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Implementation of Construction Quality Assurance (CQA) Measures for Harbor Sediments and Processed Dredged Material (at Encap Golf Site Meadowlands, New Jersey)

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HERE IS THE PROBLEM

NJDEP approved the beneficial use of processed dredged material (PDM) as a grading and barrier layer fill for closure of four landfills in the Meadowlands, New Jersey. As part of to the New Jersey Department of Environmental protection (NJDEP) Remedial Action Work-plan conditions, the Site operator accepted to beneficially use PDM as grading fill and low permeability cover system.

On behalf of the New Jersey Department of Transportation Office of Maritime Resources (NJDOT OMR) the Center for Advanced Infrastructure and Transportation (CAIT) at Rutgers University performed Quality Assurance (QA) inspections for placement of PDM at the Site. The QA inspections were designed to determine whether utilization of PDM as construction fill at the upland sites is feasible.

AND, HERE IS THE SOLUTION…

Dredged sediments are saturated and difficult to handle. Addition of Portland cement reduces moisture content, resulting in increased workability. Proper placement and compaction requires further moisture reduction or moisture conditioning. Moisture reduction is accomplished by spreading PDM in thin layers (during favorable weather conditions), exposing it to sun and air. Continuous displacement using bulldozer blades or harrowing disks further accelerates the drying process. In cold seasons (once ambient temperature falls below 40°F), however, cement hydration and PDM solidification slows down and placement becomes costly. Stockpiling of PDM is not the preferred method of PDM handling. Double handling of PDM results in breaking of soil-cement bonds, thus reducing the strength. The PDM should have been placed in layers, sloped to allow drainage, moisture conditioned, and compacted.

THESE ARE OBJECTIVES OF THE STUDY…

The objectives included the provision of CQA services for activities related to the placement of PDM. Specifically, the scope of CQA Field Oversight included:

Oversight of those closure activities that are specifically related to placement of the PDM cap to ensure that the field operations are in compliance with the approved Closure Plan. The revised PDM CQC/QA Plan which includes engineering specifications for the PDM to be placed as impermeable cap was submitted to the NJDEP. These specifications include:

- A permeability not to exceed 1x 10^{-5} centimeters per second,
- An unconfined compressive strength of 2,000 lbs/sq. ft.,
- Compliance with the January 17, 2003 NJDEP AUD and all current NJDEP regulations regarding chemical analysis,
- Seventy-two hour trafficability. The proposed PDM CQC/QA Plan includes a trafficability restriction of no major rutting within 72 hours of final PDM placement.

CQA Oversight provided information on whether:

The preparation of the subgrade prior to material placement conformed to the approved Closure Plan,

- Pre-construction testing of the PDM were performed properly as per approved CQA/QC procedure,
- The PDM met the above engineering specifications following the final placement,
- PDM placement procedures and equipment utilized by placement contractor were appropriate relative to the nature of PDM,
- Sampling and testing conformed to the approved procedures,
- Results of the field and laboratory tests (performed by others) were reviewed and evaluated, and
- Necessary corrective measures were taken to satisfy the Closure Plan requirements.

HERE IS WHAT WE DID…

Provided monthly CQA inspections to ensure the above procedures were followed by the placement contractor and to report any deviations from those provisions to the state agencies.

CONCLUSION…

In summary, the following conclusions can be made from the results of this study:

Processed dredged material (PDM) has potential to be beneficially used as grading fill and low permeability cover material for capping of landfills. PDM handling and placement requires experienced contractors familiar with characteristics of PDM as well as challenges associated with proper placement of PDM. Ideally, PDM should be placed in favorable weather conditions (e.g. temperatures above 60 degrees) and in dry conditions. Double handling of PDM results in breaking of soil-cement bonds thus reducing the strength of the PDM.

WHAT IS THE NEXT STEP?

Further review of permeability test results is required to ensure the permeability requirement of 10^{-5} cm/sec is achieved.

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A final report is available online at
http://www.state.nj.us/transportation/research/research.html

If you would like a copy of the full report, please FAX the NJDOT, Division of Research and Technology, Technology Transfer Group at (609) 530-3722 or send an e-mail to **Research.Bureau@dot.state.nj.us** and ask for: **Implementation of Construction Quality Assurance (CQA) Measures for Harbor Sediments and Processed Dredged Material (at Encap Golf Site Meadowlands, New Jersey)**

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