SCOPE OF WORK
New Jersey Department of Environmental Protection (NJDEP)
New Jersey Geological and Water Survey (NJGWS)
Request for Sealed Bids (RFSB)
Offshore Vibracore Sampling 2014

The work under this contract includes collecting fifteen (15) vibracore sediment samples, with a NJDEP option for up to fifteen (15) additional vibracores. The additional cores would be collected during the same period of performance and at the discretion of the NJDEP.

All work shall be performed in the Atlantic Ocean, within twelve (12) nautical miles of the coastline, from Barnegat Inlet to Manasquan Inlet. Water depths in the survey area can extend to 80 feet below mean low water (MLW).

General specifications

It is the responsibility of the Vendor to be knowledgeable regarding potential hazards and/or restrictions in the coring areas. These potential hazards/restrictions include, but are not limited to, submarine cables, potential unexploded ordnance, and the location of major shipping channels. Any potential conflicts with vibracoring as a result of such hazards/restrictions should be immediately brought to the attention of the NJDEP Contract Officer.

Award of contract is contingent upon the Vendor submitting fully executed State required Delegated Purchasing Authority forms, which can be found at http://www.state.nj.us/treasury/purchase/forms/DPA_Form_Packet.pdf. (Note: PDF is more easily accessed via Internet Explorer®) In addition, contract award will be contingent upon the Vendor being registered with the State of New Jersey, Division of Revenue and possessing a valid Business Registration Certificate at time of contract work. Vendors that are not registered with the Division of Revenue can fill out a Business Registration Application, found at http://www.nj.gov/njbusiness/starting/

Location of vibracoring sites

The area of investigation will be provided to the vibracore Vendor at least twenty (20) business days prior to mobilization. Exact vibracore locations will be provided in latitude/longitude coordinates (ddmm.mmm) at least five (5) business days before the first day of vibracore operations. Any changes to the locations of the vibracore sites must have NJDEP approval prior to acquisition of vibracore.

Mobilization and demobilization

A. Mobilization

Mobilization shall consist of the delivery at the project site of all plant, equipment, materials and supplies to be furnished by the Vendor; the complete assembly in satisfactory working order of all such plant and equipment on the job; and the

satisfactory storage at the project site of all materials and supplies.

B. Demobilization

Demobilization shall consist of the removal from the project site of all plant and equipment after completion of the work.

Order of work

The order in which the vibracores are drilled will be at the Vendor's discretion, unless otherwise stated by the NJDEP Contracting Officer.

Sediment sample collection specifications

A. Positioning

The vibracores will be collected from locations furnished by the NJDEP Contracting Officer. These locations shall be designated by latitude/longitude coordinates (ddmm.mmm). The positioning of the vessel relative to the sample site locations shall meet standards outlined in the Corps of Engineers Hydrographic Surveying Manual, EM 1110-2-1003, dated 28 February 1991 for class 1 surveys (see Attachment 2, Table 3-2 from the manual). Positioning shall be determined immediately prior to the start of the vibracore boring at each location. Before each core is taken, the exact position and the water depth at that point shall be recorded. All elevations and depths shall be referenced to National Geodetic Vertical Datum (NGVD). Differential GPS positioning shall be used to locate the boat to within a fifty (50) foot radius of the coring location designated by the NJDEP Contract Officer.

B. Vibracore Borings

Vibracores comprising the surface of the bottom and sub-bottom and penetrating to a minimum depth of twenty (20) feet shall be obtained by pneumatic or hydraulically activated boring having a minimum diameter of three (3) inches, and shall be representative of the relative position of the bottom and sub-bottom strata. A transparent plastic rigid sampling tube of appropriate size that permits visual inspection of the cored material will be placed inside the coring tool prior to operation. The same tube shall be removed from the coring tool when the operation at a site has been completed. If necessary, packing will be inserted at both ends of the tube to prevent disturbance of the core during handling and shipping. The plastic tube with the sample shall be cut into five-foot length segments for ease of handling and appropriately marked as to the sequence of segments and sample location. Both ends of the segments will be sealed with plastic caps and plastic pressure sensitive tape. The plastic segments will be identified as to top and bottom of core sample. The depth of the top and bottom shall be printed on the top and bottom of each five-foot segment. The core identification number and the sample designation shall be recorded on each five-foot segment. The above shall be clearly and coherently marked on each five-foot segment with a waterproof marking ink. Cores that are missing sections or are mislabeled will negate completion (and corresponding payment) of that core.

The Vendor shall make every reasonable effort to reach the twenty (20) foot required drilling depth or penetration refusal. Penetration refusal is defined as a drop in the penetration rate to > sixty (60) seconds per foot of penetration, for a duration of not more than sixty (60) seconds. This is specified to prevent inflation of the core sample in the sampling sleeve

where core recovery exceeds penetration depth. Penetration will be determined with the use of a penetrometer and chart recorder. The depth of penetration shall be determined by measuring the depth to the vibrating core head and comparing it to the depth to the sediment surface. The calculation of penetration depth by the penetrometer will be to within 0.1 foot of actual penetration.

The objective depth of penetration is twenty (20) feet. It is recognized, however, that maximum penetration may not be achieved at all sample locations. When penetration refusal is met at less than twenty (20) feet, the Vendor will remove the sampled portion from the pipe, and a new liner will be inserted into the core pipe. A jet pump hose shall be attached to the tip of the core pipe just below the vibrator. The rig shall be lowered to the bottom and jetted down to the depth where the first part met refusal. The jet will then be turned off and the vibrator turned on, taking the additional part of the core. Retries will be accomplished until penetration has reached twenty (20) foot or until, at the discretion of the NJDEP Contracting Officer, two retries have been attempted. The coring device shall recover a minimum of ninety (90) percent of the unconsolidated strata through which it has penetrated. The percent recovery will be measured by placing a tape measure, with a weighted end, down the top of the retrieved core to measure the distance to the top of the sediment in the core. This value will be compared to the measured depth of penetration to calculate percent recovery.

C. UXO (Unexploded Ordnance) Screening Specifications

The Vendor will follow the screening protocol as detailed in the NJ Geological and Water Survey Technical Memorandum: Geophysical Prove-out for UXO Detection in Marine Vibracore (see Attachment 1).

a. The Vendor shall provide written notification to the NJDEP Contract Officer not less than three (3) days prior to sampling mobilization that she/he has reviewed the NJGWS UXO screening protocol, and that the Vendor has acquired and operated the required screening tools, as stipulated in the Protocol referenced above.
b. If NJDEP personnel are on the vessel, **Section 1: UXO screening aboard vibracore acquisition vessel** is to be followed.
c. In the event that NJDEP personnel are not on the vessel during acquisition, Section 1 or 2 may be followed at the discretion of the Vendor.
d. If the Vendor is to perform the UXO screening procedures, a qualified geophysical technician must perform the screening. These qualifications are to be documented and made available to the NJDEP Contracting Officer no less than three (3) days prior to mobilization for NJDEP approval.
e. Core samples from which a segment has been excised as a result of UXO screening must be labeled to identify the interval of the excised core segment, and the top and bottom measurements on either side of the excised segment.

D. Equipment Specifications

In the event that the bidder cannot meet the equipment specifications at the time of bidding, a performance capability must be demonstrated no less than three (3) days prior to sampling mobilization, and approved by the NJDEP Contract Officer. Also at that time, the bidder must demonstrate that the required equipment has been obtained and can be operated with the

required skill and expertise to provide the vibracore samples.

a. Minimum specifications, Vibracore tool requirements:
   i. Air compressor, 375 CFM at 120 PSI minimum
   ii. Winch or crane with 10-ton minimum line pull and ¾" wire rope

b. Minimum specifications, Jetting system requirements:
   i. High-pressure hose
   ii. Jet pump, 300 GPM and 100 PSI rating

c. Minimum real-time logging system specifications:
   i. A real-time penetrometer, consisting of the following or equivalent:
      a) a vibration-resistant digital encoder for measuring down core distance;
      b) a digital counter, capable of working in feet, connected to the encoder
         via an abrasion- and water-resistant cable; and
      c) corelog software
   ii. The penetrometer records must post real-time penetration rate (feet/minute).
   iii. The penetrometer must be in continuous operation during vibracoring.
   iv. The penetrometer records must be visible to NJDEP personnel, if present during coring, to confirm penetration depth, and penetration rate measurements.
   v. Computer processing of the data to provide penetration graphs for each core, including penetration depth as a function of time (see Attachment 2, a sample penetration graph)
   vi. Capability to furnish a copy of the penetration graph for each core at the time of drilling to NJDEP scientists for on-board evaluation and drilling decisions.

Records

a. The Vendor shall maintain records of all work performed in this contract. The originals shall be furnished to the NJDEP Contracting Officer upon completion of the work.

b. The Vendor shall provide the final, actual location of where each vibracore was drilled, reported in latitude/longitude and NJ State Plane (nad83) coordinates.

c. In addition to the above records, daily records shall be maintained on the operation and shall include the date, operating port area, times of departure from the dock, times the work commences, completed cores that day, weather, state of the sea and remarks. A complete copy of the daily records shall be provided to the NJDEP Contracting Officer in the final written and digital report.

d. Electronic data sheets that include an entry for each vibracore drilled shall be maintained during the work and delivered to the NJDEP Contracting Officer at the completion of the work. The sheets shall include the date, location, core number, water depth, depth of drilling of each run, and percent recovered. Copies of all penetrometer charts showing the rate of penetration, coupled with vibratory energy output, for the entire depth of each core shall be delivered with the data sheets in the final written and

digital report. Visual descriptions for each core, based upon the materials observed during the sectioning of the cores, also will be submitted in the final written and digital report.

Shipping

All vibracores shall be cut into five-foot segments and labeled as directed above. NJDEP will take possession of the cores at the dock area at the completion of the work. The Vendor will conduct an inventory of the core segments at the dock area to guarantee that all sections of drilled cores are transferred to the NJDEP. NJDEP will review the inventory at the transfer.

NJDEP-furnished materials

Map showing areas of coring; coring locations provided in latitude/longitude coordinates.

Vertical control point and benchmark descriptions

The Vendor may establish vertical control by accessing tide gauge data from NOAA (National Oceanic and Atmospheric Administration) on their website at www.tidesandcurrents.noaa.gov.

Submissions

All records described in the section entitled "Records" above shall be delivered to the NJDEP upon completion of the contract work in hard copy and digital format. Specifically, this includes:

1. Summary Report of Vendor's Operations, Equipment and Personnel, including:
   a. Survey Vessel
   b. Positioning System
   c. Navigation data acquisition and logging system
   d. Echosounder
   e. Vibracoring Tool
   f. Personnel, including the vessel captain, field supervisor, navigator, driller, geophysical technician for UXO screening
   g. Field Methods

2. Vendor's daily records,

3. Electronic data sheets for each run of each core

4. Copies of original penetrometer graphs for each run of each core

5. Table in digital format, listing:
   a. Core Number
   b. Run Number
   c. Date of Drilling
   d. Time of Drilling (local time, hr:min:sec am/pm)
   e. Actual Drilling Location (lat/lon, in ddmm.mmm, and NJ state plane coordinates)
   f. Corrected Water Depth (in feet)
   g. Depth of Penetration (in feet)

h. Amount Recovered (in feet)

Period of performance

The Vendor shall deliver all the vibracore samples by October 31, 2014. All data records compiled in digital and hard copy shall be delivered to NJGWS by November 7, 2014. This schedule is subject to adjustment by the NJDEP Contract Officer, in writing, for conditions beyond the control of the parties hereto.

Inspection

The work will be conducted under the general direction of the NJDEP State Contract Manager. The work shall be subject to inspection by the Contracting Officer or that person's representatives to ensure strict compliance with the terms of the contract. There will be berths/food on board for up to two NJDEP staff who may be observing the collection and handling of the samples. The presence of the NJDEP inspector(s) shall not relieve the Vendor of responsibility for the proper execution of the work in accordance with the specifications.

Scheduling of work

In an effort to support scheduling and planning of NJDEP personnel, the Contractor will inform the NJDEP of the coring dates as soon as possible. Coring will be scheduled such that NJDEP personnel may be rotated on board as inspectors.

Compensation to the Vendor

In consideration of the work and services provided, the Vendor shall be paid according to the following categories, which constitute payment for all work and services to be performed under this work order, and for all expenditures that may be made and expenses incurred as otherwise provided herein.

a. Payment for mobilization/demobilization (Item 1) - Payment for Vendor's costs for mobilization to, and demobilization from, work site at beginning and completion of job, respectively.

b. Payment for vibracore borings (Item 2) – Payment for this work will be made for the actual number of borings completed and accepted in accordance with the requirements listed above.

Option for additional work

Depending on the total cost of the job, NJDEP reserves the right at award of the purchase order to purchase up to an additional 15 vibracores to be collected under this purchase order. Any additional cores would be located within the same general area as the original 15 cores. If this option is exercised, the Vendor will be reimbursed for the additional vibracores at the same price per core as the original 15 cores.

ATTACHMENT #1

For Release to Request For Sealed Bids NJGWS Vibracore Contractors
Geophysical Prove-out and Protocol for UXO Detection in Marine Vibracore
NJGWS Geophysical Technical Memorandum

Any use of trade, product or firm names herein is for descriptive purposes only and does not imply endorsement by the New Jersey State Government.

Introduction

The New Jersey Geological and Water Survey (NJGWS) collects marine vibracores as a part of its geological mapping project for beach nourishment sand resources. Recent offshore dredging has encountered unexploded ordnance (UXO) from **areas not previously identified as an area of munitions and explosives of concern (MEC)** or munitions and explosives of concern/munitions constituents (MEC/MC). This occurrence raises the possibility that UXO may unintentionally be collected in a marine vibracore.

To address UXO in marine vibracore, the NJGWS uses a protocol that is based on the results of an NJGWS/New Jersey State Police (NJSP) Arson/Bomb Unit simulation test called a geophysical prove-out (GPO). The geophysical prove-out follows the guidelines in USACE Engineer Pamphlet EP-75-1-2 [Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HRTW) and Construction Activities] and Geophysical Prove-Outs for Munitions Response Projects prepared by the Interstate Technology & Regulatory Council, Unexploded Ordnance Team. Of particular note was that the NJGWS/NJSP prove-out addresses the detection of both ferrous and non-ferrous ordnance.

Methods

The NJGWS and NJSP tested several simulations using types of ordnance that may be found in New Jersey's offshore areas.

Representatives from the NJSP Arson/Bomb Unit and the NJGWS conducted a geophysical prove-out using simulated vibracores on 12/12/2007 and 1/8/08. The NJSP provided several examples of the type of ordnance that may be found in NJ's offshore areas (figs. 1, 2, and 3).

Tests were conducted using simulated cores that mimic actual cores commonly collected in the offshore New Jersey marine environment. A 1- to 2- foot long clear PVC core sleeve was filled with sediment. The core plastic sleeve is 0.15 inches thick with an internal diameter of 3.5 inches. The test cores were filled with medium-grained quartz sand derived from previously sampled offshore vibracores.

Different ordnance types, both ferrous and non-ferrous (fuse type) supplied by the NJSP (figs. 1-3) were buried within the sediment-filled core tubes and the tubes were capped. Cores were tested first with dry sand and then flooded with salt water to saturation (figs. 4, 5, and 6). The saturated cores would indicate if the electrically conductive salt water would prevent ordnance detection. Core tubes were placed on a wooden platform supported by steel sawhorses. The steel sawhorses simulate typical

background metallic material found aboard a marine vessel which may interfere with detection.

Three detection units were tested. A Torfino Enterprises Inc, Metal-TEC™, a hand-held (electromagnetic) metal detector (figure 4) and a Schonstedt GA 52CX™ magnetic locator (figure 5) were evaluated on 12/12/07 and a Garrett SuperScanner™ (electromagnetic) (figure 6) was tested on cores on 1/08/08. The Metal-TEC™ and SuperScanner™ are law enforcement equipment. The Schonstedt GA 52CX™ is primarily used as an underground metal locator.

Results

It is important that non-ferrous UXO fuses can be detected in a screening process since they may pose an equal or greater danger than ferrous ordnance. The results of the test are summarized in table 1.

	Ferrous (dry core)	**Ferrous (flooded)**	**Non-ferrous (dry)**	**Non-Ferrous (flooded)**
Schonstedt GA 52CX™	Detected	Detected	Not detected	Not detected
Metal-TEC™	Detected (multiple scans)	Detected (multiple scans)	Detected (multiple scans)	Detected (multiple scans)
Garrett SuperScanner™	Detected	Detected	Detected	Detected

Table 1. Summary of geophysical prove-out for UXO in vibracore

The Schonstedt GA 52CX™, by its design, and in practice, was not able to detect the non-ferrous ordnance. All units were able to detect the ferrous ordnance; however the Schonstedt GA 52CX™ was also adversely affected by the metal sawhorses that simulated conditions on the boat.

The Metal-TEC™ was able to detect the fuse and ferrous ordnance with multiple passes at different orientations to effectively screen the core volume. The SuperScanner™ was able to detect ferrous and non-ferrous UXO without difficulty in one pass penetrating the entire core thickness. The SuperScanner™ has a larger coil and a lower electromagnetic operating frequency than the Metal-TEC™. The SuperScanner's interference elimination feature was able to further delineate the UXO and minimize cultural noise effects. The SuperScanner™ was the best of all three at resolving the target size of both ferrous and non-ferrous UXO in the vibracore.

Disscussion/Conclusions

The likelihood of UXO recovery as a part of the vibracore acquisition process is low, yet it is possible. The use of an electromagnetic instrument for detection was found to be most effective to identify both ferrous and non-ferrous material. Of the three units tested, the Garrett SuperScanner™ was best able to detect and resolve sampled UXO in vibracore. The NJGWS and NJSP developed a mutually acceptable protocol using this device for both onboard and dockside screening of UXO. The geophysical prove-out demonstrated that an effective screening procedure could be low-cost and take only a few minutes per core.

Protocol

Section 1: UXO screening aboard vibracore acquisition vessel. This is an addendum to step 6 in Protocol for Vibracore Acquisition (personal communication, Jane Uptegrove, NJGWS, October 2007).

1) The protocol is to be reviewed and accepted by the vibracore contractors, vessel operators and crew prior to coring operations. At the start of the acquisition day, at least two operating Garrett SuperScanners™ (one for scanning and one for backup) must be present on board.
2) Upon removal of the vibracore sleeve from the core barrel, the entire length of core should be placed on a nonmetal stand or support for cutting into lengths (usually 5 ft intervals). The stand must be at least 1 foot away from any metal bulkhead in order to reduce cultural interference effects on the UXO detection unit. The core will be marked and measured.
3) Prior to cutting the core, the vibracore crew will allow the geophysical technician to scan the length of the core with the Garrett SuperScanner™ using the following procedure:
    a. The SuperScanner™ will be tested prior to core scanning using a metal object such as a metal ring or watch for control.
    b. The technician will pass the SuperScanner™ over the core in several passes using a range of orientations of sensor to core. Typically scanning a 20 foot core will take 1-2 minutes.
    c. Any positive detection will be confirmed by multiple passes and use the interference elimination feature of the SuperScanner™.
    d. The length of positive detection limits will be marked.
4) If a positive detection zone is located, the vibracore crew will first excise the core 1 foot on either side of the positive detection zone and dispose of the section overboard. The vibracore technician and NJGWS staff will make note of the detection and record the location of the disposal.
5) The vibracore crew will proceed using the NJGWS vibracore acquisition protocol.

Section 2: UXO screening upon receipt of cut-to-length vibracores. To be used when the NJGWS receives cut-to-length vibracores that have either not been screened or have been screened using a method that has not been demonstrated (by geophysical prove-out) to detect both ferrous and non-ferrous UXO. This protocol can be used dockside, at a contractor facility, or at the NJGWS shop.

1) As soon as possible, the NJGWS should set up a UXO screening station where core can be processed prior to loading on vehicles or placed in storage. The stand must be at least 1 foot away from any metal bulkhead or object in order to reduce cultural interference effects on the UXO detection unit.
2) The geophysical technician will scan the length of the core with the Garrett SuperScanner™ using the following procedure:
    a. The SuperScanner™ will be tested prior to core scanning using a metal object such as a metal ring or watch for control.

b. The technician will pass the SuperScanner™ over the core in several passes using a range of orientations of sensor to core. Typically scanning a cut 20 foot core will take 1-2 minutes.
c. Any positive detection will be confirmed by multiple passes and use the interference elimination feature of the SuperScanner™.
d. The length of positive detection limits will be marked.

3) If a positive detection zone is located, the vibracore crew will mark the location of the positive detection zone, and set the core aside. Promptly contact the New Jersey State Police (NJSP) Bomb Squad Unit for handling and disposal.

Figure 1. Ferrous projectile with non-ferrous brasscasing (left) and Metal-TEC detector™ (right).

Figure 2. Ferrous projectile with non-ferrous brass casing.

Figure 3. Non-ferrous (brass) fuse.

Figure 4. Geophysical prove-out using Metal-TEC™ detector.

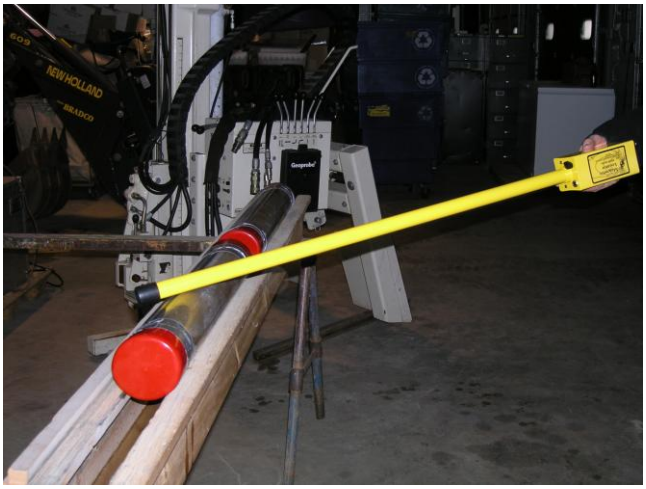

Figure 5. Geophysical prove-out using Schonstedt GA 52CX™ detector.

Figure 6. Geophysical prove-out using Garrett SuperScanner™ detector.

References

The Interstate Technology & Regulatory Council Unexploded Ordnance Team, 2004, Geophysical Prove-Outs for Munitions Response Projects, Interstate Technology & Regulatory Council, 444 North Capitol Street, NW, Suite 445, Washington, DC 20001 2 pages.

U.S. Army Corps of Engineers (USACE), 1999, Engineer Pamphlet EP-75-1-2, Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, and Radioactive Waste (HRTW) and Construction Activities, Washington D.C., 80 pages.

ATTACHMENT #2

Example of Penetration Graph

Date: 8/20/2005
Start Time: 12:01:52 PM
End Time: 12:08:36 PM

Penetration: 19.30 ft
Recovery: 19.8
W. D. Corrected: 29.6
W. D. Raw: 33.5

Easting: 365421.0
Northing: 16155.8
Coord. System: NJ NAD 83

Lat: 38 52.6109'N
Long: 74 56.7054'W
Datum: WGS-84

Comment: