***\*THIS GUIDANCE SHOULD NOT BE INCLUDED IN THE CONTRACT\****

*Annual QA checks are required by the DQM Support Center for each hopper and, unless explicitly stated by the local USACE District, should be completed prior to material being moved. Instrumentation upgrades during the year necessitate an additional QA check.*

#### *Specification Revisions*

*This section tracks all additions, deletions, and other revisions made to this document.*

| ***Sec.No.*** | ***Original Text*** | ***Revised Text*** |
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| ***Revisions made 08-04-2023*** | | |
| *Through-out* | *All references to paragraph numbers* | *References to paragraph numbers were removed; references to paragraph titles remain.* |
| *1.2* | *Government approval is required for submittals with a “G” designation; submittals not having a “G” designation are for information only. When used, a designation following the “G” designation identifies the office responsible for review of the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00, “SUBMITTAL PROCEDURES”:* | *Government approval is required for submittals with a “G” classification. Submittals not having a “G” classification are for information only. When a “G” classification is used, a code following the “G” identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:* |
| *1.2* | *Letter of National Dredging Quality Management Program Certification; G, XXX-XX-X (enter local USACE District)* | *National Dredging Quality Management Program Certification, XXX-XX-X (enter local USACE District); G, XXX (enter code)* |
| *1.3* | *No separate payment shall be made for installation, operation, and maintenance of the DQM-certified system as specified herein for the duration of the dredging operations; all costs in connection therewith shall be considered a subsidiary obligation of the Contractor and covered under the contract unit price for dredging in the bidding schedule.* | *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.* |
| *1.4.1* | *—* | *1.4.1 CERTIFICATION heading added.* |
| *1.4.1* | *Criteria for certification shall be based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil). Compliance with these criteria shall be verified by annual onsite quality assurance (QA) checks conducted by the DQM Support Center Data Acquisition and Analysis Team and by periodic review of the transmitted data.* | *Criteria for certification is based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil). Verify compliance with these criteria by annual onsite quality assurance (QA) checks conducted by the DQM Support Center Data Acquisition and Analysis Team and by periodic review of the transmitted data.* |
| *1.4.1* | *If issues with data quality are not corrected within 48 hours, the system certification shall be revoked and additional QA checks by the Data Acquisition and Analysis Team may be necessary.* | *If issues with data quality are not corrected within 48 hours, the system certification will be revoked and additional QA checks by the Data Acquisition and Analysis Team may be necessary.* |
| *1.4.1* | *Annual DQM Certification shall be based on the following:* | *Annual DQM Certification must be based on the following:* |
| *1.4.1* | *The Dredging Contractor shall have personnel who are familiar with the system instrumentation and who have the ability to recalibrate the sensors on site during the QA process. The Dredging Contractor shall coordinate pickup times and locations and provide transportation to and from any platform with a DQM system to team personnel in a timely manner. As a general rule, Data Acquisition and Analysis Team personnel will come with PPE consisting of hardhats, steel toe boots, and life jackets. If additional safety equipment is needed—such as eye protection, safety harnesses, work gloves or personal location beacons—these items shall be provided to the team while on site. It is the Dredging Contractor’s obligation to inform the QA team if the location designated for the QA checks has any site-specific safety concerns prior to their arrival on site.* | *Deleted.* |
| *1.4.2* | *—* | *1.4.2 RECERTIFICATION heading added.* |
| *1.4.2* | *The owner or operator of the dredge shall contact DQM at DQM AnnualQA@rpsgroup.com on an annual basis, or at least three weeks prior to certification expiration, to schedule QA checks for renewal.* | *The owner or operator of the dredge must contact DQM at DQM AnnualQA@rpsgroup.com on an annual basis, or at least three weeks prior to certification expiration, to schedule QA checks for renewal.* |
| *1.4.2* | *At least one week prior to the target date, the Dredging Contractor shall contact the Data Acquisition and Analysis Team and verbally coordinate a specific date and location. The Contractor shall then follow up this conversation with a written email confirmation. The owner/operator shall coordinate the QA checks with all local authorities, including but not limited to, the local USACE Contracting Officer’s Representative (COR).* | *At least one week prior to the target date, the Contractor must contact the Data Acquisition and Analysis Team and verbally coordinate a specific date and location. The Contractor must then follow up this conversation with a written email confirmation. The owner/operator must coordinate the QA checks with all local authorities, including but not limited to, the local USACE Contracting Officer’s Representative (COR).* |
| *1.4.2* | *Recertification is required for any yard work which produces modification to displacement (change in dredge lines, or repositioning or repainting hull marks), modification to bin volume (change in bin dimensions, or addition or subtraction of structure), or changes in sensor type or location; these changes shall be reported in the sensor log section of the DPIP.* | *Recertification is required for any yard work which produces modification to displacement (change in dredge lines, or repositioning or repainting hull marks), modification to bin volume (change in bin dimensions, or addition or subtraction of structure), or changes in sensor type or location; report these changes in the sensor log section of the DPIP.* |
| *1.4.2* | *If the system is powered down, calibration coefficients shall be retained.* | *If the system is powered down, retain calibration coefficients.* |
| *1.5* | *The Contractor shall have a digital copy of the DPIP on file with the DQM Support Center. While working on site, the Contractor shall also maintain on the dredge a copy of the DPIP which is easily accessible to Government personnel at all times. This document shall describe the sensors used, configuration of the system, how sensor data will be collected, how quality control on the data will be performed, and how sensors/data reporting equipment will be calibrated and repaired if they fail. A description of computed dredge-specific and how the sensor data will be transmitted to the DQM database will also be included.* | *The Contractor must have a digital copy of the 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 describe the sensors used, configuration of the system, how sensor data will be collected, how quality control on the data will be performed, and how sensors/data reporting equipment will be calibrated and repaired if they fail. A description of the computed dredge-specific data and how the sensor data will be transmitted to the DQM database will also be included.* |
| *1.5* | *The Contractor shall submit to the DQM Support Center any addendum or modifications made to the plan, subsequent to its original submission, prior to the start of work. Any changes to the computation methods shall be approved by the DQM Support Center prior to their implementation.* | *Submit to the DQM Support Center any addendum or modifications made to the plan, subsequent to its original submission, prior to the start of work. Any changes to the computation methods must be approved by the DQM Support Center prior to their implementation.* |
| *PART 2* | *(Not Applicable.)* | *Not used.* |
| *3.1* | *The Contractor shall provide, operate, and maintain all hardware and software to meet these specifications. The Contractor shall be responsible for replacement, repair, and calibration of sensors and other necessary data acquisition equipment needed to supply the required data.* | *Provide, operate, and maintain all hardware and software to meet these specifications. The Contractor is responsible for replacement, repair, and calibration of sensors and other necessary data acquisition equipment needed to supply the required data.* |
| *3.1* | *Repairs shall be completed within 48 hours of any sensor failure. Upon completion of a repair, replacement, installation, modification, or calibration, the Contractor shall notify the COR.* | *Complete repairs within 48 hours of any sensor failure. Notify the COR upon completion of a repair, replacement, installation, modification, or calibration.* |
| *3.1* | *The Contractor shall keep a log of sensor repair, replacement, installation, modification, and calibration in the dredge’s onboard copy of the DPIP. The log shall 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 shall also contain the name of the person responsible for the sensor work.* | *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.* |
| *3.1* | *Sensors installed shall be capable of collecting parameters within specified accuracies and resolutions indicated in the following subparagraphs.* | *Install sensors that are capable of collecting parameters within specified accuracies and resolutions indicated in the following subparagraphs.* |
| *3.1.1* | *The date and time shall be reported to the nearest second and referenced to UTC time based on a 24-hour format:* mm/dd/yyyy hh:mm:ss*. The reported time shall* *be the time reported by the GPS in the NMEA string.* | *Report the date and time to the nearest second and referenced to UTC time based on a 24-hour format:* mm/dd/yyyy hh:mm:ss*. The reported time must be the time reported by the GPS in the NMEA string.* |
| *3.1.2* | *A load number shall document the end of a disposal event.* | *A load number must document the end of a disposal event.* |
| *3.1.2* | *Whenever possible, the load number shall be calculated off of the sensors aboard the dredge and shall be a mathematically repeatable routine. Efforts shall be made to include logic that avoids false load number increments while also not allowing the routine to miss any disposal event. If manual incrementing of the load number is in place, extra attention shall be paid to this value in the quality control process.* | *Whenever possible, calculate the load number off of the sensors aboard the dredge using a mathematically repeatable routine. Make efforts to include logic that avoids false load number increments. Do not allow the routine to miss any disposal event. If manual incrementing of the load number is in place, pay extra attention to this value in the quality control process.* |
| *3.1.3* | *Obtain all locations using a positioning system operating with a minimum accuracy level of 1 to 3 meters horizontal Circular Error Probable (CEP). Report positions as Latitude/Longitude WGS 84 in decimal degrees.* | *Obtain all locations using a positioning system operating with a minimum accuracy level of 1 to 3 meters horizontal Circular Error Probable (CEP). Report positions as Latitude/Longitude WGS 84 in decimal degrees.* |
| *3.1.3.1* | *Vessel horizontal positioning shall be recorded as geographic coordinates of the vessel as indicated by the location of the GPS antenna.* | *Record vessel horizontal positioning as geographic coordinates of the vessel as indicated by the location of the GPS antenna.* |
| *3.1.3.2* | *Draghead horizontal positioning shall be recorded as geographic coordinates of the heel on the centerline of the draghead(s). Any offset calculations from the GPS antenna should be described in the DPIP.* | *Record draghead horizontal positioning as geographic coordinates of the heel on the centerline of the draghead(s). Describe any offset calculations from the GPS antenna in the DPIP.* |
| *3.1.4* | *Open/closed status of the hopper dredge, corresponding to the split/non-split condition of a split-hull hopper dredge, shall be monitored.* | *Monitor open/closed status of the hopper dredge, corresponding to the split/non-split condition of a split-hull hopper dredge.* |
| *4.1.4* | *An “open” value shall indicate that the hopper door is open or, in the case of split-hull dredges, that the hull is split.* | *An “open” value indicates that the hopper door is open or, in the case of split-hull dredges, that the hull is split.* |
| *3.1.4* | *For this contract, hull status shall register closed prior to leaving the disposal area.* | *For this contract, hull status must register closed prior to leaving the disposal area.* |
| *3.1.5* | *Dredge course-over-ground (COG) shall be provided using industry-standard equipment. The Contractor shall provide dredge course-over-ground to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention.* | *Provide dredge course-over-ground (COG) using industry-standard equipment. Provide dredge course-over-ground to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention.* |
| *3.1.6* | *Dredge speed-over-ground shall be provided in knots using industry-standard equipment with a minimum accuracy of 1 knot and resolution to the nearest 0.1 knot.* | *Provide dredge speed-over-ground in knots using industry-standard equipment with a minimum accuracy of 1 knot and resolution to the nearest 0.1 knot.* |
| *3.1.7* | *Dredge heading shall be provided using industry-standard equipment. The dredge heading shall 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.* | *Provide dredge heading using industry-standard equipment. The dredge 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.* |
| *3.1.8* | *Tide data shall be obtained using appropriate equipment to give the water level with an accuracy of ± 0.1 foot and a resolution of 0.01 foot. Tide values above project datum described in the dredging specification shall be entered with a positive sign and those below with a negative sign.* | *Obtain tide data using appropriate equipment to give the water level with an accuracy of ± 0.1 foot and a resolution of 0.01 foot. Enter tide values above project datum described in the dredging specification with a positive sign and those below with a negative sign.* |
| *3.1.9* | *All reported draft measurements shall be in feet, tenths, and hundredths with an accuracy of ± 0.1 foot relative to observed physical draft readings. The measurements shall be reported at a resolution of two decimal places (hundredths of a foot). The reported forward draft value shall be equal to the sum of the visual forward port and starboard draft mark readings divided by two. The reported aft draft value shall be equal to the sum of the visual aft port and starboard draft mark readings divided by two. Forward draft, aft draft, and average draft will be reported. Sensors shall be placed at an optimum location on the vessel to be reflective of observed physical draft mark readings at any trim or list.* | *Report all draft measurements in feet, tenths, and hundredths with an accuracy of ± 0.1 foot relative to observed physical draft readings. Report the measurements at a resolution of two decimal places (hundredths of a foot). The reported forward draft value is equal to the sum of the visual forward port and starboard draft mark readings divided by two. The reported aft draft value is equal to the sum of the visual aft port and starboard draft mark readings divided by two. Forward draft, aft draft, and average draft will be reported. Place sensors at an optimum location on the vessel to be reflective of observed physical draft mark readings at any trim or list.* |
| *3.1.9* | *The sensor value reported shall be an average of at least ten samples per event, with at least one maximum value and one minimum value removed, and the minimum eight remaining values averaged. When the average draft is calculated for the purpose of determining displacement, significant digits for average draft shall be maintained such that if forward draft was 0.15 and aft draft was 0.1, then the average draft would be 0.125.* | *The sensor value reported must be an average of at least ten samples per event, with at least one maximum value and one minimum value removed, and the minimum eight remaining values averaged. When the average draft is calculated for the purpose of determining displacement, maintain significant digits for average draft such that if forward draft was 0.15 and aft draft was 0.1, the average draft would be 0.125.* |
| *3.1.10* | *All reported ullage soundings shall be in feet, tenths, and hundredths with an accuracy of ± 0.1 foot, with respect to the combing and be representative of the forward and aft extents of the hopper as close to the centerline as is possible. The measurements shall be reported at a resolution of two decimal places (hundredths of a foot). Forward ullage and aft ullage soundings will be reported. Sensors should be mounted so as to avoid discharge flume turbulence, foam, and any structure that could produce sidelobe errors.* | *Report all ullage soundings in feet, tenths, and hundredths with an accuracy of ± 0.1 foot with respect to the combing; they must be representative of the forward and aft extents of the hopper as close to the centerline as is possible. Report the measurements at a resolution of two decimal places (hundredths of a foot). Report forward ullage and aft ullage soundings. Mount sensors to avoid discharge flume turbulence, foam, and any structure that could produce sidelobe errors.* |
| *3.1.10* | *If more than one fore or one aft sensor are used, they shall be placed near the corners of the hopper, and the average value of the fore sensors and the average value of the aft sensors shall be reported.* | *If more than one fore or one aft sensor are used, place the sensors near the corners of the hopper, and report the average value of the fore sensors and the average value of the aft sensors.* |
| *3.1.10* | *When the average ullage is calculated for the purpose of determining hopper volume, significant digits for average ullage shall be maintained such that if forward ullage was 0.15 and aft ullage was 0.1, then the average ullage would be 0.125.* | *When the average ullage is calculated for the purpose of determining hopper volume, maintain significant digits for average ullage such that if forward ullage was 0.15 and aft ullage was 0.1, the average ullage would be 0.125.* |
| *3.1.11* | *Hopper volume shall be reported in cubic yards, based on the most accurate method available for the dredge.* | *Report hopper volume in cubic yards, based on the most accurate method available for the dredge.* |
| *3.1.12* | *Dredge displacement shall be reported in long tons, based on the most accurate method available for the dredge. The minimum standard of accuracy for displacement is interpolation from the displacement table, based on the average draft. For this contract the density of water used to calculate displacement shall be\_\_\_\_\_\_\* kg/cubic meter, and it shall be used for an additional interpolation between the fresh and salt water tables.* | *Report dredge displacement in long tons, based on the most accurate method available for the dredge. The minimum standard of accuracy for displacement is interpolation from the displacement table, based on the average draft. For this contract the density of water used to calculate displacement is \_\_\_\_\_\_\* kg/cubic meter, and it will be used for an additional interpolation between the fresh and salt water tables.* |
| *3.1.13* | *Empty displacement shall be reported in long tons and shall be the lightship value of the dredge, or the weight of the dredge with no material in the hopper, adjusted for fuel and water consumption.* | *Report empty displacement in long tons, which is the lightship value of the dredge, or the weight of the dredge with no material in the hopper, adjusted for fuel and water consumption.* |
| *3.1.14* | *Draghead depths shall be reported with an accuracy of ± 0.5 foot and a resolution to the nearest 0.1 foot as measured from the surface of the water with no tidal adjustments.* | *Report draghead depths with an accuracy of ± 0.5 foot and a resolution to the nearest 0.1 foot as measured from the surface of the water with no tidal adjustments.* |
| *3.1.4* | *The sensor value reported shall be an average of at least ten samples per event, with at least one maximum value and one minimum value removed and the minimum eight remaining values averaged.* | *The sensor value reported must be an average of at least ten samples per event, with at least one maximum value and one minimum value removed and the minimum eight remaining values averaged.* |
| *3.1.15* | *A density-metering device, calibrated according to the manufacturer’s specifications, shall be used to record the slurry density of the material being moved to the nearest 0.001 g/cc with an accuracy of ± 0.01 g/cc. If the manufacturer does not specify a frequency of recalibration, calibration shall be conducted prior to commencement of work.* | *Use a density-metering device, calibrated according to the manufacturer’s specifications, to record the slurry density of each dragarm to the nearest 0.001 g/cc with an accuracy of ± 0.01 g/cc. If the manufacturer does not specify a frequency of recalibration, conduct calibration prior to commencement of work.* |
| *3.1.16* | *A flow-metering device, calibrated according to the manufacturer’s specifications, shall be used to record the slurry velocity of the material being moved to the nearest 0.01 fps with an accuracy of ± 0.5 fps. If the manufacturer does not specify a frequency of recalibration, calibration shall be conducted prior to commencement of work. The slurry velocity shall be measured in the same pipeline inside diameter as that used for the slurry density measurement.* | *Use a flow-metering device, calibrated according to the manufacturer’s specifications, to record the slurry velocity of each dragarm to the nearest 0.01 fps with an accuracy of ± 0.5 fps. If the manufacturer does not specify a frequency of recalibration, conduct calibration prior to commencement of work. Measure the slurry velocity in the same pipeline inside diameter as that used for the slurry density measurement.* |
| *3.1.17* | *The RPM of any pump being used to move material shall be measured with the highest level of accuracy that is standard on the vessel operational displays, either at the bridge, at the drag tender’s controls, or in the engine room. Dredges with multiple pumps per side shall report RPM for the pump that best describes the dredging process (typically the outboard pump).* | *Measure the RPM of any pump being used to move material with the highest level of accuracy that is standard on the vessel operational displays, either at the bridge, at the drag tender’s controls, or in the engine room. Dredges with multiple pumps per side must report RPM for the pump that best describes the dredging process (typically the outboard pump).* |
| *3.1.18* | *The sea suction location shall be reported in a standard non-changing name string of no more than 20 characters.* | *Report the sea suction location in a standard non-changing name string of no more than 20 characters.* |
| *3.1.19* | *When the hopper dredge is being pumped out, a “true” value shall be reported; when it is not, a “false” value shall be reported.* | *When the hopper dredge is being pumped out, report a “true” value; when it is not, report a “false” value.* |
| *3.2* | *The Contractor’s DQM system shall be capable of collecting, displaying, and transmitting information to the DQM database. The applicable parameters from Paragraph 3.1, “Requirements for Reported Data,” shall be recorded as events locally and continually transmitted to the DQM database anytime an Internet connection is available. The Dredge shall be equipped with a DQM computer system, consisting of a computer, monitor, keyboard, mouse, data modem, UPS, and network hub. The computer system shall be a standalone system, exclusive to the DQM monitoring system, and will have USACE DQM software installed on it. If a hardware problem occurs, or if a part of the system is physically damaged, then the Contractor shall be responsible for repairing it within 48 hours of determination of the condition.* | *The Contractor’s DQM system must be capable of collecting, displaying, and transmitting information to the DQM database. Record the applicable parameters from paragraph REQUIREMENTS FOR REPORTED DATA as events locally, and continually transmit them 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, 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 48 hours of determination of the condition.* |
| *3.2.1* | *The Contractor shall provide a dedicated onboard computer for use by the DQM system. This computer shall run USACE software and receive data from the Contractor’s data-reporting interface.* | *Provide a dedicated onboard computer for use by the DQM system. This computer must run USACE software and receive data from the Contractor’s data-reporting interface.* |
| *3.2.1* | *The Contractor shall install a fully licensed copy of Windows 10 (or higher) Professional Operating System on the computer specified above. The Contractor shall also install any necessary manufacturer-provided drivers for the installed hardware.* | *Install a fully licensed copy of Windows 10 (or higher) Professional Operating System on the computer specified above. Also install any necessary manufacturer-provided drivers for the installed hardware.* |
| *3.2.1* | *This computer shall be located and oriented to allow data entry and data viewing as well as to provide access to data ports for the connection of external hardware.* | *Locate and orient the computer to allow data entry and data viewing as well as to provide access to data ports for the connection of external hardware.* |
| *3.2.2* | *No other software which conflicts with this function shall be installed on this computer. The DQM computer will have the USACE-provided Dredging Quality Management Onboard Software (DQMOBS) installed on it by DQM personnel along with USACE-selected software for remote support and management.* | *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 along with USACE-selected software for remote support and management.* |
| *3.2.3* | *The Contractor shall supply an Uninterruptible Power Supply (UPS) for the computer and networking equipment. The UPS shall provide backup power at 1 kVA for a minimum of ten minutes. The UPS shall interface with the DQM computer to communicate UPS status. The Contractor shall ensure that sufficient power outlets are available to run all specified equipment.* | *Supply an Uninterruptible Power Supply (UPS) for the computer and networking equipment. The UPS must provide backup power at 1 kVA for a minimum of ten minutes. The UPS must interface with the DQM computer to communicate UPS status. Ensure that sufficient power outlets are available to run all specified equipment.* |
| *3.2.4* | *The Contractor shall maintain an Internet connection capable of transmitting real-time data to the DQM server and supporting remote access as well as enough additional bandwidth to clear historically queued data when a connection is re obtained. If connectivity is lost, unsent data shall be queued and transmitted upon restoration of connectivity.* | *Maintain an Internet connection capable of transmitting real-time data to the DQM server and supporting remote access as well as enough additional bandwidth to clear historically queued data when a connection is re obtained. If connectivity is lost, queue and transmit unsent data upon restoration of connectivity.* |
| *3.2.4* | *The Contractor shall acquire and install all necessary hardware and software to make the Internet connection available for data transmission to the DQM web service. The hardware and software must be configured to allow the DQM Support Center remote access to this computer.* | *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.* |
| *3.2.5* | *Onboard sensors shall continually monitor dredge conditions, operations, and efficiency and route this information into the shipboard dredge-specific system (DSS) computer to assist in guiding dredge operations. Portions of this Contractor-collected information shall be routed to the DQM computer on a real-time basis. Standard sensor data shall be sent to the DQM computer via an RS 232 9600- or 19200-baud serial interface. The serial interface shall be configured as 8 bits, no parity, and no flow control.* | *Onboard sensors must continually monitor dredge conditions, operations, and efficiency and route this information into the shipboard dredge-specific system (DSS) computer to assist in guiding dredge operations. Portions of this Contractor-collected information must be routed to the DQM computer on a real-time basis. Use an RS 232 9600- or 19200-baud serial interface to send standard sensor data to the DQM computer. Configure the serial interface as 8 bits, no parity, and no flow control.* |
| *3.2.6* | *Data shall be logged as a series of events.* | *Log data as a series of events.* |
| *3.2.6* | *Any required information in Paragraph 3.1 that is not an averaged variable (draft and ullage) shall be collected within 1 second of the reported time. A data string for an event shall be sent to the DQM computer every 6 to 12 seconds, and this interval shall remain constant throughout the contract; data strings shall never be transmitted more frequently than once per every 5 seconds. Any averaged variable must be collected and computed within this sampling interval.* | *Collect any required information in paragraph REQUIREMENTS FOR REPORTED DATA that is not an averaged variable (draft and ullage) within 1 second of the reported time. Send a data string for an event to the DQM computer every 6 to 12 seconds. This interval must remain constant throughout the contract; do not transmit data strings more than once per every 5 seconds. Collect and compute any averaged variable within this sampling interval.* |
| *3.2.7* | *Data shall be reported as an eXtensible Markup Language (W3C standard XML 1.0) document as indicated below.* | *Report data as an Extensible Markup Language (W3C standard XML 1.0) document as indicated below.* |
| *3.2.8* | *The system shall transmit correctly formatted event data XML strings to the DQM database continuously from mobilization until the last USACE post-dredging survey has been accepted. If the Internet connection (Paragraph 3.2.4, “Internet Access”) is non-operable, manual backups from the dredge computer of the XML data string which would have been transmitted to the DQM computer over the serial connection shall be performed for each day the device is inoperable and submitted to the DQM Support Center within 48 hours.* | *The system must transmit correctly formatted event data XML strings to the DQM database continuously from mobilization until the last USACE post-dredging survey has been accepted. If the Internet connection (paragraph INTERNET ACCESS) is non-operable, perform manual backups from the dredge computer of the XML data string which would have been transmitted to the DQM computer over the serial connection for each day the device is inoperable and submit to the DQM Support Center within 48 hours.* |
| *3.2.8* | *In the event of data transfer, transmission, or hardware failure, a manually recorded disposal log shall be maintained. It shall consist of a series of events.* | *In the event of data transfer, transmission, or hardware failure, maintain a manually recorded disposal log consisting of a series of events.* |
| *3.2.8* | *Each event shall include time stamp (GMT), position (Latitude and Longitude WGS84), draft, ullage, volume, and displacement. Disposal logs shall be submitted on a daily basis to the COR during the time when the system is not operational.* | *Include time stamp (GMT), position (Latitude and Longitude WGS84), draft, ullage, volume, and displacement for each event. Submit disposal logs on a daily basis to the COR during the time when the system is not operational.* |
| *3.2.9* | *The Contractor shall maintain an archive of all data sent to the DQM computer during the dredging contract.* | *Maintain an archive of all data sent to the DQM computer during the dredging contract.* |
| *3.2.9* | *The data shall be provided in the XML format which would have been transmitted to the DQM computer. There shall be no line breaks between the parameters; each record string shall be on a separate line. The naming convention for the files shall be <dredgename> \_<StartYYYYMMddhhmmss>\_<EndYYYYMMddhhmmss>.txt. Data submission shall be via storage medium acceptable to the COR.* | *Provide the data transmitted to the DQM computer in the XML format with no line breaks between the parameters and each record string on a separate line. The naming convention for the files is <dredgename> \_<StartYYYYMMddhhmmss>\_<EndYYYYMMddhhmmss>.txt. Submit data via storage medium acceptable to the COR.* |
| *3.2.9* | *At the end of the dredging contract, the Contractor shall contact the DQM Support Center prior to discarding the data.* | *At the end of the dredging contract, contact the DQM Support Center prior to discarding the data.* |
| *3.2.9* | *The Contractor shall then record in a separate section at the end of the dredge’s onboard copy of the DPIP the following information:* | *Record the following information in a separate section at the end of the dredge’s onboard copy of the DPIP:* |
| *3.2.9* | *The Contractor’s DQM system must be fully operational at the start of dredging operations and fully certified prior to moving dredge material on the contract (see Paragraph 1.4, “National Dredging Quality Management Program Certification”).* | *The Contractor’s DQM system must be fully operational at the start of dredging operations and fully certified prior to moving dredge material on the contract (see paragraph “National Dredging Quality Management Program Certification”).* |
| *3.3* | *The Contractor’s DQM system shall be fully operational at the start of dredging operations and fully certified prior to moving dredge material on the contract (see Paragraph 1.4, “National Dredging Quality Management Program Certification”). To meet contract requirements for operability, in addition to certification, the Contractor’s system shall provide a data string with all values for all parameters while operating, as described in the specifications. Additionally, all hardware shall be compliant with hardware requirements (Paragraph 3.2.1, “Computer Requirements”).* | *The Contractor’s DQM system must be fully operational at the start of dredging operations and fully certified prior to moving dredge material on the contract (see paragraph NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM CERTIFICATION). To meet contract requirements for operability, in addition to certification, the Contractor’s system must provide a data string with all values for all parameters while operating, as described in the specifications. Additionally, all hardware must be compliant with hardware requirements (paragraph COMPUTER REQUIREMENTS).* |
| *3.3* | *Repairs necessary to restore data return compliance shall be made within 48 hours. Failure by the Contractor to report the required data within the specified time window for dredge measurements (see Paragraph 3.2.7, “Data Reporting Frequency,” and Paragraph 3.2.9, “Data Reporting”) will result in withholding of up to 10% of the contract progress payment per clause 52.232-5.* | *Make repairs necessary to restore data return compliance within 48 hours. Failure by the Contractor to report the required data within the specified time window for dredge measurements (see paragraph DATA REPORTING FREQUENCY and paragraph DATA REPORTING) will result in withholding of up to 10% of the contract progress payment per FAR 52.232 5 (“Payments Under Fixed-Price Construction Contracts”).* |

| ***Sec.No.*** | ***Original Text*** | ***Revised Text*** |
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| ***Revisions made 05-12-2023*** | | |
| *1.4* | *Criteria for certification shall be based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil/ Specifications/Index.aspx).* | *Criteria for certification shall be based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil).* |
| *1.4* | *• A series of quality assurance checks as outlined on the DQM website (https://dqm.usace.army.mil/ Certifications/Index.aspx)* | *• A series of quality assurance checks as outlined on the DQM website (https://dqm.usace.army.mil)* |
| *1.5* | *A complete list of the required DPIP contents is provided on the DQM website (https://dqm.usace.army.mil/Certifications/Index.aspx).* | *A complete list of the required DPIP contents is provided on the DQM website (https://dqm.usace.army.mil).* |
| *3.2.1* | *The Contractor shall install a fully licensed copy of Windows 7 Professional Operating System or later on the computer specified above. The Contractor shall also install any necessary manufacturer-provided drivers for the installed hardware.* | *The Contractor shall install a fully licensed copy of Windows 10 (or higher) Professional Operating System on the computer specified above. The Contractor shall also install any necessary manufacturer-provided drivers for the installed hardware.* |
| *3.2.7* | *Data Format*  *<?xml version="1.0"?>*  *<HOPPER\_DREDGING\_DATA version = “2.0”> <DREDGE\_NAME>****string32****</DREDGE\_NAME>* | *Data Format*  *<?xml version="1.0"?>*  *<HOPPER\_DREDGING\_DATA version = “2.0”>*  *<PLANT\_IDENTIFIER>****integer   string****</PLANT\_IDENTIFIER>*  *<DREDGE\_NAME>****string32****</DREDGE\_NAME>* |
| *3.2.7* | *Example*  *<?xml version="1.0"?>*  *<HOPPER\_DREDGING\_DATA version = “2.0”> <DREDGE\_NAME>Essayons  </DREDGE\_NAME>*  *<HOPPER\_DATA\_RECORD>* | *Data Format*  *<?xml version="1.0"?>*  *<HOPPER\_DREDGING\_DATA version = “2.0”>*  *<PLANT\_IDENTIFIER>9999*  *</PLANT\_IDENTIFIER>*  *<DREDGE\_NAME>Essayons**</DREDGE\_NAME>*  *<HOPPER\_DATA\_RECORD>* |
| *3.2.7* | *Example*  *<cr>*  *<lf>*  *<DREDGE\_NAME>Essayons  </DREDGE\_NAME>*  *<HOPPER\_DATA\_RECORD>* | *Example*  *<cr>*  *<lf>*  *<?xml version="1.0"?>*  *<HOPPER\_DREDGING\_DATA version = “2.0”>*  *<PLANT\_IDENTIFIER>9999  </PLANT\_IDENTIFIER>*  *<DREDGE\_NAME>Essayons*  *</DREDGE\_NAME>*  *<HOPPER\_DATA\_RECORD>* |
| *3.4* | *DPIP: https://dqm.usace.army.mil/ Certifications/Index.aspx* | *DPIP: https://dqm.usace.army.mil* |

| ***Sec.No.*** | ***Original Text*** | ***Revised Text*** |
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| ***Revisions made 03-11-2020*** | | |
| *1.2* | *SD-01, Preconstruction Submittals*   * *Dredge Plant Instrumentation Plan Revisions or Addendum; G, SAM-OP-J* | *[Deleted]* |

| ***Sec.No.*** | ***Original Text*** | ***Revised Text*** |
| --- | --- | --- |
| ***Revisions made 08-30-2019*** | | |
| *Pages  1 – 11* | *[None]* | *\*THIS GUIDANCE SHOULD NOT BE INCLUDED IN THE CONTRACT\**  *Annual QA checks are required by the DQM Support Center for each hopper and, unless explicitly stated by the local USACE District, should be completed prior to material being moved. Instrumentation upgrades during the year shall necessitate an additional QA check.*  *Specification Revisions*  *This section tracks all additions, deletions, and other revisions made to this document.*  *[Revisions list]*  *\*THIS GUIDANCE SHOULD NOT BE INCLUDED IN THE CONTRACT\** |
| *1.2* | *SD-06, Test Reports*   * *Data Appropriately Archived Email, Paragraph 3.2.10 (“Contractor Data Backup”); G, XXX-XX-X (enter local USACE District)* | *[Deleted]* |
| *1.4* | *NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM CERTIFICATION*  *The Contractor is required to have a current certification from DQM for the hopper dredge instrumentation system to be used under this contract. Criteria for certification shall be based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil/ Specifications/Index.aspx). Compliance with these criteria shall be verified by annual onsite quality assurance (QA) checks conducted by the DQM Support Center Data Acquisition and Analysis Team and by periodic review of the transmitted data. DQM Certification is valid for one year from the date of the annual QA checks. Certification is contingent upon the system’s ability to continuously meet the performance requirements as outlined in Paragraph 3.3, “Performance Requirements,” and Paragraph 3.5, “Contractor Quality Control.” If issues with data quality are not corrected within 48 hours, the system certification shall be revoked and additional QA checks by the Data Acquisition and Analysis Team may be necessary.* | *NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM CERTIFICATION*  *The Contractor is required to have a current certification from DQM for the hopper dredge instrumentation system to be used under this contract. Criteria for certification shall be based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil/ Specifications/Index.aspx). Compliance with these criteria shall be verified by annual onsite quality assurance (QA) checks conducted by the DQM Support Center Data Acquisition and Analysis Team and by periodic review of the transmitted data. DQM Certification is valid for one year from the date of the annual QA checks. Certification is contingent upon the system’s ability to continuously meet the performance requirements as outlined in Paragraph 3.3, “Performance Requirements.” If issues with data quality are not corrected within 48 hours, the system certification shall be revoked and additional QA checks by the Data Acquisition and Analysis Team may be necessary.* |
| *1.4* | *• A series of quality assurance checks as described in Paragraph 3.4, “Compliance Quality Assurance Checks”* | * *A series of quality assurance checks as outlined on the DQM website (https://dqm.usace. army.mil/Certifications/Index.aspx)* |
| *1.5* | *[…] A description of computed dredge-specific data and how the sensor data will be transmitted to the DQM database will also be included. The Contractor shall submit to the DQM Support Center any addendum or modifications made to the plan, subsequent to its original submission, prior to the start of work.*  *The DPIP shall include the following as a minimum:*  *(The DPIP must have a Table of Contents in the following order and tabs separating sections.)*  *Cover Page*  *Dredge name*  *Date*  *Photo of plant*  *Table of Contents*  *New page*  *Dredge contacts*  *Dredging company*   * *Dredge point of contact on site* * *Phone number* * *Email address*   *Dredge monitoring system provider*   * *Dredge monitoring system point of contact* * *Telephone number* * *Email address*   *New page*  *Table of dredge characteristics*   * *Dimensions of the dredge* * *Dimensions of the hopper* * *Method of disposal* * *Capacity* * *Minimum and maximum digging depth* * *Minimum and maximum drafts and displacements* * *RPM and velocity range* * *IDs of the suction and discharge pipes*   *New page*  *Sensor data collection method*   * *Any averaging* * *Route from the sensors to the DQM computer* * *Internet connection type and provider*   *Sensor descriptions, locations, and calibration methods*   * *Positioning system*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions* * *Dredge heading instrumentation*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation* * *Hull status*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions*   + *Calibration procedure* * *Draft*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions*   + *Calibration procedure* * *Ullage*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions*   + *Calibration procedure* * *Dragarm depths*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions*   + *Calibration procedure* * *Density*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions, including pipe diameter*   + *Calibration procedure* * *Velocity*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions, including pipe diameter*   + *Calibration procedure* * *Pump RPM*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions*   + *Calibration procedure* * *Pumpout (if instrumented)*   + *Brand name, model, and accuracy*   + *Any calculation done external to the instrumentation*   + *Sensor location with referenced dimensions*   + *Calibration procedure*   *Calculated parameters*   * *Displacement*   + *Method used by the Contractor to calculate displacement*   + *Tables listing (fresh and salt water) displacement as a function of draft in feet and tenths of feet* * *Hopper volume*   + *Method used by the Contractor to calculate the hopper volume*   + *Table listing the hopper volume as a function of hopper ullage in feet and tenths of feet*   + *Description of the datum for ullage sounding measurements* * *Draghead position*   + *Method used by the Contractor to calculate the draghead position* * *Load number*   + *Method used to increment the load number*   + *Quality control* * *Description of the Contractor’s quality control process* * *Log of sensor calibrations, repairs, and modifications*   *Appendices*   * *Hydrostatic curves* * *Certified displacement and volume tables* * *Legible dimensioned drawings of the dredge with units in feet*   + *Typical plan of the dredge, showing the following:*     - *Overall dredge and hopper dimensions*     - *Locations of the required sensors, referenced to uniform longitudinal and transverse reference points*     - *Distance between the draft sensors*     - *Distance between the ullage sensors*     - *Dimensions of the dragarm*   + *Profile view of the dredge, showing the following:*     - *Overall dredge and hopper dimensions*     - *Distance between the draft sensors and the draftmarks*     - *Locations of the required sensors, referenced to uniform vertical and longitudinal reference points*   + *Typical vessel cross section through the hopper* * *Sensor manuals and certificates of calibration*   *Any changes to the computation methods shall be approved by the DQM Support Center prior to their implementation.* | *[…] A description of computed dredge-specific data and how the sensor data will be transmitted to the DQM database will also be included.*  *A complete list of the required DPIP contents is provided on the DQM website (https://dqm.usace. army.mil/Certifications/Index.aspx).*  *The Contractor shall submit to the DQM Support Center any addendum or modifications made to the plan, subsequent to its original submission, prior to the start of work. Any changes to the computation methods shall be approved by the DQM Support Center prior to their implementation.* |
| *3.1.2* | *Load Number*  *A load number shall document the end of a disposal event. Load numbering will begin at number 1 at the start of the contract and will be incremented by 1 at the completion of each disposal event or emptying of the hopper. Whenever possible, the load number shall be calculated off of the sensors aboard the dredge and shall be a mathematically repeatable routine. Efforts shall be made to include logic that avoids false load number increments while also not allowing the routine to miss any disposal event. If manual incrementing of the load number is in place, extra attention shall be paid to this value in the Contractor’s quality control process (Paragraph 3.5, “Contractor Quality Control”).* | *Load Number*  *A load number shall document the end of a disposal event. Load numbering will begin at number 1 at the start of the contract and will be incremented by 1 at the completion of each disposal event or emptying of the hopper. Whenever possible, the load number shall be calculated off of the sensors aboard the dredge and shall be a mathematically repeatable routine. Efforts shall be made to include logic that avoids false load number increments while also not allowing the routine to miss any disposal event. If manual incrementing of the load number is in place, extra attention shall be paid to this value in the quality control process.* |
| *3.1.15* | *Slurry Densities of Dragarms*  *A density-metering device, calibrated according to the manufacturer’s specifications, shall be used to record the slurry density of each dragarm to the nearest 0.0001 g/cc with an accuracy of ± 0.001 g/cc.* | *Slurry Densities*  *A density-metering device, calibrated according to the manufacturer’s specifications, shall be used to record the slurry density of the material being moved to the nearest 0.001 g/cc with an accuracy of ± 0.01 g/cc.* |
| *3.1.16* | *Slurry Velocities of Dragarms*  *A flow-metering device, calibrated according to the manufacturer’s specifications, shall be used to record the slurry velocity of each dragarm to the nearest 0.0001 fps with an accuracy of ± 0.001 fps.* | *Slurry Velocities*  *A flow-metering device, calibrated according to the manufacturer’s specifications, shall be used to record the slurry velocity of the material being moved to the nearest 0.01 fps with an accuracy of ± 0.5 fps.* |
| *3.1.17* | *Pump RPM shall be measured with the highest level of accuracy that is standard on the vessel operational displays, either at the bridge, at the drag tender’s controls, or in the engine room.* *Dredges with multiple pumps per side shall report RPM for the pump that best describes the dredging process (typically the outboard pump). If requirements of Paragraph 3.1.19, “Pumpout,” are determined based on the pump RPM, then that value shall be reported.* | *The RPM of any pump being used to move material shall be measured with the highest level of accuracy that is standard on the vessel operational displays, either at the bridge, at the drag tender’s controls, or in the engine room.* *Dredges with multiple pumps per side shall report RPM for the pump that best describes the dredging process (typically the outboard pump).* |
| *3.2.1* | * + *CPU—Intel or AMD processor with a (non-overclocked) clock speed of at least 3 gigahertz (GHz)*   + *Hard drive—250 gigabytes (GB); internal*   + *RAM—2 gigabytes (GB)*   + *Ethernet adapter—10 or 100 megabit (Mbit) internal network card with an RJ-45 connector*   + *Video adapter—Must support a resolution of 1024x768 at 16-bit color depth*   + *Keyboard—Standard 101-key keyboard*   + *Mouse—Standard 2-button mouse*   + *Monitor—17-inch viewable display; must support 1024x768 resolution of at 16-bit color depth*   + *CD-ROM drive—16X read speed/8X write speed*   + *Ports—2 free serial ports with standard 9-pin connectors; 1 free USB port*   + *Other Hardware—Category 5 (Cat-5) cable with standard RJ-45 plugs connecting the network adapter to the network hub; 1 spare cable* | * + *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* |
| *3.2.1* | *The Contractor shall install a fully licensed copy of Windows 7 Professional Operating System on the computer specified above. The Contractor shall also install any necessary manufacturer-provided drivers for the installed hardware.* | *The Contractor shall install a fully licensed copy of Windows 10 (or higher) Professional Operating System on the computer specified above. The Contractor shall also install any necessary manufacturer-provided drivers for the installed hardware.* |
| *3.2.1* | *This computer shall be located and oriented to allow data entry and data viewing as well as to provide access to data ports for the connection of external hardware. Location and orientation shall be subject to the COR’s approval.* | *This computer shall be located and oriented to allow data entry and data viewing as well as to provide access to data ports for the connection of external hardware.* |
| *3.2.3* | *Network Hub*  *The DQM computer shall communicate via IEEE 802.3 Ethernet and the TCP/IP networking protocol. The Contractor shall provide a network hub to allow the temporary addition of the COR’s portable computer to the computer network. The hub shall provide a minimum of four RJ-45 ports that support Category 5 (Cat-5) cable with standard RJ-45 plugs connecting the network adapter to the network hub; one spare cable shall be available on site to plug into the network hub.* | *[Deleted]* |
| *3.2.5* | *The Contractor shall maintain an Internet connection capable of transmitting real-time data to the DQM server and supporting remote access as well as enough additional bandwidth to clear historically queued data when a connection is re-obtained. The telemetry system shall always be available and have connectivity in the contract area. If connectivity is lost, unsent data shall be queued and transmitted upon restoration of connectivity.* | *The Contractor shall maintain an Internet connection capable of transmitting real-time data to the DQM server and supporting remote access as well as enough additional bandwidth to clear historically queued data when a connection is re-obtained. If connectivity is lost, unsent data shall be queued and transmitted 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.* |
| *3.2.10* | *At the end of the dredging contact, the Contractor shall contact the DQM Support Center prior to discarding the data to ensure that it has been appropriately archived. The Contractor shall record in a separate section at the end of the dredge’s onboard copy of the DPIP the following information:* | *At the end of the dredging contact, the Contractor shall contact the 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. The Contractor shall then record in a separate section at the end of the dredge’s onboard copy of the DPIP the following information:* |
| *3.2.10* | *The same day of the phone call and prior to discarding the data, the Contractor shall submit a “Data Appropriately Archived” email to the local District’s Permit Project Manager with the above information and cc: the DQM Support Center representative providing discard permission. In addition to the above information, the following shall also be included in the email:*  *• Project name and contract number*  *• Dredge start and end dates*  *• Name of the hopper dredge* | *[Deleted]* |
| *3.3* | *Failure by the Contractor to report the required data within the specified time window for dredge measurements (see Paragraph 3.2.7, “Data Reporting Frequency,” and Paragraph 3.2.9, “Data Reporting”) may result in withholding of up to 10% of the contract progress payment per clause 52.232-5.* | *Failure by the Contractor to report the required data within the specified time window for dredge measurements (see Paragraph 3.2.6, “Data Reporting Frequency,” and Paragraph 3.2.8, “Data Reporting”) will result in withholding of up to 10% of the contract progress payment per clause 52.232-5.* |
| *3.4* | *COMPLIANCE QUALITY ASSURANCE CHECKS*  *Quality assurance checks are required prior to the commencement of dredging and at the discretion of a COR periodically throughout the duration of the contract. Detailed instructions for performing these checks and a spreadsheet for recording the results are available on the DQM website (*[*https://dqm.usace.army.mil/Certifications/Index.aspx*](https://dqm.usace.army.mil/Certifications/Index.aspx)*). Incoming data shall be periodically reviewed to ensure compliance with performance requirements outlined in Paragraph 3.3, “Performance Requirements.” The data received must meet the reporting requirements outlined in the subparagraphs under Paragraph 3.1, “Requirements for Reported Data”; a more detailed description of some of the quality assurance methods is outlined below.*  *For annual instrumentation checks and compliance monitoring, the DQM Data Acquisition and Analysis Team personnel attempt to be as flexible as possible in performing their checks so as not to delay work; however, in order to expedite matters as much as possible, it is necessary that they receive the support and cooperation of the local District and the Dredging Contractor. The Dredging Contractor shall coordinate pickup times and locations and provide transportation to and from any platform with a DQM-certified system in a timely manner. Calibrations to the sensors should already have been performed before DQM personnel arrive on site.* | *[Deleted]* |
| *3.4.1* | *Draft and Displacement Check*  *The COR shall periodically verify the accuracy of the fore and aft system-reported draft values by comparing the vessel hull draft marks to the corresponding sensor readings indicated on the DQM screen. The vessel’s hull draft reading shall be viewed from a Contractor-supplied auxiliary vessel circling the dredge. The COR shall review the difference between averaged drafts recorded by the instruments and those estimated from the draft marks to ensure that the system is operating within the acceptable accuracy of approximately ± 0.1 foot in calm seas conditions. Reported draft values will be verified light, loaded, and at other intervals at the discretion of the COR. If sensors responsible for collecting draft values are not located on centerline, verification may be required under different trim and list conditions. If values are outside the acceptable range, the Contractor shall recalibrate or repair system components as necessary. This check may be performed separately or as a part of the Water Load Test. For each system-provided fore and aft draft, an average draft value will be calculated during the draft check, and the corresponding displacement will be verified longhand using the supplied draft/displacement tables.* | *[Deleted]* |
| *3.4.2* | *Draghead Depth Check*  *The COR may require periodic calibration checks of the reported draghead depth using manual means, such as tape measures or sounding lines, to directly measure draghead depth. The Contractor shall furnish a steel tape, chain, or wire with clearly visible flags/tags placed at 1-foot increments within the operational range of the dragarm. These devices shall be capable of measuring the depth below the water surface to the lowest fixed point of each draghead (often the heel) with sufficient length to measure 5 feet more than the maximum project depth. Pressure sensors may be used to verify calibration of the draghead sensors only in areas where current flow past the vessel/dragarm cannot be reduced sufficiently to allow safe handling of manual measuring devices. Pressure sensors used for this purpose shall be vented pressure gages and shall be subjected to an annual manufacturer’s calibration. Prior to the dragarm depth check, the sensor shall be checked at a known depth and may be required to be zeroed at this point according to manufacturer’s specifications. Care shall be taken not to kink the cable or restrict the vent during deployment.*  *The COR shall review the draghead depth data to ensure that the system is operating within acceptable accuracy and may direct the Contractor to recalibrate or repair system components as necessary. If a bubbler-type system is used, weekly calibration of the draghead sensors is recommended as they are sensitive to environmental conditions.* | *[Deleted]* |
| *3.4.3* | *Ullage Sounding and Volume Check*  *The COR shall periodically check the reported hopper ullage sounding using a tape measure or other distance-measuring device. The Contractor shall furnish a clearly readable weighted tape, marked in tenths of a foot, capable of measuring throughout the full range of hopper depth. The weight for this tape shall be a 6 inch diameter disk weighing between 2 and 3 pounds. The COR shall review the hopper dredge ullage sounding data to ensure that the system is operating within acceptable accuracy (0.1 foot). Reported ullage soundings will be verified light, loaded, and at other intervals at the COR’s discretion. Measurements can be taken from multiple locations along the combing or from sensor location at the COR’s discretion. If values are outside the acceptable range, the Contractor shall recalibrate or repair system components as necessary. This check may be performed separately or as a part of the Water Load Test. For each sensor-provided fore and aft ullage sounding value, an average ullage sounding value will be calculated during the ullage sounding check, and the corresponding volume will be verified longhand using the supplied hopper volume tables.* | *[Deleted]* |
| *3.4.4* | *Position Check*  *During the QA checks, the reported position of the dredge shall be verified by comparison with readings from a handheld GPS receiver. Throughout the contract, the COR shall periodically take readings from an independent GPS to verify locations.* | *[Deleted]* |
| *3.4.5* | *Water Load Test*  *Water Load Tests shall consist of pumping the hopper dredge out to its lowest level and then filling it to capacity with water, taking ullage and draft measurements at both levels to determine hopper dredge volume and displacement. The objective of the Water Load Test is to validate the dredge’s reported displacement and hopper volumes. If the results of the Water Load Test indicate that the system is not operating within acceptable accuracy, the Contractor shall correct the deficiencies causing the error and repeat the Water Load Test until the results are acceptable.*  *The Contractor shall provide a handheld refractometer with automatic temperature compensation to measure the hopper dredge water-specific gravity during water tests. The refractometer shall be capable of measuring the hopper dredge water-specific gravity in grams/cubic centimeter with a resolution of 0.001 and minimum accuracy of ± 0.001. The Contractor shall also provide a water-sampling device to retrieve a sufficient volume of water from various depths in the hopper dredge to accurately determine the specific gravity with the refractometer and a sufficient volume of deionized water for calibration of the device.* | *[Deleted]* |
| *3.5* | *CONTRACTOR QUALITY CONTROL*  *The Dredging Contractor shall designate a Quality Control Systems Manager (QCSM), who shall develop and maintain daily procedures to ensure the Contractor’s quality control (CQC) of the DQM system. These methods shall include a procedure by which data being collected is checked against known values, telemetry is verified to be functioning, and the DQM computer is verified to be on and the DQMOBS is running. The Contractor Quality Control Plan which describes these methods and procedures shall be included in the DPIP as per Paragraph 1.5, “Dredge Plant Instrumentation Plan (DPIP).” This is the only section which shall be submitted to the local District and is a required submittal prior to the start of the contract. CQC Reports may be required at the discretion of the Quality Assurance Representative (QAR) daily. Annotations shall be made in the CQC Report, documenting all actions taken on each day of work, including all deficiencies found and corrective actions taken.* | *[Deleted]* |
| *3.6* | *LIST OF ITEMS TO BE PROVIDED BY THE CONTRACTOR*   * + *DPIP: Paragraph 1.5, “Dredge Plant Instrumentation Plan (DPIP)”*   + *DQM System*   *- Sensor instrumentation: Paragraph 3.1, “Requirements for Reported Data”*  *- DQM computer: Paragraph 3.2, “National Dredging Quality Management Program System Requirements”*   * + *Dredge Data*   *- Event documentation: Paragraph 3.2.9, “Data Reporting”*  *- Dredge data backups: Paragraph 3.2.10, “Contractor Data Backup”*   * + *QA EQUIPMENT ON THE DREDGE*   *- Dragarm depth chain: Paragraph 3.4.2, “Draghead Depth Check”*  *- Ullage tape: Paragraph 3.4.3, “Ullage Sounding and Volume Check”*  *- Refractometer: Paragraph 3.4.5, “Water Load Test”*  *- Water sampling device: Paragraph 3.4.5, “Water Load Test”* | *LIST OF ITEMS TO BE PROVIDED BY THE CONTRACTOR*   * + *DPIP: https://dqm.usace.army.mil/ Certifications/Index.asp*   + *DQM System*   *- Sensor instrumentation: Paragraph 3.1, “Requirements for Reported Data”*  *- DQM computer: Paragraph 3.2, “National Dredging Quality Management Program System Requirements”*   * + *Dredge Data*   *- Event documentation: Paragraph 3.2.8, “Data Reporting”*  *- Dredge data backups: Paragraph 3.2.9, “Contractor Data Backup”*   * + *QA EQUIPMENT ON THE DREDGE*   *- Dragarm depth chain*  *- Ullage tape*  *- Refractometer*  *- Water-sampling device* |

***\*THIS GUIDANCE SHOULD NOT BE INCLUDED IN THE CONTRACT\****



SECTION 35 20 23.23  
  
NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM  
HOPPER DREDGE  
08-04-2023

# 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 as well as the precision and instrumentation requirements. The requirements may be satisfied using equipment and technical procedures selected by the Contractor.

# 1.2 SUBMITTALS

Government approval is required for submittals with a “G” classification. Submittals not having a “G” classification are for information only. When a “G” classification is used, a code following the “G” 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, *XXX‑XX-X (enter local USACE District)*;G, *XXX* *(enter code)*

# 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

# 1.4.1 CERTIFICATION

The Contractor is required to have a current certification from DQM for the hopper dredge instrumentation system to be used under this contract. Criteria for certification is based on the most recent specification posted on the DQM website (<https://dqm.usace.army.mil>). Verify compliance with these criteria by annual onsite quality assurance (QA) checks conducted by the DQM Support Center Data Acquisition and Analysis Team and by periodic review of the transmitted data. DQM Certification is valid for one year from the date of the annual QA checks. Certification is contingent upon the system’s ability to continuously meet the performance requirements as outlined in paragraph PERFORMANCE REQUIREMENTS. If issues with data quality are not corrected within 48 hours, the system certification will be revoked and additional QA checks by the Data Acquisition and Analysis Team may be necessary.

Annual DQM Certification must be based on the following:

* A series of quality assurance checks as outlined on the DQM website (<https://dqm.usace.army.mil>)
* Verification of data acquisition and transfer as described in paragraph PERFORMANCE REQUIREMENTS
* Review of the Dredge Plant Instrumentation Plan (DPIP) as described in paragraph DREDGE PLANT INSTRUMENTATION PLAN (DPIP)

# 1.4.2 RECERTIFICATION

The owner or operator of the dredge must contact DQM at [DQM‑AnnualQA@rpsgroup.com](mailto:DQM%1eAnnualQA@rpsgroup.com) on an annual basis, or at least three weeks prior to certification expiration, to schedule QA checks for renewal. This notification is meant to make the Data Acquisition and Analysis Team aware of a target date for the annual QA checks for the dredge. At least one week prior to the target date, the Contractor must contact the Data Acquisition and Analysis Team and verbally coordinate a specific date and location. The Contractor must then follow up this conversation with a written email confirmation. The owner/operator must coordinate the QA checks with all local authorities, including but not limited to, the local USACE Contracting Officer’s Representative (COR).

Recertification is required for any yard work which produces modification to displacement (change in dredge lines, or repositioning or repainting hull marks), modification to bin volume (change in bin dimensions, or addition or subtraction of structure), or changes in sensor type or location; report these changes in the sensor log section of the DPIP. A system does not have to be transmitting data between jobs; however, in order to retain its certification during this period, the system sensors or hardware should not be disconnected or removed from the dredge. If the system is powered down, retain calibration coefficients.

# 1.5 DREDGE PLANT INSTRUMENTATION PLAN (DPIP)

The Contractor must have a digital copy of the 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 describe the sensors used, configuration of the system, how sensor data will be collected, how quality control on the data will be performed, and how sensors/data reporting equipment will be calibrated and repaired if they fail. A description of the computed dredge-specific data and how the sensor data will be transmitted to the DQM database will also be included.

A complete list of the required DPIP contents is provided on the DQM website (<https://dqm.usace.army.mil>).

Submit to the DQM Support Center any addendum or modifications made to the plan, subsequent to its original submission, prior to the start of work. Any changes to the computation methods must be approved by the DQM Support Center prior to their implementation.

# 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 responsible for replacement, repair, and calibration of sensors and other necessary data acquisition equipment needed to supply the required data.

Complete repairs within 48 hours of any sensor failure. Notify the COR upon completion of a repair, replacement, installation, modification, or calibration. The COR may request recalibration of 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 specified accuracies and resolutions indicated in the following subparagraphs.

Reported sensor values for ullage, draft, and draghead depth should represent a weighted average with the highest and lowest values not included in the calculated average for the given interval. This information should be documented in the DPIP sections that say “Calculations done external to the instrumentation.”

# 3.1.1 Date and Time

Report the date and time to the nearest second and referenced to UTC time based on a 24-hour format: *mm*/*dd*/*yyyy* *hh*:*mm*:*ss*. The reported time must be the time reported by the GPS in the NMEA string.

# 3.1.2 Load Number

A load number must document the end of a disposal event. Load numbering will begin at number 1 at the start of the contract and will be incremented by 1 at the completion of each disposal event or emptying of the hopper. Whenever possible, calculate the load number off of the sensors aboard the dredge using a mathematically repeatable routine. Make efforts to include logic that avoids false load number increments. Do not allow the routine to miss any disposal event. If manual incrementing of the load number is in place, pay extra attention to this value in the quality control process.

# 3.1.3 Horizontal Positioning

Obtain all locations using a positioning system operating with a minimum accuracy level of 1 to 3 meters horizontal Circular Error Probable (CEP). Report positions as Latitude/Longitude WGS 84 in decimal degrees. West Longitude and South Latitude values are reported as negative.

# 3.1.3.1 Vessel Horizontal Positioning

Record vessel horizontal positioning as geographic coordinates of the vessel as indicated by the location of the GPS antenna.

# 3.1.3.2 Draghead Horizontal Positioning

Record draghead horizontal positioning as geographic coordinates of the heel on the centerline of the draghead(s). Describe any offset calculations from the GPS antenna in the DPIP.

# 3.1.4 Hull Status

Monitor open/closed status of the hopper dredge, corresponding to the split/non-split condition of a split-hull hopper dredge. For dredges with hopper doors, the status of a single door that is the first opened during normal disposal operations may be monitored. An “open” value indicates that the hopper door is open or, in the case of split-hull dredges, that the hull is split. A “closed” value indicates that the hopper doors are closed or, in the case of split-hull dredges, that the hull is not split.

*For this contract, hull status must register closed prior to leaving the disposal area.*

# 3.1.5 Dredge Course

Provide dredge course-over-ground (COG) using industry-standard equipment. Provide dredge course-over-ground to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention.

# 3.1.6 Dredge Speed

Provide dredge speed-over-ground in knots using industry-standard equipment with a minimum accuracy of 1 knot and resolution to the nearest 0.1 knot.

# 3.1.7 Dredge Heading

Provide dredge heading using industry-standard equipment. The dredge 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.

# 3.1.8 Tide

Obtain tide data using appropriate equipment to give the water level with an accuracy of ± 0.1 foot and a resolution of 0.01 foot. Enter tide values above project datum described in the dredging specification with a positive sign and those below with a negative sign.

# 3.1.9 Draft

Report all draft measurements in feet, tenths, and hundredths with an accuracy of ± 0.1 foot relative to observed physical draft readings. Report the measurements at a resolution of two decimal places (hundredths of a foot). The reported forward draft value is equal to the sum of the visual forward port and starboard draft mark readings divided by two. The reported aft draft value is equal to the sum of the visual aft port and starboard draft mark readings divided by two. Forward draft, aft draft, and average draft will be reported. Place sensors at an optimum location on the vessel to be reflective of observed physical draft mark readings at any trim or list. Minimum accuracies are conditional to relatively calm water. The sensor value reported must be an average of at least ten samples per event, with at least one maximum value and one minimum value removed, and the minimum eight remaining values averaged. When the average draft is calculated for the purpose of determining displacement, maintain significant digits for average draft such that if forward draft was 0.15 and aft draft was 0.1, the average draft would be 0.125.

# 3.1.10 Hopper Ullage Sounding

Report all ullage soundings in feet, tenths, and hundredths with an accuracy of ± 0.1 foot with respect to the combing; they must be representative of the forward and aft extents of the hopper as close to the centerline as is possible. Report the measurements at a resolution of two decimal places (hundredths of a foot). Report forward ullage and aft ullage soundings. Mount sensors to avoid discharge flume turbulence, foam, and any structure that could produce sidelobe errors. If sensors must be offset from the centerline of the hopper, they should be offset to opposite sides of the vessel. If more than one fore or one aft sensor are used, place the sensors near the corners of the hopper, and report the average value of the fore sensors and the average value of the aft sensors. The sensor value reported must be an average of at least ten samples per event, with at least one maximum value and one minimum value removed and the minimum eight remaining values averaged. When the average ullage is calculated for the purpose of determining hopper volume, maintain significant digits for average ullage such that if forward ullage was 0.15 and aft ullage was 0.1, the average ullage would be 0.125.

# 3.1.11 Hopper Volume

Report hopper volume in cubic yards, based on the most accurate method available for the dredge. The minimum standard of accuracy for hopper volume is interpolation from the certified hopper volume table, based on the average fore and aft ullage soundings.

# 3.1.12 Displacement

Report dredge displacement in long tons, based on the most accurate method available for the dredge. The minimum standard of accuracy for displacement is interpolation from the displacement table, based on the average draft. For this contract the density of water used to calculate displacement is **\_\_\_\_\_\_\*** kg/cubic meter, and it will be used for an additional interpolation between the fresh and salt water tables.

\* *The water density used is project-/location-specific. Enter the appropriate water density in the blank:  
 • Fresh Water—1000 kg/m3 (1 g/cm3)  
 • Salt Water—1027-1030 kg/m3 (1.027-1.03 g/cm3)*

# 3.1.13 Empty Displacement

Report empty displacement in long tons, which is the lightship value of the dredge, or the weight of the dredge with no material in the hopper, adjusted for fuel and water consumption.

# 3.1.14 Draghead Depths

Report draghead depths with an accuracy of ± 0.5 foot and a resolution to the nearest 0.1 foot as measured from the surface of the water with no tidal adjustments. Minimum accuracies are conditional to relatively calm water. The sensor value reported must be an average of at least ten samples per event, with at least one maximum value and one minimum value removed and the minimum eight remaining values averaged.

# 3.1.15 Slurry Densities

Use a density-metering device, calibrated according to the manufacturer’s specifications, to record the slurry density of each dragarm to the nearest 0.001 g/cc with an accuracy of ± 0.01 g/cc. If the manufacturer does not specify a frequency of recalibration, conduct calibration prior to commencement of work.

# 3.1.16 Slurry Velocities

Use a flow-metering device, calibrated according to the manufacturer’s specifications, to record the slurry velocity of each dragarm to the nearest 0.01 fps with an accuracy of ± 0.5 fps. If the manufacturer does not specify a frequency of recalibration, conduct calibration prior to commencement of work. Measure the slurry velocity in the same pipeline inside diameter as that used for the slurry density measurement.

# 3.1.17 Pump RPM

Measure the RPM of any pump being used to move material with the highest level of accuracy that is standard on the vessel operational displays, either at the bridge, at the drag tender’s controls, or in the engine room. Dredges with multiple pumps per side must report RPM for the pump that best describes the dredging process (typically the outboard pump).

# 3.1.18 Sea Suction Valve for Dragarm

If sea suction can be taken to bypass suction through the draghead, the sea suction location and valve status will be reported. The status of the valve will change from “closed” to “open” when the valve starts to open and will register “closed” when the valve is fully closed. When applicable, the state of the latch will be reported as “true” or “false.” Report the sea suction location in a standard non-changing name string of no more than 20 characters. These field values will always occur in the XML string as a set. The DQM system can accommodate only up to four unique sea suction locations. Suggested options for the naming convention can be found in the example dataset in paragraph DATA FORMAT.

# 3.1.19 Pumpout

When the hopper dredge is being pumped out, report a “true” value; when it is not, report a “false” value. The only permissible values are “true” and “false.”

# 3.2 NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM SYSTEM REQUIREMENTS

The Contractor’s DQM system must be capable of collecting, displaying, and transmitting information to the DQM database. Record the applicable parameters from paragraph REQUIREMENTS FOR REPORTED DATA as events locally, and continually transmit them 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, 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 48 hours of determination of the condition.

# 3.2.1 Computer Requirements

Provide a dedicated onboard computer for use by the DQM system. This computer must run USACE 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 10 (or higher) Professional Operating System on the computer specified above. Also install any necessary manufacturer-provided drivers for the installed hardware.

Locate and orient the computer to allow data entry and data viewing as well as to provide access to data ports for the 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 along with USACE-selected software for remote support and management.

# 3.2.3 UPS

Supply an Uninterruptible Power Supply (UPS) for the computer and networking equipment. The UPS must provide backup power at 1 kVA for a minimum of ten minutes. The UPS must interface with the DQM computer to communicate UPS status. 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 and supporting remote access as well as enough additional bandwidth to clear historically queued data when a connection is reobtained. If connectivity is lost, queue 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. Coordination between the dredging company’s IT and the DQM Support Center may be required in order to configure remote access though any security, firewall, router, and telemetry systems. Telemetry systems must be capable of meeting these minimum reporting requirements in all operating conditions.

# 3.2.5 Data Routing Requirements

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

# 3.2.6 Data Reporting Frequency

Log data as a series of events. Each event will consist of a dataset containing dredge information in accordance with paragraph REQUIREMENTS FOR REPORTED DATA. Each set of measurements (time, position, etc.) will be considered an event. Collect any required information in paragraph REQUIREMENTS FOR REPORTED DATA that is not an averaged variable (draft and ullage) within 1 second of the reported time. Send a data string for an event to the DQM computer every 6 to 12 seconds. This interval must remain constant throughout the contract; do not transmit data strings more than once per every 5 seconds. Collect and compute any averaged variable within this sampling interval.

# 3.2.7 Data Format

Report data as an Extensible Markup Language (W3C standard XML 1.0) document as indicated below. Line breaks and spaces are added for readability, but the carriage return, line feed character combination is added only to delineate records (HOPPER \_DREDGING\_DATA tag) for actual data transmission.

<?xml version="1.0"?>

<HOPPER\_DREDGING\_DATA version = "2.0">

<PLANT\_IDENTIFIER>**integer string**</PLANT\_IDENTIFIER>

<DREDGE\_NAME>**string32**</DREDGE\_NAME>

<HOPPER\_DATA\_RECORD>

<DATE\_TIME>**time date string**</DATE\_TIME>

<CONTRACT\_NUMBER>**string32**</CONTRACT\_NUMBER>

<LOAD\_NUMBER>**integer string**</LOAD\_NUMBER>

<VESSEL\_X coord\_type = “LL”>**floating point string**</VESSEL\_X>

<VESSEL\_Y coord\_type = “LL”>**floating point string**</VESSEL\_Y>

<PORT\_DRAG\_X coord\_type = “LL”>**floating point string**</PORT\_DRAG\_X>

<PORT\_DRAG\_Y coord\_type = “LL”>**floating point string**</PORT\_DRAG\_Y>

<STBD\_DRAG\_X coord\_type = “LL”>**floating point string**</STBD\_DRAG\_X>

<STBD\_DRAG\_Y coord\_type = “LL”>**floating point string**</STBD\_DRAG\_Y>

<HULL\_STATUS>**OPEN/CLOSED string**</HULL\_STATUS>

<VESSEL\_COURSE>**floating point string**<VESSEL\_COURSE >

<VESSEL\_SPEED>**floating point string**</VESSEL\_SPEED>

<VESSEL\_HEADING>**floating point string**</VESSEL\_HEADING>

<TIDE>**floating point string**</TIDE>

<DRAFT\_FORE>**floating point string**</DRAFT\_FORE>

<DRAFT\_AFT>**floating point string**</DRAFT\_AFT>

<ULLAGE\_FORE>**floating point string**</ULLAGE\_FORE>

<ULLAGE\_AFT>**floating point string**</ULLAGE\_AFT>

<HOPPER\_VOLUME>**floating point string**</HOPPER\_VOLUME>

<DISPLACEMENT>**floating point string**</DISPLACEMENT>

<EMPTY\_DISPLACEMENT>**floating point string**</EMPTY\_DISPLACEMENT>

<DRAGHEAD\_DEPTH\_PORT>**floating point string**</DRAGHEAD\_DEPTH\_PORT>

<DRAGHEAD\_DEPTH\_STBD>**floating point string**</DRAGHEAD\_DEPTH\_STBD>

<PORT\_DENSITY>**floating point string**</PORT\_DENSITY>

<STBD\_DENSITY>**floating point string**</STBD\_DENSITY>

<PORT\_VELOCITY>**floating point string**</PORT\_VELOCITY>

<STBD\_VELOCITY>**floating point string**</STBD\_VELOCITY>

<PUMP\_RPM\_PORT>**floating point string**</PUMP\_RPM\_PORT>

<PUMP\_RPM\_STBD>**floating point string**</PUMP\_RPM\_STBD>

<VALVE\_1\_LOCATION>**string32**</VALVE\_1\_LOCATION>

<VALVE\_1\_STATUS>**open/closed**</VALVE\_1\_STATUS>

<VALVE\_1\_LATCHED>**true/false**</VALVE\_1\_LATCHED>

<VALVE\_2\_LOCATION>**string32**</VALVE\_2\_LOCATION>

<VALVE\_2\_STATUS>**open/closed**</VALVE\_2\_STATUS>

<VALVE\_2\_LATCHED>**true/false**</VALVE\_2\_LATCHED>

<VALVE\_3\_LOCATION>**string32**</VALVE\_3\_LOCATION>

<VALVE\_3\_STATUS>**open/closed**</VALVE\_3\_STATUS>

<VALVE\_3\_LATCHED>**true/false**</VALVE\_3\_LATCHED>

<VALVE\_4\_LOCATION>**string32**</VALVE\_4\_LOCATION>

<VALVE\_4\_STATUS>**open/closed**</VALVE\_4\_STATUS>

<VALVE\_4\_LATCHED>**true/false**</VALVE\_4\_LATCHED>

<PUMP\_OUT\_ON>**true/false/unknown string**</PUMP\_OUT\_ON>

</HOPPER\_DATA\_RECORD>

</HOPPER\_DREDGING\_DATA>

Carriage Return – ASCII value 13

Line Feed – ASCII value 10

# Example

<?xml version="1.0"?>

<HOPPER\_DREDGING\_DATA version = "2.0">

<PLANT\_IDENTIFIER>9999</PLANT\_IDENTIFIER>

<DREDGE\_NAME>Essayons</DREDGE\_NAME>

<HOPPER\_DATA\_RECORD>

<DATE\_TIME>04/11/2002 13:12:05</DATE\_TIME>

<CONTRACT\_NUMBER>GDSNWP-11-G-0001</CONTRACT\_NUMBER>

<LOAD\_NUMBER>102</LOAD\_NUMBER>

<VESSEL\_X coord\_type = "LL">-80.123333</VESSEL\_X>

<VESSEL\_Y coord\_type = "LL">10.123345</VESSEL\_Y>

<PORT\_DRAG\_X coord\_type = "LL">-80.1233371</PORT\_DRAG\_X >

<PORT\_DRAG\_Y coord\_type = "LL">10.12335</PORT\_DRAG\_Y >

<STBD\_DRAG\_X coord\_type = "LL">-80.123339</STBD\_DRAG\_X >

<STBD\_DRAG\_Y coord\_type = "LL">10.123347</STBD\_DRAG\_Y >

<HULL\_STATUS>CLOSED</HULL\_STATUS>

<VESSEL\_COURSE>258</VESSEL\_COURSE>

<VESSEL\_SPEED>3.4</VESSEL\_SPEED>

<VESSEL\_HEADING>302</VESSEL\_HEADING>

<TIDE>-0.1</TIDE>

<DRAFT\_FORE>10.05</DRAFT\_FORE>

<DRAFT\_AFT>15.13</DRAFT\_AFT>

<ULLAGE\_FORE>10.11</ULLAGE\_FORE>

<ULLAGE\_AFT>10.22</ULLAGE\_AFT>

<HOPPER\_VOLUME>2555.2</HOPPER\_VOLUME>

<DISPLACEMENT>4444.1</DISPLACEMENT>

<EMPTY\_DISPLACEMENT>2345.0</EMPTY\_DISPLACEMENT>

<DRAGHEAD\_DEPTH\_PORT>55.10</DRAGHEAD\_DEPTH\_PORT>

<DRAGHEAD\_DEPTH\_STBD>53.21</DRAGHEAD\_DEPTH\_STBD

<PORT\_DENSITY>1.02</PORT\_DENSITY>

<STBD\_DENSITY>1.03</STBD\_DENSITY>

<PORT\_VELOCITY>22.1</PORT\_VELOCITY>

<STBD\_VELOCITY>23.3</STBD\_VELOCITY>

<PUMP\_RPM\_PORT>55</PUMP\_RPM\_PORT>

<PUMP\_RPM\_STBD>54</PUMP\_RPM\_STBD>

<VALVE\_1\_LOCATION>Starboard Dragarm</VALVE\_1\_LOCATION>

<VALVE\_1\_STATUS>open</VALVE\_1\_STATUS>

<VALVE\_1\_LATCHED>true</VALVE\_1\_LATCHED>

<VALVE\_2\_LOCATION>Port Dragarm</VALVE\_2\_LOCATION>

<VALVE\_2\_STATUS>closed</VALVE\_2\_STATUS>

<VALVE\_2\_LATCHED>false</VALVE\_2\_LATCHED>

<VALVE\_3\_LOCATION>Port Sea Chest</VALVE\_3\_LOCATION>

<VALVE\_3\_STATUS>closed</VALVE\_3\_STATUS>

<VALVE\_3\_LATCHED>false</VALVE\_3\_LATCHED>

<VALVE\_4\_LOCATION>Starboard Sea Chest</VALVE\_4\_LOCATION>

<VALVE\_4\_STATUS>open</VALVE\_4\_STATUS>

<VALVE\_4\_LATCHED>false</VALVE\_4\_LATCHED>

<PUMP\_OUT\_ON>false</PUMP\_OUT\_ON>

</HOPPER\_DATA\_RECORD>

</HOPPER\_DREDGING\_DATA>

<cr>

<lf>

<?xml version="1.0"?>

<HOPPER\_DREDGING\_DATA version = "2.0">

<PLANT\_IDENTIFIER>9999</PLANT\_IDENTIFIER>

<DREDGE\_NAME>Essayons</DREDGE\_NAME>

<HOPPER\_DATA\_RECORD>

<DATE\_TIME>04/11/2002 13:12:10</DATE\_TIME>

<CONTRACT\_NUMBER>GDSNWP-11-G-0001</CONTRACT\_NUMBER>

<LOAD\_NUMBER>102</LOAD\_NUMBER>

<VESSEL\_X coord\_type = "LL">-80.123334</VESSEL\_X>

<VESSEL\_Y coord\_type = "LL">10.123346</VESSEL\_Y>

<PORT\_DRAG\_X coord\_type = "LL">-80.1233372</PORT\_DRAG\_X >

<PORT\_DRAG\_Y coord\_type = "LL">10.12336</PORT\_DRAG\_Y >

<STBD\_DRAG\_X coord\_type = "LL">-80.123340</STBD\_DRAG\_X >

<STBD\_DRAG\_Y coord\_type = "LL">10.123348</STBD\_DRAG\_Y >

<HULL\_STATUS>CLOSED</HULL\_STATUS>

<VESSEL\_COURSE>259</VESSEL\_COURSE>

<VESSEL\_SPEED>3.5</VESSEL\_SPEED>

<VESSEL\_HEADING>300</VESSEL\_HEADING>

<TIDE>-0.1</TIDE>

<DRAFT\_FORE>10.00</DRAFT\_FORE>

<DRAFT\_AFT>15.15</DRAFT\_AFT>

<ULLAGE\_FORE>10.15</ULLAGE\_FORE>

<ULLAGE\_AFT>10.20</ULLAGE\_AFT>

<HOPPER\_VOLUME>2555.5</HOPPER\_VOLUME>

<DISPLACEMENT>4444.0</DISPLACEMENT>

<EMPTY\_DISPLACEMENT>2345.0</EMPTY\_DISPLACEMENT>

<DRAGHEAD\_DEPTH\_PORT>55.15</DRAGHEAD\_DEPTH\_PORT>

<DRAGHEAD\_DEPTH\_STBD>53.19</DRAGHEAD\_DEPTH\_STBD

<PORT\_DENSITY>1.00</PORT\_DENSITY>

<STBD\_DENSITY>1.01</STBD\_DENSITY>

<PORT\_VELOCITY>22.5</PORT\_VELOCITY>

<STBD\_VELOCITY>23.3</STBD\_VELOCITY>

<PUMP\_RPM\_PORT>55</PUMP\_RPM\_PORT>

<PUMP\_RPM\_STBD>54</PUMP\_RPM\_STBD>

<VALVE\_1\_LOCATION>Starboard Dragarm</VALVE\_1\_LOCATION>

<VALVE\_1\_STATUS>open</VALVE\_1\_STATUS>

<VALVE\_1\_LATCHED>true</VALVE\_1\_LATCHED>

<VALVE\_2\_LOCATION>Port Dragarm</VALVE\_2\_LOCATION>

<VALVE\_2\_STATUS>closed</VALVE\_2\_STATUS>

<VALVE\_2\_LATCHED>false</VALVE\_2\_LATCHED>

<VALVE\_3\_LOCATION>Port Sea Chest</VALVE\_3\_LOCATION>

<VALVE\_3\_STATUS>closed</VALVE\_3\_STATUS>

<VALVE\_3\_LATCHED>false</VALVE\_3\_LATCHED>

<VALVE\_4\_LOCATION>Starboard Sea Chest</VALVE\_4\_LOCATION>

<VALVE\_4\_STATUS>open</VALVE\_4\_STATUS>

<VALVE\_4\_LATCHED>false</VALVE\_4\_LATCHED>

<PUMP\_OUT\_ON>false</PUMP\_OUT\_ON>

</HOPPER\_DATA\_RECORD>

</HOPPER\_DREDGING\_DATA>

<cr>

<lf>

# 3.2.8 Data Reporting

The system must transmit correctly formatted event data XML strings to the DQM database continuously from mobilization until the last USACE post-dredging survey has been accepted. If the Internet connection (paragraph INTERNET ACCESS) is non-operable, perform manual backups from the dredge computer of the XML data string which would have been transmitted to the DQM computer over the serial connection for each day the device is inoperable and submit to the DQM Support Center within 48 hours. This submission does not replace the requirement of correcting the issue affecting the automatic transmission of data. In the event of data transfer, transmission, or hardware failure, maintain a manually recorded disposal log consisting of a series of events. These events are start of dredging, end of dredging, pre-disposal, and post-disposal. Include time stamp (GMT), position (Latitude and Longitude WGS84), draft, ullage, volume, and displacement for each event. Submit disposal logs on a daily basis to the COR during the time when the system is not operational.

# 3.2.9 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 transmitted to the DQM computer in the XML format with no line breaks between the parameters and each record string on a separate line. The naming convention for the files is <*dredgename*>\_<*StartYYYYMMddhhmmss*>\_<*EndYYYYMMddhhmmss*>.txt. Submit data via storage medium acceptable to the COR.

At the end of the dredging contract, contact the 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 made the call
* Date of the call
* DQM representative who gave permission to discard

# 3.3 PERFORMANCE REQUIREMENTS

The Contractor’s DQM system must be fully operational at the start of dredging operations and fully certified prior to moving dredge material on the contract (see paragraph NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM CERTIFICATION). To meet contract requirements for operability, in addition to certification, the Contractor’s system must provide a data string with all values for all parameters while operating, as described in the specifications. Additionally, all hardware must be compliant with hardware requirements (paragraph COMPUTER REQUIREMENTS). Quality data strings are considered to be those providing values for all parameters reported when operating according to the specification. Make repairs necessary to restore data return compliance within 48 hours. Failure by the Contractor to report the required data within the specified time window for dredge measurements (see paragraph DATA REPORTING FREQUENCY and paragraph DATA REPORTING) will result in withholding of up to 10% of the contract progress payment per FAR 52.232‑5 (“Payments Under Fixed-Price Construction Contracts”).

# 3.4 LIST OF ITEMS TO BE PROVIDED BY THE CONTRACTOR

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

DQM System

Sensor instrumentation Paragraph REQUIREMENTS FOR REPORTED DATA

DQM computer Paragraph NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM SYSTEM REQUIREMENTS

Dredge Data

Event documentation Paragraph DATA REPORTING

Dredge data backups Paragraph CONTRACTOR DATA BACKUP

QA Equipment on the Dredge

Dragarm depth chain

Ullage tape

Refractometer

Water-sampling device