.

3.1.1.3.7 Outfall Information

Monitor and send the X and Y position of the terminal end of the outfall pipe at the start of the contract and thereafter according to the following table. Discharge Heading and Pipe Elevation may be omitted if the dredge is not discharging into an upland disposal site. For beach nourishment, the horizontal X and Y position of the outfall must be sent at the start of the contract and at the completion of each 24-hour period ending at midnight local time.

Discharge Location	Horizontal Position	Discharge Pipe Elevation	Discharge Outfall Heading
Open Water	Continuous Work Event	N/A	N/A
Scow	Upon Change	N/A	N/A
Beach	Every 24 Hours	N/A	N/A
Upland	Upon Change	Upon Change	Upon Change

3.1.1.3.7.1 Discharge Location

Report information on where the slurry is being discharged with the tag "outfall_location". Acceptable values include "upland", "open water", "beach", and "scow".

3.1.1.3.7.2 Discharge Horizontal Position

Obtain the horizontal position of the outfall end of the discharge pipe using a positioning system operating with a minimum accuracy level of 3-10 feet horizontal Circular Error Probable (CEP). Report it as Latitude/Longitude WGS 84 in decimal degrees with West Longitude and South Latitude values being reported as negative. Identify position values by the tags "outfall_latitude" and "outfall_longitude".

3.1.1.3.7.3 Discharge Outfall Heading

The discharge outfall heading is the angle relative to true north measured from the centerline of the pipe in the direction of discharge. Provide all headings using industry-standard equipment. They must be accurate to within 5 degrees and report to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention. Identify the discharge heading by the tag

"outfall_heading".

3.1.1.3.7.4 Discharge Pipe Elevation

The discharge pipe elevation is the height of the outfall measured in feet and tenths of a foot relative to the project datum. The required accuracy is contingent upon contract requirements. Use the tag "outfall_elevation" to identify this elevation.

3.1.1.3.8 Non-effective Work Event

Report delays and dredge downtime at the conclusion of the event. Submit the reason for the non-effective work time under the header tag "non_eff_event" within 24 hours of the event.

3.1.1.3.8.1 Non-effective Work Interval

Report the start and end times for the non-effective work event using the tags "msg_start_time" and "msg_end_time".

3.1.1.3.8.2 Dredge Function Code

Transmit the dredge operator indication of production delays, as listed on Form 4267, at the end of the non-effective interval. Identify dredge function event messages by the tag "function_code" consisting of one of the following standardized entries to indicate the operation:

AGV	Assisting Grounded Vessels
CCH	Change Cutterhead
CCSH	Clear Cutter Suction
CLPJ	Change Location Bar
COLL	Collision
CPPL	Clear Pump Pipeline
CPR	Change Impeller
DR	Dike Repair
FBD	Fire Boat Drills
HPL	Handling Pipe Line
HSL	Handling Swing Line
HSP	Handling Shore Pipe
LDNE	Loss Due to Natural Elements
LDPV	Loss Due to Passing Vessel
LNL	Transfer to New Location
MISC	Miscellaneous
MOB	Mobilization & Demobilization
MSC	Miscellaneous/Non-pay
OC	Out of Commission
OR	Operating Repairs
P	Preparation
PREP	Preparation & Making Up Tow
RPL	Repair Pipeline
SB	Sounding & Buoying
SBT	Stand-By Time as Directed
SH	Sundays-Holidays
TFS	Taking on Fuel & Supplies
TOW	Time on Tow
WAP	Waiting Attendant Plant

3.1.1.3.8.3 Additional Comments

Use the "comment" tag to provide additional explanation for the noted delays or downtimes. For example, when the code "LDPV" (Loss Due to Passing Vessel) is indicated, list the name of the vessel and the number of tows with the "comment" tag.

3.2 NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM SYSTEM REQUIREMENTS

The Contractor's DQM system must be capable of collecting and transmitting information to the DQM onboard computer. Record the applicable parameters from paragraph REQUIREMENTS FOR REPORTED DATA as local events and transmit continuously to the DQM database anytime an Internet connection is available. Equip the dredge with a DQM computer system consisting of a computer, monitor, keyboard, mouse, data modem, Universal Power Supply (UPS), and network hub. Provide a standalone computer system, exclusive to the DQM monitoring system, with USACE DQM software installed on it. If a hardware problem occurs, or if a part of the system is physically damaged, the Contractor is responsible for repairing it within two business days of the determination of the condition or submitting a plan and timeline for repair if the repair will take more than two business days.

3.2.1 Computer Requirements

Provide a dedicated onboard computer for use by the Dredging Quality Management system. This computer must run the USACE DQM software and receive data from the Contractor's data-reporting interface. This computer must meet or exceed the following performance specifications:

CPU:	Intel or AMD processor with a (non-overclocked) clock speed of at least 1.6 gigahertz (GHz)
Hard drive:	250 gigabytes (GB); internal
RAM:	4 gigabytes (GB)
Ethernet adapter:	Internal network card with an RJ-45 connector
Ports:	1 free serial port with standard 9-pin connectors; 1 free USB port
Other hardware:	Keyboard, mouse, monitor

Install a fully licensed copy of Windows 7 Professional Operating System or later on the computer specified above. Also install any necessary manufacturer-provided drivers for the installed hardware.

Locate and orient this computer to allow data entry and data viewing as well as to provide access to data ports for connection of external hardware.

3.2.2 Software

The DQM computer's primary function is to transmit data to the DQM shoreside database. Do not install software which conflicts with this function on this computer. The DQM computer must have the USACE-provided Dredging Quality Management Onboard Software (DQMOBS) installed on it by DQM personnel.

3.2.3 UPS

Supply an Uninterruptible Power Supply (UPS) for the computer and networking equipment. It must interface with the DQM computer to communicate UPS status, and it must provide backup power at 1 kVA for a minimum of 10 minutes. Ensure that sufficient power outlets are available to run all specified equipment.

3.2.4 Internet Access

Maintain an Internet connection capable of transmitting real-time data to the DQM server as well as enough additional bandwidth to clear historically queued data when a connection is re-established. If connectivity is lost, que and transmit unsent data upon restoration of connectivity. Delays in pushing real-time data to the DQM database should not exceed four hours. Exceptions to these requirements may be granted by the DQM Support Center on a case-by-case basis with consideration for contract-specific requirements, site-specific conditions, and extreme weather events.

Acquire and install all necessary hardware and software to make the Internet connection available for data transmission to the DQM web service. Configure the hardware and software to allow the DQM Support Center remote access to this computer, and the telemetry system must be capable of meeting these minimum reporting requirements in all operating conditions.

In areas with poor cellular service and at the local District's discretion, it may be required to manually download the data on a daily basis using the protocol for retrieving and submitting backup files provided by the DQM Support Center. This method of data transmission should be used only if Internet connectivity is unavailable at the dredging site, and it should be considered a temporary measure.

3.2.5 Data Routing Requirements

Onboard sensors continually monitor dredge conditions, operations, and efficiency and route this information to the shipboard dredge-specific system (DSS) computer to assist in guiding dredge operations. Portions of this Contractor-collected information, as described in this specification, must be routed to the DQM computer on a real-time basis. Use an RS-232 serial interface with a baud rate of 9600 or 19200 bps to send standard sensor data to the DQM computer. Configure the serial interface as 8 bits, no parity, and no flow control.

Digitally log and transmit information regarding changes in the state of the dredge as close to the time of the occurrence as possible. These events can either be included in a separate message bundle going to the DQM onboard computer, or they can be entered on the "State" tab in the DQM Pipeline Software.

3.3 DREDGE MONITORING DATA

3.3.1 General

Onboard sensors continuously collect dredging data in support of the dredge Contractor's operations. Portions of this Contractor-collected information, as described in this specification, and store and transmit

calculations based on them to the DQM database on a near real-time basis. Additionally, digitally log and transmit information regarding the state of the dredge.

3.3.2 Data Measurement Frequency

The frequency of data transmission is dependent on the type of message being sent. Work Event messages contain data that are instantaneously collected or calculated from sensors and are logged as a series of events. State event messages are activated by a change in the dredge state.

3.3.2.1 Work Event Messages

Log data as a series of events. Each event must consist of a dataset containing dredge information (as defined in paragraph REQUIREMENTS FOR REPORTED DATA). Consider each set of measurements (for example, time and position) an event with a 6-12 second interval between work events. This interval must remain consistent across event types for the dredge plant.

Record a standard data string within one second of an event trigger with the time stamp and all parameters reflecting when the event happened.

3.3.2.2 State Event Messages

Consider a set of descriptive information (event name, time, description, comment) a state event. Record these events within 24 hours of a change in state with the time stamp reflecting when the event happened.

3.3.3 Parameter Transmission to the Web Service

Format the data as JSON (JavaScript Object Notation, as defined at http://www.json.org) strings of arbitrary length. These JSON strings represent a hierarchical data structure consisting of a message bundle which may contain 0-3 automatic data messages and any number of manual data messages.

A tag/parameter is reported only when it contains a value. Do not include "Null" value strings in a message bundle.

```
****************************
Message bundle
****************************

{
  "DQM_Data": {
    "messages": [
      {
        "work_event": {
        "msg_time":            <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
          "vert_correction":   <floating point 100th decimal place>,
          "ch_latitude":       <decimal to 6 decimal places>,
          "ch_longitude":      <decimal to 6 decimal places>,
          "ch_depth":          <floating point 100th decimal
place>,
          "ch_heading":        <integer value 000-359>,
          "slurry_velocity":   <floating point 100th decimal place>,
          "slurry_density":    <floating point 100th decimal place>,
          "pump_rpm":          <integer>,
```

```
            "vacuum":             <floating point 100th decimal place>,
            "outlet_psi":         <floating point 100th decimal place>,
            "comment":            <string>},
          }
        },
        {
          "contract_event": {
            "msg_time":           <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
            "contract_number":    <string>,
            "event_type":         <string - "start" or "end">,
            "comment":            <string>
          }
        },
        {
          "station_event": {
            "msg_time":           <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
            "station_name":       <string>,
            "comment":            <string>
          }
        },
        {
          "pipe_length_event": {
            "msg_time":           <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
            "length_floating":    <integer>,
            "length_submerged":   <integer>,
            "length_land":        <integer>,
            "comment":            <string>
          }
        },
        {
          "booster_pump_event": {
            "msg_time":           <24-hour UTC time YYYY-MM-DDHH:MM:SS>,
            "booster_total":      <integer>,
            "comment":            <string>
          }
        },
        {
          "advance_Event": {
            "msg_time":           <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
            "advance_daily":      <integer>,
            "comment":            <string>
          }
        },
        {
          "outfall_position": {
            "msg_time":           <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
            "outfall_location":   <string-"upland", "beach", "scow",
"open water">
            "outfall_latitude":   <decimal to 6 decimal places>,
            "outfall_longitude":  <decimal to 6 decimal places>,
            "outfall_heading":    <integer value 000-359>,
            "outfall_elevation":  <floating point 10th decimal place>,
            "comment":            <string>
          }
        },
        {
          "non_eff_event": {
            "msg_start_time":     <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
            "msg_end_time":       <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
```

```
                "function_code":     <string - 1 to 4 characters>,
                "comment":           <string>

              }
            }
          ]
        }
      }
```

3.3.4 Contractor Data Backup

Maintain an archive of all data sent to the DQM computer during the dredging contract. The COR may require, at no increase in the contract price, that the Contractor provide a copy of these data covering specified time periods. Provide the data in the same JSON format as would have been transmitted to the DQM computer. There must be no line breaks between the parameters, and each record string must be on separate line. The naming convention for the files must be <*dredgename*>_<*StartYYYYMMddhhmmss*>_<*EndYYYYMMddhhmmss*>.txt.
Data submission must be via a storage medium acceptable to the COR.

At the end of the dredging contact, call the National DQM Support Center prior to discarding the data. The DQM Support Center will verify that all data has been received and appropriately archived before giving the Contractor discard permission. Record the following information in a separate section at the end of the dredge's onboard copy of the DPIP:

Person who called the National DQM Support Center
Date of the call
DQM representative who gave permission to discard the data

3.4 PERFORMANCE REQUIREMENTS

The Contractor's National Dredging Quality Management Program's data transmission must be fully operational at the start of dredging operations. To meet contract requirements for operability, the Contractor's system must provide an accurate data string return and be compliant with hardware requirements. Data string return is defined as the number of quality records within an event or state tag sent by the contractor's system to the DQM database. Quality data strings are considered to be those providing accurate values for all parameters reported when operating according to the specification. Make repairs necessary to restore data return compliance within two business days, or submit a plan and timeline for repair if the repair will take more than two business days. Failure by the Contractor to report quality data within the specified time window for dredge measurements as stated in the specifications (see paragraph INTERNET ACCESS, paragraph DATA MEASUREMENT FREQUENCY, and paragraph PARAMETER TRANSMISSION TO THE WEB SERVICE, will result in withholding of up to 10 percent of the contract progress payment per FAR 52.232-5 Payments under Fixed-Price Construction Contracts.

3.5 LIST OF ITEMS TO BE PROVIDED BY THE CONTRACTOR

DPIP
https://dqm.usace.army.mil

DQM System
Paragraph 3.2 NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM SYSTEM REQUIREMENTS, including all subparagraphs

Dredge Data
    Paragraph DREDGING MONITORING DATA

-- End of Section --