
USACE / NAVFAC / AFCEC UFGS-02 61 13 (February 2025)

Preparing Activity: USACE

Superseding
UFGS-02 61 13 (February 2010)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2025

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SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL 02/25

NOTE: This guide specification covers the requirements for excavation, handling, and temporary storage of contaminated material.

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

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

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a [Criteria Change Request \(CCR\)](#).

PART 1 GENERAL

1.1 UNIT PRICES

NOTE: These paragraphs should be edited based on whether the contract will use a single job price, or unit prices. If there is a separate Measurement and Payment Section, edited versions of these paragraphs should be inserted in that section.

The amount of contaminated material to be excavated is often subject to uncertainty due to the difficulty in fully characterizing subsurface conditions prior to excavation. For this reason, single job pricing that is fair to both the

Government and Contractor can be a challenge. One option if using single job pricing is to set the base bid using the best estimate of the amount of contaminated material to be excavated and include options that can be exercised for additional volumes or weights. Coordinate requirements of these paragraphs with the bidding schedule.

1.1.1 Measurement

NOTE: Options are provided for payment by either volume or weight. If payment is on a weight basis, weights must either be measured on-site using a scale system (provided by the Government or the Contractor) or off-site at the point of disposal (e.g. a landfill).

Base measurement for excavation and onsite handling on the[actual number of cubic meters cubic yards of contaminated material in-place prior to excavation. Base determination of the volume of contaminated material excavated on cross-sectional volume determination reflecting the differential between the original elevations of the top of the contaminated material and the final elevations after removal of the contaminated material.][metric tons tons of contaminated material excavated. Use a properly calibrated weighing system to accurately measure the gross (bulk) weight of the contaminated material. Convert the measured gross (bulk) weight of the contaminated material to dry weight based on the[percent moisture content][_____] of representative contaminated material samples. Determine the percent moisture content in accordance with[ASTM D2216][ASTM D4643][ASTM D4959][_____]. Determine moisture content[daily.][for every [500][_____] metric tons tons of excavated contaminated material.]] Base measurement for construction, maintenance, and removal of stockpile areas on the number of square meters square yards of stockpile liner constructed.

1.1.2 Payment

1.1.2.1 Excavation and Handling

Compensation for excavation and onsite handling of contaminated material will be paid as a unit cost. Include any other items incidental to excavation and handling not defined as having a specific unit cost.

1.1.2.2 Stockpiling

Compensation for construction of stockpile areas will be paid for as a unit cost. Include all aspects of grading stockpile areas, preparation of stockpile areas, handling and placing contaminated materials in the stockpiles, maintenance of stockpile liners covers, leachate collection systems, removal of contaminated materials from stockpiles, disposal of stockpile cover materials and liner materials, and all other items incidental to construction of stockpiles in the unit cost.

1.1.2.3 Other Work Items

NOTE: If extensive dewatering to facilitate excavation of contaminated materials may be needed, or dewatering quantities are especially uncertain, consider including a separate unit price payment item for dewatering.

Payment for other work items not included in the above paragraphs will be included in the payment for the base bid for excavation, handling, and temporary storage of the contaminated materials. The other work items include preparation of submittals, mobilization and demobilization, site preparation, environmental compliance monitoring, health and safety monitoring and controls, and utilities required for the project if approved by the Government as necessary for the project.

1.2 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D2216	(2019) Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D4643	(2017) Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4959	(2016) Determination of Water (Moisture) Content of Soil by Direct Heating
ASTM D5434	(2012) Field Logging of Subsurface Explorations of Soil and Rock

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44

(2018) Specifications, Tolerances, and
Other Technical Requirements for Weighing
and Measuring Devices

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 505-B-04-900A

(2005) Intergovernmental Data Quality Task
Force - Uniform Federal Policy for Quality
Assurance Project Plans: Evaluating,
Assessing, and Documenting Environmental
Data Collection and Use Programs Part 1:
UFP-QAPP Manual

UFP-QAPP WKSTS

(2012) Intergovernmental Data Quality Task
Force - Uniform Federal Policy for Quality
Assurance Project Plans, Optimized
UFP-QAPP Worksheets

1.3 SYSTEM DESCRIPTION

NOTE: The Designer should include the bracketed
text if the amount and type of debris anticipated to
be present in the PCB-contaminated soil will not
impact the work described in this section and
referenced sections. If the amount or type of debris
is significant (see Section 01 57 19 TEMPORARY
ENVIRONMENTAL CONTROLS, for definitions related to
debris), this section and associated sections should
be edited to indicate how debris will be managed.

The work consists of excavation and temporary storage of approximately[
cubic meters cubic yards][metric tons tons][_____] of contaminated
material[and any debris contained within the contaminated material].

1.3.1 Design Requirements

1.3.1.1 Excavation Work Plan

NOTE: The Designer may wish to require the
Excavation Work Plan, UFP-QAPP, and any other
preconstruction submittals required under this
section to be completed concurrently or with all
other plans being appendices of one primary plan.
This section should be edited to reflect such a
requirement if applicable.

Submit an Excavation Work Plan within [30][_____] calendar days after
notice to proceed. Do not perform work at the site, with the exception of
site inspections and surveys, until the work plan is approved. Prepare[
draft for Government review][draft-final for [regulatory][_____] review]
and final versions of the Excavation Work Plan. Allow [30][_____] calendar
days for[Government] review[and [30][_____] calendar days for
regulatory review]. Allow [45][_____] days for comment resolution

following each review and preparing the next version of the document. No adjustment for time or money will be made if resubmittals of the work plan are required due to deficiencies in the plan. At a minimum, include the following in the work plan:

- a. Schedule of activities.
- b. Method of excavation and equipment to be used.
- c. Shoring or side-wall slopes proposed.
- d. Dewatering and Leachate Management Plan which includes: anticipated sources and quantities of water that will enter the excavation, means of removing water from the excavation, means of storage and treatment, discharge requirements, and discharge methods.
- e. Storage methods and locations for liquid and solid contaminated material. Provide design details for stockpiles including but not limited to: geomembrane liner and cover, berms, anchors/ballast for cover, vehicle access points, and leachate collection sumps.
- f. Haul routes.
- g. Decontamination procedures developed in accordance with[Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES][_____].
- h. Temporary use areas required for staging equipment and supplies, for temporary storage of excavated materials, or for stockpiles.

1.3.1.2 Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP)

Prepare a Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) in accordance with the requirements set forth in EPA 505-B-04-900A and using the 2012 UFP-QAPP WKSTS. Submit the UFP-QAPP within [30][_____] calendar days after notice to proceed. Do not perform work at the site, with the exception of site inspection and surveys, until the UFP-QAPP is approved. Prepare[draft for Government review][draft-final for [regulatory][_____] review] and final versions of the UFP-QAPP. Allow [30][_____] calendar days for[Government] review[and [30][_____] calendar days for regulatory review]. Allow [45][_____] days for comment resolution following each review and preparing the next version of the document. Tailor the content to the requirements of the project and the site conditions. If field analyses methods are used as described in paragraph EXCAVATION, include those field analysis in the UFP-QAPP.

1.3.2 Performance Requirements

NOTE: This paragraph provides for two approaches to excavation of contaminated materials. The first approach is to excavate only a fixed volume of contaminated material. This approach could be used in a situation where excavation cannot proceed beyond certain limits, or excavation is being used to target hot-spots of contamination only. If this approach is used, the bracketed text and Table should be deleted. The second approach is to excavate to "clean" soil, using post-excavation

confirmation samples to demonstrate achievement of cleanup goals. Cleanup goals should be determined on a site-specific basis considering the purpose of the excavation, applicable regulations, and other criteria. Ideally, cleanup goals will be defined in a site-specific decision document. Guidance on defining cleanup goals is beyond the scope of this section.

Excavate to the limits as shown on the drawings.[When excavation samples collected in accordance with paragraph FIELD QUALITY CONTROL indicate that remaining contaminant concentrations exceed the cleanup goals specified in Table 1, conduct additional excavations to achieve the cleanup goals in the excavation.

TABLE 1 - CLEANUP GOALS FOR EXCAVATION BASE AND SIDEWALLS	
CONTAMINANT	TOTAL CONCENTRATION IN EXCAVATION BASE/SIDEWALL
[_____]	[_____] mg/kg
[_____]	[_____] mg/kg
[_____]	[_____] mg/kg

]1.4 PRE-INSTALLATION MEETING

NOTE: Delete this paragraph if a separate specification section is developed for the entire project to cover pre-installation meetings and other administrative requirements.

Conduct a pre-installation meeting at the jobsite[at least five business days prior to the start of operations on the project][_____]. The pre-installation meeting is to be arranged by the Contractor and is to follow the written [pre-installation meeting agenda](#) submitted prior to the meeting. The purpose of this meeting is to review the requirements of this specification and the associated plans. The following individuals must be in attendance at this meeting: Contractor's Project Manager and Site Foreman and [Contracting Officer][_____].

Record [pre-installation meeting minutes](#) and publish via email within 48 hours to all attendees. The minutes must be re-published within 48 hours via email pending any subsequent comments from the attendees.

]1.5 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity

or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

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

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

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

SD-01 Preconstruction Submittals

Pre-Installation Meeting Agenda

Pre-Installation Meeting Minutes; G, [_____]

Excavation Work Plan; G, [_____]

Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP); G, [_____]

Pre-Installation Examination Report

Pre-Construction Equipment Examination

SD-02 Shop Drawings

Surveys

SD-06 Test Reports

Dewatering Performance Records

SD-07 Certificates

Qualifications; G, [_____]

SD-11 Closeout Submittals

Closeout Report; G, [_____]

1.6 QUALITY CONTROL

1.6.1 Regulatory Requirements

1.6.1.1 Permits and Licenses

NOTE: For sites addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), administrative permit requirements for on-site activities are not required, though the substantive requirements may need to be met. The permits or permit equivalents may include those addressing air emissions, water discharge, stormwater pollution prevention, and possibly others. Permitting requirements known to have substantive requirements should be listed here. If permit requirements are covered in other specifications, such as 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, delete this section.

Coordinate and obtain all necessary [permits][permit equivalents] prior to the initiation of the relevant activities. Submit documentation of the completed permitting or permit equivalent to the Contracting Officer[as part of the Excavation Work Plan]. Comply with all Federal, state, and local regulations. Obtain the permits, permit equivalents and certifications, and meet the substantive regulatory requirements necessary for the execution of the project. For any of the above-listed items requiring a longer time frame, copies of applications, and scheduled dates for receiving final approval, must be included.

1.6.1.2 Environmental Protection

NOTE: This specification section does not attempt to provide comprehensive environmental protection requirements, but rather refers to a separate specification section that would be prepared using UFGS Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. Specific technical considerations for excavation projects are discussed below.

An air pathway analysis should be performed during design to determine what air monitoring and controls are required. Guidance on air pathway analyses is provided in EP 200-1-24 Air Pathway Analysis for the Design of Hazardous, Toxic, and Radioactive Waste (HTRW) Remedial Action Projects. Specify perimeter air monitoring requirements in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

UFGS Section 01 57 19 provides information related to regulations of spills including notification and

response requirements. Spills on excavation projects can occur due to releases from equipment, fuel storage tanks, etc. Excavated materials can also be inadvertently spilled during transport between the excavation and storage locations. Lastly, although not directly related to spills, excavation projects have the potential to encounter unanticipated materials such as buried tanks, containers, munitions and explosive constituents, etc. An environmental protection plan prepared under Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS should include provisions for managing both spills and encountering unanticipated materials.

Develop and implement environmental protection requirements in accordance with[Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][_____].

1.6.2 Qualifications

NOTE: Requirements for the Contractor's experience should be determined and specified based on the experience and availability of Contractors in the area as well as the complexity of the project. An option is included to require the Contractor to demonstrate experience with excavation of regulated hazardous waste/material. The Designer could also edit the option text to list specific contaminants applicable to the project.

1.6.2.1 Contractor Experience

Submit evidence of successful completion of at least [1][_____] project of comparable size and scope[for materials contaminated with[RCRA hazardous wastes][CERCLA hazardous material][_____]].

1.6.2.2 Key Personnel

Provide key personnel with a minimum of [3][_____] years of excavation field experience. Include the Site Foreman, quality control personnel, and supervisory engineering and technical staff involved with operation in key personnel. Perform all survey work under the supervision of a registered land surveyor licensed in the[applicable jurisdiction][State of [_____]]. Submit a list of these personnel with their qualifications.

1.6.2.3 Lab Validation

Perform testing by a DoD Environmental Laboratory Accreditation Program (DoD ELAP) accredited commercial testing laboratory meeting the requirements of[Section 01 45 00 QUALITY CONTROL][_____] and approved by the Contracting Officer. Submit testing laboratory validation for the testing to be performed. Do not permit work requiring testing until the Contracting Officer approves use of the testing laboratory.

1.7 [PROJECT][SITE] CONDITIONS

1.7.1 Environmental Requirements

NOTE: Revise this paragraph if requirements are provided in other specification sections, health and safety plans, environmental permits/permit equivalents, etc. The conditions described in the following paragraph represent challenges to environmental protection (winds causing dust, rain causing stormwater contamination), saturation of excavated materials (rain), or site damage (saturated soils).

Do not conduct excavation or handling of contaminated materials in the following conditions: [wind speeds in excess of [50][_____] kilometers [30][_____] miles per hour,][moderate rain greater than [5][_____] mm [0.2][_____] inches per hour,][saturated soils caused by recent [rains][snowmelt] such that equipment traffic would cause excessive rutting or damage].

1.7.2 Existing Conditions

NOTE: Include any pertinent information regarding project/site conditions in this paragraph, the appendices to the specifications, or on the drawings. If the contaminated material to be excavated contains a significant amount of debris, the available information about its extent and characterization should also be provided. Indicate the detail to which site characterization has been performed and indicate where obvious data gaps exist. The following information should be shown on the project drawings (unless the Contractor is required to develop any aspects of the project design under a performance-based project):

a. Overall site plan, borrow areas, stockpile areas, storage areas, security requirements, special shoring requirements, boring logs, and access routes.

b. Individual site plans of each area of contamination with site features such as buildings, roads, utilities, topography, trees, shrubs, surface conditions, etc.

c. Limits of pavement removal, fence removal, and the location of ancillary equipment to be removed.

The existing site conditions are presented[in Appendix [_____]][and][on the Drawings]. These include[physical configuration][utilities][topography][land uses][groundwater depth][geotechnical characteristics of the contaminated materials (including[grain size analysis][pH][moisture content][density][porosity)][hydrogeology][nature and extent of contamination][_____]]. The existing conditions presented are the

result of site investigations at specific locations; variations in the existing site conditions could occur. Perform an independent interpretation of the site characterization data. Notify the Contracting Officer within [48 hours][_____] if discrepancies between the data provided and actual field conditions are discovered.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Backfill

NOTE: If Section 31 00 00 EARTHWORK is not in the project, backfill information can be copied from that section and edited as appropriate.

The paragraph ENVIRONMENTAL REQUIREMENTS FOR OFF-SITE SOIL in Section 31 00 00 EARTHWORK should be edited to include an appropriate list of chemical testing parameters for off-site soil. Some backfill sources may have chemical testing data already available; the Government should require chemical testing if the backfill chemical testing data is inadequate or does not exist. Off-site backfill should not be tested for only the site contaminants of concern. At a minimum, samples should be analyzed for target contaminant list (TCL) VOCs, TCL SVOCs, target analyte list (TAL) Metals, and Pesticides/PCBs. Additional analyses such as Total Petroleum Hydrocarbons may be appropriate also. Individual States or military installations may require or recommend additional parameters. Typical frequency of sampling would be one sample per 1,900 to 2,300 cubic meters 2,500 to 3,000 cubic yards. However, individual States or military installations may require or recommend more frequent or less frequent sampling.

In many cases, the degree of engineering control of the materials used as backfill may not need to be as stringent as described in Section 31 00 00 EARTHWORK. In other cases, such as under pavements, special compaction and material requirements may apply and the specifications will need to address these special requirements.

At some sites, previously contaminated material which has been removed from the excavation is reused as backfill following treatment to remove the contaminant of concern.

Provide backfill in accordance with[Section 31 00 00 EARTHWORK][_____].

2.1.2 Topsoil

NOTE: If Section 31 00 00 EARTHWORK is not in the

project, topsoil information can be copied from that section and edited as appropriate. Section 31 00 00 EARTHWORK includes a provision to strip existing on-site topsoil for re-use. The project specifications should only allow that practice if topsoil has been tested or will be tested to confirm that it is not considered contaminated.

Provide topsoil in accordance with the requirements in[Section 31 00 00 EARTHWORK][_____]. Stripping existing topsoil for re-use on-site[is][is not] allowed.

2.1.3 Geomembrane

NOTE: If Section 02 56 13.16 GEOMEMBRANE WASTE CONTAINMENT is not in the project, geomembrane material information can be copied from that section and edited as appropriate.

Scrim reinforced geomembranes are commonly specified for stockpile covers and liners. Due to their higher strength properties, scrim reinforced geomembranes can generally be thinner than non-reinforced geomembranes. For bottom liners, a commonly used minimum thickness is 0.5 mm (20 mils) for non-reinforced geomembrane and for scrim reinforced geomembranes a common minimum weight is 20 kg/100 square meter (40 lbs./1000 square feet). For stockpile cover geomembranes, a commonly used minimum thickness is 0.25 mm (10 mils) for non-reinforced geomembrane and for scrim reinforced geomembranes a common minimum weight is 13 kg/100 square meter 26 lbs./1000 square feet.

Section 02 56 13.16 GEOMEMBRANE WASTE CONTAINMENT includes substantial levels of effort for construction quality control and construction quality assurance (CQC/CQA) that are meant to ensure performance when geomembranes are used in long-term applications like a landfill. For use of geomembranes in temporary stockpiles of contaminated soils, the designer should consider reducing the level of CQC/CQA in Section 02 56 13.16 GEOMEMBRANE WASTE CONTAINMENT. Specific CQC/CQA requirements that could be reduced include Qualifications, requirements for Layout and Detail Drawings, Tests/Inspections/Verifications of materials conducted off-site, and on-site CQA/CQC of Field Seams. Reduced material requirements for temporary applications of geomembranes can also be considered; instead of using HDPE geomembranes that are 1 mm (40 mil) or greater (typical for landfills), other materials such as PVC may be appropriate.

Provide geomembranes for lining [and][or] covering contaminated material stockpiles. Provide geomembranes in accordance with[Section 02 56 13.16

GEOMEMBRANE WASTE CONTAINMENT][_____] .

2.2 EQUIPMENT

2.2.1 Scales

NOTE: This paragraph is primarily intended to ensure that calibrated scales are being used to weigh excavated contaminated material, when weight is being used as the basis for measurement and payment. If off-site scales will be used (e.g. at a weighing station or disposal facility), this paragraph can be deleted.

Provide scales of sufficient length to permit simultaneous weighing of all axle loads and with an accuracy within 0.2 percent throughout the range of the scales. Ensure the scale's accuracy conforms to the applicable requirements of NIST HB 44 and is certified[by an acceptable scales company representative][by an inspector of the State Inspection Bureau charged with scales inspection within the state in which the project is located] prior to weighing any excavated contaminated material.[Locate the scales at the site of work.][Ensure the scales are capable of printing a weight ticket including time, date, truck number, and weight.] Perform a check of calibration of measuring equipment prior to initial use, and once every [7][_____] calendar days. The requirements of this paragraph do not apply to measurement of chemical data.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Surveys

NOTE: If payment for the project is based on a single job price or based on weight of material exported/imported from the site, then a highly accurate survey by a registered land surveyor may not be necessary. A lower level of effort in these cases could be to require the Contractor to survey only the excavation, using a handheld, sub-meter accurate GPS unit.

Perform surveys immediately prior to and after excavation of contaminated material to determine the volume of contaminated material removed. Provide cross-sections on [7.6][_____] meter [25][_____] foot intervals and at break points for all excavated areas. Survey and show locations of confirmation samples on the drawings. Perform surveys in accordance with Section: [_____] .

3.1.2 Conditions

Conduct a pre-installation examination of the on-site infrastructure, utility conduits, monitoring points, site access constraints, and infrastructure. Photographically document, with identifying labels, the existing condition of infrastructure and utilities, particularly for

comparison to post-excavation conditions. Verify locations of critical utilities that cannot be disrupted and those utilities that would potentially have significant impacts on excavation and public safety. Submit a [Pre-Installation Examination Report](#) documenting the examination activity. Obtain all necessary utility clearances before initiation of subsurface work.

3.1.3 [Pre-Construction Equipment Examination](#)

Conduct a pre-construction examination of the excavation equipment for any damage, defect, and dilapidation. Submit the results of the pre-construction examination to the Contracting Officer for review and information. The Contracting Officer may conduct an independent examination to ascertain the condition and functionality of the equipment. Based on this examination, the Contracting Officer has the right to reject any damaged, defective or dilapidated equipment. The cost associated with equipment or control replacement or repair, and delays caused by the rejection must be borne by the Contractor. Routinely and properly inspect and maintain the equipment to provide the project execution as required by the contract schedule. Any schedule delay and cost associated with power failure, improper functioning of equipment and controls, unavailability of labor and materials, etc., must be the responsibility of the Contractor.

3.2 PREPARATION

3.2.1 Mobilization

NOTE: Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES includes requirements for decontaminating equipment that has been used in contaminated zones. That section should be modified to extend decontamination/cleaning requirements to equipment being brought on-site to cover the requirements of this paragraph.

Do not mobilize to the site until the [Excavation Work Plan][_____] has been approved by the Contracting Officer and the Contractor has received written confirmation. Delays caused by the Contractor's failure to meet regulatory requirements must result in no additional cost to the Government. In accordance with[Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES][_____] , the equipment which is rented [and][or] previously used for other site remediation must be decontaminated and tested for contaminants of concern before being brought to the site.

3.2.2 Clearing

NOTE: Grubbing is typically not required at sites where contaminated soil is being excavated for treatment and/or disposal. Typically, vegetation that is cut off above a certain height is defined as clean and any stumps and brush below this height are defined as contaminated.

Perform clearing to the limits[shown on the drawings][defined in the Excavation Work Plan][_____] in accordance with[Section 31 11 00 CLEARING AND GRUBBING][_____].

3.3 CONTAMINATED MATERIAL REMOVAL

Notify the Contracting Officer [_____] calendar days prior to the start of excavation of contaminated material. The [Contracting Officer][Contractor] is responsible for contacting regulatory agencies in accordance with the applicable reporting requirements.

3.3.1 Excavation

NOTE: For large excavations, more than one excavation log may be required.

When the intent of excavation is to remove all contamination exceeding cleanup goals, the use of onsite field screening or field analysis (supported at a prescribed frequency by fixed laboratory analysis) should be encouraged to avoid prolonged delays or equipment downtime. Optional text is provided for using field screening/field analysis. Common field analytical tools include handheld X-ray fluorescence (XRF) analyzers for measuring metals concentrations, photoionization detector (PID) or flame ionization detectors (FID) for measuring volatile organics, and various field screening kits for measuring individual chemicals or groups of chemicals.

Excavate areas of contamination to meet the requirements in paragraph PERFORMANCE REQUIREMENTS.[After all material suspected of being contaminated has been removed, examine the excavation for evidence of contamination. If the excavation appears to be free of contamination, use field analysis to determine the presence of contamination using[a real time vapor monitoring instrument][X-ray fluorescence analyzer][immunoassay field kits][_____]. Calibrate and use field analysis equipment in accordance with manufacturer instructions[and the UFP QAPP]. Excavate additional material as directed by the Contracting Officer.] Maintain an excavation log describing visible signs of contamination encountered for each area of excavation. Prepare excavation logs in accordance with ASTM D5434.

Use methods and equipment that result in minimal disturbance to remaining soil beyond the excavation limits. Remove and dispose of any material that becomes contaminated as a result of the Contractor's operation at no additional cost to the Government. Stage operations to minimize the time the contaminated soil is exposed to the weather .

3.3.2 Shoring, Sloping, or Bracing

Implement shoring, sloping, bracing, or any other excavation health and safety requirements in accordance with[Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS][_____].

3.3.3 Dewatering

NOTE: Dewatering can significantly increase the cost of a project involving the excavation of contaminated material and should be carefully considered during design. UFC 3-220-05 Dewatering and Groundwater Control provides guidance on the design of dewatering systems.

If water from dewatering operations will be allowed to discharge onto the ground, a National Pollutant Discharge Elimination System (NPDES) permit for dewatering may be required (see Paragraph REGULATORY REQUIREMENTS Designer's Note for more details on permits). Reference the permits paragraph of Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for permit requirements.

Note that Section 31 00 00 EARTHWORK also includes dewatering requirements, but they are limited in scope and do not include any consideration of collection, treatment, sampling, or discharge of contaminated waters. If Section 31 00 00 EARTHWORK is included in the project, either delete dewatering requirements from that section or cut and paste the dewatering requirements from this section into Section 31 00 00.

Divert surface water to prevent entry into the excavation.[Limit dewatering to that necessary to assure adequate access, a safe excavation, prevent the spread of contamination, and to ensure that compaction requirements can be met.][Do not perform dewatering without prior approval of the Contracting Officer.] Conduct dewatering in accordance with the Dewatering and Leachate Management Plan developed as part of the Excavation Work Plan.

[3.3.3.1 Collection and Disposal of Incidental Contaminated Water

NOTE: Determine appropriate disposal method. Choose this paragraph when significant quantities of groundwater will not be encountered and only small amounts of rinse and other contaminated waters are expected.

Collect rinsewater. Collect ground, surface, and rain water contaminated by operations including water collected in the open excavation pit or temporary containment. Soak up with absorbent material so that no free liquid is present. Containerize, sample, and analyze contaminant absorbed material and dispose of as specified for contaminated soils.

]3.3.3.2 Collection, Treatment, and Discharge of Contaminated Water

NOTE: Choose these paragraphs when groundwater will be encountered or when significant amount of rinse

water or other contaminated water is expected, and on-site treatment is allowed. Typical treatment system consists of particulate/suspended solids removal by various means such as settling or filtration and contaminant removal by carbon filtration. Location of discharge for water after it is treated must be coordinated and approved by appropriate (EPA, State, station, local, and regional) authority.

Another option to consider is to containerize liquid and haul to off-site publicly-owned treatment works (POTW) with pretreatment capability, however this can be extremely costly for large quantities of water. Use unit pricing, assumed quantities, or some other method to give Contractor something to base bids on when water is to be taken off site. Where off site facilities are involved, verify such facilities exist, that they are permitted to accept, and that they will accept the liquid waste stream. Specification will require modifying for site specific requirements.

Furnish labor, materials, and equipment necessary for collecting, treating, and discharging of contaminated surface and subsurface water in excavations at the site. Conduct excavation and backfilling operations at the site in a manner that minimizes the amount of surface and subsurface water which may collect in the open excavation. Collect standing surface water in contact with contaminated material.

3.3.3.2.1 Subsurface Drainage

Remove water by pumping or other methods to prevent softening of surfaces exposed by excavation. Provide water treatment necessary to treat water to levels specified in the Dewatering and Leachate Management Plan. Operate dewatering system continuously until construction work below static water levels is complete. Submit [Dewatering Performance Records](#) weekly. Measure and record performance of the dewatering system at the same time each day by use of observation wells or piezometers installed in conjunction with the dewatering system.

3.3.3.2.2 Treatment System Requirements

The Contractor is responsible for all aspects of verifying design parameters designing, providing, installing, operating, maintaining, and removing collection, storage, and treatment facilities as required to discharge treated waters within the treatment limits required. The treatment system must:

- a. Be capable of removing contaminants to below the limit defined in the Dewatering and Leachate Management Plan for contaminated water.
- b. Include effluent holding tanks designed to allow on-site testing of water quality prior to discharge.
- c. Include recycle capability for retreatment of effluent not meeting the discharge requirements of this specification, as determined by on-site testing.

3.3.3.2.3 Treatment System Operations

Monitor, test, and adjust the treatment system in accordance with the Dewatering and Leachate Management Plan[and [UFP-QAPP][and basewide QAPP][____]], or as otherwise modified by special regulatory requirements. If there is a conflict between requirements, the more stringent requirement prevails.

3.3.3.2.4 Discharge of Treated Water

Do not discharge any water until tests results show water is below contaminated water limits as specified in the Dewatering and Leachate Management Plan. Provide erosion control at outlet of piping to minimize erosion. Discharge treated water to the [____].

3.3.3.2.5 Cleanup and Removal of Treatment System

Upon completion of work, close and remove from the site the surface water and groundwater treatment system. Decontaminate equipment in accordance with the[Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES][____]. Containerize, sample, test, and dispose of carbon, residues, cleaning aids, decontamination liquids, and waste as specified for the contaminated soils.

]3.3.4 Contaminated Material Storage

NOTE: For CERCLA sites, permits are not required to store hazardous waste in a stockpile. However, storage structures and conditions must be in compliance with the Applicable, Relevant, and Appropriate Regulations (ARARs). For RCRA sites, permits are required to store hazardous waste in a stockpile. However, for RCRA sites, hazardous waste can be stored in a drum or roll-off unit for up to 90 days without a permit.

For temporary storage of more than 90 days, dual containment of hazardous liquid and some hazardous solids may be required. Containment system requirements are described in 40 CFR 264.175. For stockpiles that meet the definition of a waste pile, see 40 CFR 264.250.

To provide secondary containment, tanks and roll-off units are sometimes stored on lined areas similar in design to what is described in paragraph Contaminated Material Stockpiles.

Place material in temporary storage[immediately after excavation][after treatment while awaiting test results]. The following paragraphs describe acceptable methods of material storage. Provide storage units that are in good condition and constructed of materials that are compatible with the material or liquid to be stored. If multiple storage units are required, clearly label each unit with an identification number and keep a written log to track the source of contaminated material in each temporary storage unit.

3.3.4.1 Contaminated Material Stockpiles

NOTE: Check state regulations to determine the minimum requirements for stockpiles and modify this paragraph accordingly. For contaminated material with high moisture content, the subgrade for the stockpile must be sloped and a sump should be provided.

For post treatment stockpiles, chemical testing is usually required to determine if material is contaminated or clean. Maximum stockpile size should be based on the required frequency of chemical testing. For example, if chemical tests are required at a frequency of one per 1,000 **cubic meters** **cubic yards**, then stockpiles should be no greater than 1,000 **cubic meters** **cubic yards** in size.

As noted in paragraph GEOMEMBRANE, the Designer may wish to reduce the level of CQC/CQA requirements if using Section 02 56 13.13 GEOMEMBRANE WASTE CONTAINMENT as the requirement for installation of the stockpile bottom liner.

Construct stockpiles to isolate stored contaminated material from the environment. Cover stockpiles at the end of each workday. Stockpile size greater than [_____] **cubic meters** **cubic yards** is prohibited. Construct stockpiles to include:

- a. [Place a geomembrane liner on a ground surface that is free of rocks greater than 13 mm 0.5 inches in diameter and any other object which could damage the membrane. Where multiple geomembrane panels are necessary to construct the liner, seam the panels together and test the seams in accordance with[manufacturer requirements][Section 02 56 13.13 GEOMEMBRANE WASTE CONTAINMENT]][Use pavement as the liner system. Construct pavement in accordance with Section [____]].
- b. Place a geomembrane cover over the stockpiles. Extend the cover material over the berms and anchor or ballast to prevent it from being removed or damaged by wind. Where multiple geomembrane panels are necessary to construct the cover, shingle the upslope panel over the downslope panel and overlap the panels at least [150][_____] mm [6][_____] inches. Secure the panels together using[ballast such as sandbags or tires][adhesives][thermal fusion seams][____].
- c. Construct berms surrounding the stockpile, a minimum of 300 mm 12 inches in height. Berm vehicle access points.
- d. Slope the liner system to allow collection of leachate. Construct sumps to facilitate removal of leachate from the stockpile. Store and remove liquid which collects in the stockpile, in accordance with paragraph[COLLECTION AND DISPOSAL OF INCIDENTAL CONTAMINATED WATER][COLLECTION, TREATMENT, AND DISCHARGE OF CONTAMINATED WATER].

3.3.4.2 Roll-Off Units

Use water-tight roll-off units to temporarily store contaminated material. Place a cover over the units to prevent precipitation from contacting the stored material. Remove liquid which collects inside the units and store in accordance with paragraph[COLLECTION AND DISPOSAL OF INCIDENTAL CONTAMINATED WATER][COLLECTION, TREATMENT, AND DISCHARGE OF CONTAMINATED WATER].

3.3.5 Backfilling and [Finishing][Finish] Operations

Backfill excavations immediately after all contaminated materials have been removed and confirmation test results have been approved. Conduct backfilling and [finishing][finish] operations in accordance with[Section 31 00 00 EARTHWORK][_____].

3.3.6 Treatment and Disposal of Excavated Contaminated Material

NOTE: If excavated contaminated materials will be taken off-site for treatment (if necessary) and disposal, select the first set of bracketed text. If on-site treatment will be used, select the second set of bracketed text and indicate the section(s) that define the onsite treatment.

[Perform offsite disposal of excavated contaminated material in accordance with Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS.][Perform treatment of excavated contaminated material onsite in accordance with Section [_____].]

[3.3.7 Closeout Report

NOTE: If there is a separate section in Division 01 that defines project close-out documentation, edited versions of this paragraph should be inserted in that section, and this paragraph deleted. In addition to progress photos, video has been used at some sites to record site activities.

Submit [_____] copies of a Closeout Report within [60][_____] calendar days of completing work at the site. Label the report with the contract number, project name, location, date, name of general Contractor, and the Government agency contracting for the work. As a minimum, include the following information:

- a. A cover letter signed by a[responsible company official][Professional Engineer registered in the State of [_____] who is a responsible company official] certifying that all services involved have been performed in accordance with the terms and conditions of the contract documents and regulatory requirements.
- b. A narrative report including, but not limited to, the following:
 - (1) site conditions, ground water elevation, and cleanup goals;

- (2) excavation logs;
 - (3) field screening readings;
 - (4) quantity of materials removed from each area of contamination;
 - (5) quantity of water/product removed during dewatering;
 - (6) sampling locations and sampling methods;
 - (7) sample collection data such as time of collection and method of preservation;
 - (8) sample chain-of-custody forms; and
 - (9) source of backfill.
- c. Copies of all chemical and physical test results.
 - d. Copies of all manifests and land disposal restriction notifications.
 - e. Copies of all certifications of final disposal signed by the responsible disposal facility official.
 - f. Waste profile sheets.
 - g. Scale drawings showing limits of each excavation, limits of contamination, known underground utilities within 15 m 50 feet of excavation, sample locations, and sample identification numbers. Show on-site stockpile, storage, treatment, loading, and disposal areas on the drawings. Provide separate cross-sections of each excavation area before and after excavation and after backfilling, based on survey data.
 - h. Progress Photographs. Use color photographs to document progress of the work. Take a minimum of four views of the site showing the location of the area of contamination, [entrance][exit] road, and any other notable site conditions before work begins. After work has been started, photographically record [daily][weekly] activities at each work location. Provide photographs including:
 - (1) Soil removal and sampling.
 - (2) Dewatering operations.
 - (3) Unanticipated events such as spills and the discovery of additional contaminated material.
 - (4) Contaminated material/water storage, handling, treatment, and transport.
 - (5) Site or task-specific employee respiratory and personal protection.
 - (6) Fill placement and grading.
 - (7) Post-construction photographs. After completion of work at each site, take a minimum of four views of each excavation site.

Include a digital version of all photos shown in the report with the Closure Report. Provide photographs with a minimum of 181.11 pixels per cm 300 pixels per inch resolution for all photo files. Provide photos in a lossless compression file format that does not lose any pixels in the compression process (e.g. .TIFF, .PNG, and .GIF). Ensure no loss of original resolution from the raw photo if converted to a lossless format. Create digital images and metadata that meet or exceed the specifications of the Exchangeable Image File Format (EXIF) version [____][2.3] or higher. In addition to the raw digital photo submissions, submit a PDF document as part of the Closeout Report displaying all required progress or other photos organized into separate documents. Render the photos in the PDF with a resolution that represents the original photo resolution to the human eye. Place photos according to their proper orientation (portrait or landscape). Create an index with bookmarks for each PDF organized by submittal section and suborganized by work area (if applicable) and then by date in the sequence which they were taken.

Process all raw photos for inclusion in the PDF submission with a border including a 13 mm 0.5 inch caption at the base of each photo for descriptive information. Include the following information for each photographic image in the caption:

Project Name
Contract Number
Contractor Name
Date
Station and Offset
Photo Number
Orientation View
Work Element Depicted
General Project Area

]3.4 FIELD QUALITY CONTROL

3.4.1 Tests

3.4.1.1 Sampling Excavations

NOTE: The number of confirmation samples must be based on the size of the excavation and regulatory requirements. For small excavations, a minimum of one sample should be taken from near the center of the excavation (or where there is the highest potential for contamination). It may be acceptable to change the number of samples during development of a UFP-QAPP, but the Designer should attempt to establish a reasonable sampling frequency in the specifications to provide a basis for the Contractor to bid the project. Additional samples may be oriented symmetrically relative to the center sample and the limits of the excavation. Incremental sampling should be considered as discussed below.

Many military facilities have base-wide sampling and analysis plans which have been approved by the applicable regulatory agencies. These plans may specify the number of confirmation samples which must be taken.

For larger excavations, EPA 230/02-89-042 Methods of Evaluation and Attainment of Cleanup Standards provides guidance on the design of statistically based sampling intervals.

With regulator approval, confirmation sampling and analysis may be accomplished using an averaging technique for comparison to cleanup criteria. This is based on the fact that most soil risk exposure scenarios do not model contamination as existing in discrete hot spots but as a more disperse phenomenon. Two ways to accomplish this averaging technique are to take discrete samples and average the data or by using an incremental sampling approach. Incremental sampling has an objective of obtaining a single sample per decision unit for laboratory analysis. Further information on incremental sampling can be found in the Interstate Technology Regulatory Council's Incremental Sampling Methodology (ISM-1), February 2012 and update (ISM-2), October 2020.

Confirmation sampling at a site with radioactive contamination in surface soils or on building surfaces will be performed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 Rev-1, EPA 402-R-97-016, Rev-1. This manual is a guide for confirmation survey design (planning) and for data evaluation. Its primary purpose is to acquire legally defensible data concerning the post excavation residual radioactivity at the site to demonstrate that the site meets release criteria.

The sentences regarding additional excavation would not be necessary if the project requirement is to only excavate a fixed volume of contaminated material as discussed in the Performance Requirements paragraph Designer's Note.

Collect excavation base and sidewall confirmation samples in accordance with the[UFP-QAPP][basewide QAPP][____], and this paragraph. Collect confirmation samples at a minimum frequency of one per [____] square meter square yard from the bottom [and each of the side walls]. Collect a minimum of one sample from the bottom [and each side wall] of the excavation. Collect samples as[discrete grabs][composites][incremental samples][____]. Analyze samples for the contaminants identified in paragraph PERFORMANCE REQUIREMENTS. Complete all other sampling and analysis activities in accordance with the[UFP-QAPP][basewide QAPP][____] (including but not limited to sample handling, preservation, transportation, [collection][analysis] of quality control samples, data validation, and data reporting). Any deviations to sampling frequency, number of samples, or sample collection methods must be[established in the approved[UFP-QAPP][basewide QAPP]][approved by the Contracting Officer].[Based on confirmation sample results, propose any additional excavation which may be required to remove material which is contaminated above the cleanup goals defined in paragraph PERFORMANCE REQUIREMENTS.

Additional excavation is subject to approval by the Contracting Officer.] Mark locations of samples in the field and document on the as-built drawings.

3.4.1.2 Sampling of Stored Material

NOTE: Additional samples are sometimes collected from excavated material to determine the contaminants present prior to treatment or disposal.

Composite samples are often collected from stockpiled material. However, composite samples cannot be taken if the samples are being analyzed for volatile organic contaminants.

At sites with radioactive contamination, ex-situ sampling of excavated material is typically performed to ensure that the material meets disposal facility acceptance criteria and, in some cases, to assist with the preparation of shipping papers. The ex-situ sampling regime is site-specific. It is usually determined in consultation with the disposal facility and its regulatory agency.

Collect samples of stored material in accordance with the[UFP-QAPP][basewide QAPP][_____] and this paragraph. Collect samples of stored material at a minimum frequency of once per [_____] cubic meters cubic yards. Collect samples as[discrete grabs][composites][incremental samples][_____]. Complete all other sampling and analysis activities in accordance with the[UFP-QAPP][basewide QAPP][_____] (including but not limited to sample handling, preservation, transportation, [collection][analysis] of quality control samples, data validation, and data reporting). Any deviations to sampling frequency, number of samples, or sample collection methods must be[established in the approved[UFP-QAPP][basewide QAPP]][approved by the Contracting Officer]. Test samples for the following parameters: [_____].

3.4.1.3 Sampling Beneath Storage Units

NOTE: At some sites, samples are collected to verify the soil underlying a contaminated material storage unit has not become contaminated due to leachate migration or mixing of contaminated soils with underlying soils .

Sampling along any connecting pipelines that transport contaminated liquid may also be appropriate. A standard practice is to sample at 6 m (20 foot) intervals under piping and at connections such as bends, elbows, or tees.

Collect samples from beneath storage units in accordance with the[UFP-QAPP][basewide QAPP][_____] and this paragraph. Collect samples from beneath each storage unit[prior to construction of and] after removal of the storage unit. Collect samples at a minimum frequency of one per each

[_____] square meter square yard from a depth interval of [0 to 0.15][_____] meters [0 to 0.5][_____] feet and analyze for the contaminants identified in paragraph PERFORMANCE REQUIREMENTS. Collect samples as[discrete grabs][composites][incremental samples][_____] . Complete all other sampling and analysis activities in accordance with the[UFP-QAPP][basewide QAPP][_____] (including but not limited to sample handling, preservation, transportation, [collection][analysis] of quality control samples, data validation, and data reporting). Any deviations to sampling frequency, number of samples, or sample collection methods must be[established in the approved[UFP-QAPP][basewide QAPP]][approved by the Contracting Officer].

If sample results from beneath storage units exceed the cleanup goals specified in paragraph PERFORMANCE REQUIREMENTS, remove soil which has become contaminated at no additional cost to the Government. Handle contaminated material which is removed from beneath the storage unit in accordance with paragraph TREATMENT AND DISPOSAL OF EXCAVATED CONTAMINATED MATERIAL. As directed by the Contracting Officer and at no additional cost to the Government, perform additional sampling and testing per the requirements of this paragraph to verify areas of contamination found beneath stockpiles have been excavated to below action levels.

3.4.1.4 Government Quality Assurance Testing

NOTE: The need for quality assurance testing should be considered on a project-by-project basis, and if not considered necessary this paragraph should be deleted. Factors to consider include whether the Government has access to a laboratory that can analyze quality assurance samples in a timely manner to not delay the project execution. If conducting quality assurance testing, a separate third-party quality assurance contract should be considered based on the qualifications of the Government QA personnel, and the size and importance of the project.

Use of quality assurance testing data also needs to be considered. A relatively straightforward data use is to compare quality assurance sample results to the project performance requirements, and failing result would be treated the same way as a failing Contractor test result. A more complicated data use is to compare results from quality assurance samples and contractor quality control samples for the purpose of determining if there is meaningful disagreement between the results. In this case, procedures would need to be developed for determining when there is a meaningful disagreement between quality assurance and quality control sample results; corrective actions for when a meaningful disagreement was identified would also need to be developed. The process of defining procedures for identifying and correcting meaningful differences should be documented in a project-specific CQA Plan or Quality Assurance Project Plan and referenced in this specification; the process is likely too complex to be adequately defined in this

specification.

Two options are provided for defining Government Quality Assurance. The first option is to defer details of the Government QA to a separate CQA Plan. This option would be preferred for large, complex projects where the excavation is one component of a larger process. A second, simpler option is provided to define Government QA testing frequency.

[Work will be monitored and tested in accordance with the requirements of the Construction Quality Assurance (CQA) Plan. Be aware of all monitoring and testing activities defined in the CQA Plan and account for these activities in the construction schedule. Quality Assurance testing and monitoring does not relieve the contractor of the responsibility to complete the quality control testing and monitoring defined in this specification section.

] [[Provide] [The Contracting Officer may provide] duplicate quality assurance samples to the Government's quality assurance laboratory at a frequency of one set of samples per [10][_____] sets of quality control tests performed. Quality assurance samples will be tested for the same parameters as the parent quality control sample. The Contracting Officer may require additional quality assurance tests as a result of failed quality assurance or quality control tests. Account for Government quality assurance testing in the construction schedule. Quality Assurance testing and monitoring does not relieve the contractor of the responsibility to complete the quality control testing and monitoring defined in this specification section.]

3.5 PROTECTION

Do not store or stockpile contaminated materials on excavation areas that have been completed and tested in accordance with paragraph FIELD QUALITY CONTROL.

-- End of Section --