

COASTAL PLANNING & ENGINEERING OF NORTH CAROLINA, INC.

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December 23, 2013

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Subject: Final Report and Submission of Geological Data (BOEM Authorization for Geological Prospecting for Mineral Resources or Scientific Research on the Outer Continental Shelf Related to Mineral Other Than Oil, Gas, and Sulphur: Authorization Number E13-001)

Mr. Layton:

This letter serves as a final report and submittal of geological data associated with the reconnaissance washbore activities authorized by Bureau of Ocean Energy Management (BOEM) Authorization E13-001.

Coastal Planning & Engineering of North Carolina, Inc. (CPE-NC) requested authorization from BOEM in order to conduct a reconnaissance sand resource survey to determine the estimates of quantity and quality of sediments located in Federal waters offshore Kill Devil Hills, North Carolina. The method proposed for this reconnaissance survey was to conduct SCUBA diver operated washbores (jetprobes) at up to 50 sites located in two potential sand areas. A crew of 4 scientists and technicians mobilized to Nags Head, North Carolina on Wednesday, September 4th, 2013. The crew mobilized the 28 ft. *M/V CPE Survey Vessel* (Parker 2006 28SCXL) at the Oregon Inlet Fishing Center. Washbore operations began on Thursday, September 5th. Weather conditions on Friday, September 6th were not conducive to field activities. The crew conducted the remainder of the washbore surveys between Saturday, September 7th and Monday, September 9th. This work was conducted under a contract between CPE-NC and the Town of Kill Devil Hills.

Over the four days of operations a total of 29 washbore surveys were conducted (See Attachment 1 - Maps). At each location the proposed methodology was to collect a grab sample of the undisturbed seafloor surface, a second sample of the spoils that were jettied out of the washbore hole from the maximum depth penetrated, and a third sample to be taken of the spoils that were jettied out of the washbore at ½ the depth of maximum penetration. At most locations all three samples were obtained; however depending on the maximum penetrations depth and type of material encountered at some locations less than three (3) samples were obtained. In total 80 grab samples were collected during the survey.

Daily Logs:

Day 1. September 5, 2013: Depart Oregon Inlet Fishing Center at 7:00 a.m. Arrive in Vicinity of survey area at 8:30. 8 washbore surveys (DCJP-13-01 through DCJP-13-08) were conducted on Day 1. All 8 surveys were conducted within Area 1. Arrive back at Oregon Inlet Fishing Center at 6:45 p.m. Weather conditions throughout the day were calm with seas less than 2 feet and wind between 0 and 10 mph.

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- Day 2. September 7, 2013: Depart Oregon Inlet Fishing Center at 8:30 a.m. Arrive in Vicinity of survey area at 10:10 a.m. 4 washbore surveys (DCJP-13-09 through DCJP-13-12) were conducted on Day 2. All 4 surveys were conducted within Area 1. Arrive back at Oregon Inlet Fishing Center at 6:25 p.m. Weather conditions throughout the day were rough. Wind in the morning was 10-15 kt out of the NE with seas of 3 ft. at 5 sec periods. Conditions improved throughout the day with wind subsiding to 8 – 10 kt and seas in the 2-3 ft. range with longer periods.
- Day 3. September 8, 2013: Depart Oregon Inlet Fishing Center at 7:15 a.m. Arrive in Vicinity of survey area at 8:10. 8 washbore surveys (DCJP-13-13 through DCJP-13-20) were conducted on Day 3. The first 3 surveys were conducted in Area 5 and the other 5 surveys were conducted within Area 1. Arrive back at Oregon Inlet Fishing Center at 6:35 p.m. Weather conditions throughout the day were moderate with seas around 2 feet and wind between 10 and 12 mph out of the west.
- Day 4. September 9, 2013: Depart Oregon Inlet Fishing Center at 7:20 a.m. Arrive in Vicinity of survey area at 7:50. 9 washbore surveys (DCJP-13-21 through DCJP-13-29) were conducted on Day 4. The first 4 surveys were conducted in State waters within 3 miles of the beach offshore the Town of Nags Head. 2 surveys were conducted in Area 5, and the final 3 surveys were conducted in Area 1. Arrive back at Oregon Inlet Fishing Center at 6:45 p.m. Weather conditions throughout the day were calm with seas between 1 - 2 feet and wind between 8 and 10 mph out of the NNE.

Environmental Observations:

During the course of the investigation no hydrocarbons were observed. The bottom characteristics range from fine sand to fine/medium sand with shell hash, shell fragments, and whole shells. Areas of fine sand tended to be devoid of macrofauna. Hermit crabs, starfish, sea robin and pinfish were occasionally spotted in areas where bottom substrates were composed of fine to medium sand with shell hash and shell fragments. Given the nature of the investigation methodology, no adverse effects on the environment, aquatic life, archeological resources, or other uses of the area occurred.

Data Products:

Observations made during the washbore surveys and data from grain size analysis conducted on select samples, were used to generate washbore (jetprobe) logs. A total of eighteen (18) samples underwent mechanical grain size analysis. Sieve analyses were conducted in accordance with American Society for Testing and Materials Standard Materials Designation (D422-63) for particle-size analysis of soils. This method covers the quantitative determination of the distribution of sand size particles. Mechanical sieving was accomplished using a calibrated sieve stack with a gradation of half phi intervals. Additional sieves representing key ASTM sediment classification boundaries were also used

Grain size results (distribution of particle sizes) were entered into the gINT[®] software program, which computes the mean and median grain size, sorting, and silt/clay percentages for each sample using the moment method (FOLK, 1974). A grain-size distribution curve for each sample was compiled. Washbore logs as well as granulometric reports and grain size distribution curves/histograms from the sieve analyses conducted are attached to this report.

Summary of Findings:

Observations made during the washbore operations as well as data generated from processing sediment samples suggest a high probability of sufficient quantities of beach compatible sand exists within the areas investigated. Based on this reconnaissance investigation, CPE-NC has recommended to local sponsors that a comprehensive marine sand

search investigation be conducted to further delineate the quantity and quality of sand resources in these areas. On December 5, 2013, CPE-NC submitted applications to conduct both geological and geophysical prospecting for sand sources in sub-sections of each of the areas surveyed during the washbore investigation.

Responsibilities of Recipients of Data:

The BOEM authorization (E13-001) required to conduct the reconnaissance washbore survey was issued to CPE-NC. As defined by the Authorization, the Town of Duck is considered a third party recipient of the data. Section VI (B) lists the responsibilities of all holders of this data including third party recipients. It is the Town's responsibility to understand their responsibilities as a holder of this data. As required under item 2 of Section VI (B), CPE-NC is advising the Town that accepting these obligations is a condition precedent of the sale, trade, license, or other agreement.

List of Attachments:

- Attachment 1 – Maps
- Attachment 2 – Sample Locations
- Attachment 3 – Washbore Logs
- Attachment 4 – Granularmetric Reports
- Attachment 5 – Grain Size Distribution Curves
- Attachment 6 – GIS Shapefiles (Digital Copies Only)
- Attachment 7 – Copy of BOEM Authorization E13-001

At this time, all activities associated with the washbore reconnaissance study are complete. Although this work was conducted under an agreement between CPE-NC and the Town of Kill Devil Hills, the Town of Kill Devil Hills provided written authorization to CPE-NC in a letter dated July 30, 2013, to share the information obtained through this reconnaissance investigation with the Town of Duck. Please feel free to contact me with any questions or comments regarding this submittal.

Very truly yours,

COASTAL PLANNING & ENGINEERING OF NORTH CAROLINA, INC.



Kenneth Willson
Project Manager