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New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-4011



Thomas C. Jorling
Commissioner

SEP 15 1987

Mr. Richard Simberg, P.E.
Assistant Commissioner and Chief Engineer
NYS Department of Transportation
Building #5
NY State Office Building Campus
1220 Washington Avenue
Albany, New York 12232

RECEIVED

10/14/87 CMV

Dear Mr. Simberg:

Re: Request for Assistance in Performing Independent Soil Testing
for Clay Material to be Used for an Interim Landfill Cap for the
General Motors Industrial Landfill in Massena, New York
(Region 6, St. Lawrence County) Site Code 6-45-007

The landfill cap referenced above is currently in the initial stages of construction by O'Brien and Gere Technical Services, Inc. A fairly comprehensive program of field and laboratory testing of the cap materials will be performed by a subcontractor testing firm (Atlantic Testing, Inc.) The portion of the contract specification which covers this testing is enclosed as Attachment A. Independent oversight of the design and construction of this interim landfill cap is being provided by the New York State Department of Environmental Conservation (NYSDEC) and by the U.S. Environmental Protection Agency (USEPA) Region II Office.

A small amount of independent soils testing is currently being recommended by the NYSDEC as an independent verification or quality control check of the subcontractor testing laboratory and of the landfill cap construction. The interim cap specification calls for a minimum 12 inch thick clay layer compacted in six (6) inch lifts to a minimum in place density of 90 percent modified proctor (per ASTM D1557-78). The clay material must also have a permeability which is less than or equal to 1.0×10^{-7} .

At this time the NYSDEC does not have in-house capability for performing laboratory testing of soils materials. Since the amount of testing which appears to be necessary is fairly small, assistance in performing these tests is being requested from the New York State Department of Transportation, Engineering and Soil Mechanics Group. Please contact Mr. Jim Reagan of the Bureau of Eastern Remedial Action at (518) 457-5637 to discuss any additional technical aspects of the proposed testing program and to discuss reimbursement mechanisms to compensate the New York State Department of Transportation for the cost of the labor and materials expended in responding to this request.

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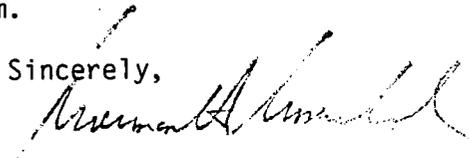
The total number of soil (clay) samples which would require testing is currently estimated to be between five and ten samples (total). It could possibly be as few as two or three samples total. Some or all of the following analyses would be required for each individual soil sample:

- A. Grain size distribution (hydrometer),
- B. Atterberg Limits (liquid limit, plastic limit, plasticity index),
- C. Permeability (in centimeters/second).

Standard test methods such as ASTM, U.S. Army Corps of Engineers, or equivalent test methods should be employed if possible to ensure comparability and validity of the test data. It is our understanding that individually bagged soil samples containing approximately 25 pounds of soil material (field or wet weight) would provide an adequate amount of soil sample to perform the requested analyses.

Should you have any questions concerning this proposed testing program, please contact Mr. Reagan. Thank you for any assistance which you are able to provide to complete this soils testing program.

Sincerely,



Norman H. Nosenchuck, P.E.
Director
Division of Solid and Hazardous Waste

Enclosure

cc: w/enc. - W. Moody, NYSDOT
G. Litwin, NYSDOH
C. Visnic, USEPA

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ATTACHMENT A

MATERIALS AND PERFORMANCE
COVER AND GRADING - SECTION 02500

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INDUSTRIAL LANDFILL
Grading Plan

Contract No. 10

General Motors Corporation
Body & Chassis Division

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MATERIALS AND PERFORMANCE
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PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Cover and grading work shall be performed at the Industrial Landfill in the areas indicated in the Contract Drawings. Cover Material shall be added so that there is a minimum of one foot of clay and 6" of topsoil with seed on top of the area designated in the Contract Drawings. In addition, grading work shall be performed so that there is a minimum slope of 4% in all areas where cover and grading activities are to be performed.
2. The work specified includes the excavation, backfilling, and compacting including the loosening, removing, working, transporting, storage, and fill of all cover and grading materials, as shown or specified, or as directed by the Engineer.

B. Related Work Specified Elsewhere
Topsoil Seeding - Section 02003

1.02 SUBMITTALS

- A. Source(s) of borrow materials.
- B. Laboratory certification of cover and grading materials including results of required testing in a construction certification report.

1.03 TESTING

- A. All testing involving field and laboratory services shall be performed by the Contractor.

PART 2 - PRODUCTS

- A. Type A - Cover Material shall be clay or clay loam from an off-site source. This material shall be free of brush, weeds, other extraneous litter, and free of roots and stumps. Additionally, this material shall be free of chert, cobbles or rock materials larger than four (4) inches in any dimension. This material may not be borrowed from within the Contract Work Area.
- B. For purposes of this Contract, clay or clay loam shall conform to the U.S.D.A. textural classification chart on Page 7 of the

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EPA Publication SW-867, "Evaluation of Cover System for Solid and Hazardous Waste." (See back pocket of this document).

- C. The source of cover material shall be tested in accordance with the following schedule:

<u>Test</u>	<u>Frequency</u>
Grain Size Analysis	1000 yd ³
Moisture Content	1000 yd ³
Liquid Limit and Plasticity Index	5000 yd ³
Moisture-Density Curve	5000 yd ³ and at material changes
Lab Permeability (Remolded Samples)	5000 yd ³

1. The cap and material shall be characterized as a clay material with a minimum of 30% of the particle sizes finer than a number 200 sieve size. The material shall have a Plasticity Index greater than 15; and a liquid limit greater than 30.
2. The cap and material shall have a remolded permeability of a maximum of 1×10^{-7} cm/sec (0.0000001 cm/sec) as identified by laboratory falling head permeability tests using a Triaxial apparatus with back pressure as indicated in the methods of the Army Corps of Engineers, Laboratory Soils Testing, Manual EM 110-2-1906, Appendix VII. The consolidation pressure applied to the sample during testing shall simulate the effective stress anticipated at mid-depth of the cap.
3. The Contractor shall submit testing methods (prior to conducting test), test results, and a certification from the approved soils testing laboratory that the cap materials meets the requirements of 1 and 2 above. In addition, the Contractor shall submit compaction curves (ASTM D-1557-78 Method C) for the proposed cap material. The results of all soils testing specified herein shall be submitted to the Owner for approval.

PART 3 - EXECUTION

3.01 SOIL COMPACTION EXPERIMENT

- A. Prior to initiation of the cover and grading activities, a soil compaction test will be conducted to establish compaction specifications and procedures to govern cover and grading work at the Industrial Landfill. The soil compaction experiment shall be performed in the following manner:

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- (1) The Engineer shall select three test areas in locations considered to be representative of the surface to receive cover and grading materials.
- (2) Each test area to be used in the experiment shall be at least twice as long and four times as wide as the sheepsfoot roller identified in subsection A(5) below.
- (3) Each test area to be used in the soil compaction experiment shall be cleared in a manner consistent with the requirements of subsection 3.03, Surface Preparation, below.
- (4) Only Type A Cover Material having a water content at time of placement within 3% dry and 3% wet of optimum water content for compaction as determined by laboratory tests shall be applied in the test areas. Moisture density relationship for Type A Cover Material shall be established by ASTM-D698 (standard proctor) method of testing. The lift thickness of compacted Cover Material shall not exceed six inches.
- (5) A sheepsfoot roller having a drum diameter of sixty inches shall be used to compact the Cover Material in the manner specified in subsection a(6) below.
- (6)(a) In each of the test areas, an initial lift of Cover Material shall be applied and compacted in an area twice as long and twice as wide as the roller while the roller drum is empty of fluid. The roller shall continue to make passes over such initial lift area until the sheepsfoot pads no longer significantly penetrate the Cover Material in the judgment of the Engineer. Two field densities measurements shall be performed in the relevant half of each test area in accordance with ASTM-D2922-78 method of testing. If the test results demonstrate that 90% of maximum dry density has been achieved in any test area section, the experiment shall be concluded in such test area.

(b) If 90% of maximum dry density is not achieved after compacting the initial lift using a roller with an empty drum in any test area section where additional Cover Material must still be added to achieve a one (1) foot minimum clay cover thickness, a second lift of Cover Material shall be applied and compacted using a roller with an empty drum and tested in the same manner described in (6)(a) above. If the test results demonstrate that 90% maximum dry density has been achieved after completion of the second lift in any test area

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section, the experiment shall be concluded in such test area.

- (c) If 90% of maximum dry density is not achieved after compacting the second lift using a roller with an empty drum in a test area section where a third lift must be added to achieve a one (1) foot minimum cover thickness, a final lift shall be applied, compacted and tested in the same manner described in subsections (6)(a) and (b) above. If test results demonstrate that 90% of maximum of dry density is achieved after compaction of the third lift, the experiment shall be concluded in such test area.
- (d) If 90% of maximum dry density is not achieved in any test area section after all Cover Material to be added has been applied and compacted using a sheepsfoot roller with an empty drum in accordance with the provisions of subsections (6)(a), (b) and (c) above, the drum of the sheepsfoot roller shall be filled with fluid before Cover Material is applied and compacted in the remaining half of the relevant test area or areas. The roller so filled shall make passes over the lift area until the sheepsfoot pads no longer significantly penetrate the Cover Material in the judgment of the Engineer. Two field density measurements shall be performed after compaction of each lift in the relevant test area section. The experiment shall be concluded in the relevant test area whenever such density measurements demonstrate that 90% of maximum dry density has been achieved in any lift or the maximum practical dry density less than 90% has been achieved following the test procedures outlined above.

- (7) The density for full-scale placement of the cover material shall be 90% of maximum dry density or the maximum practical dry density percentage ($\pm 2\%$) achieved for each of the three (3) added cover thicknesses as derived from the soil compaction experiment.

3.02 FIELD CONTROL OF THE FINAL COVER AND GRADING CONTOURS

The following will be undertaken to establish field control of final cover and grading contours:

- (1) Prior to placement of cover and grading materials, a fifty (50) foot grid shall be established by the Contractor over the area to be covered and graded. Survey control stakes shall be

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located and installed at each intersection point on the grid. The existing grade elevations shall be determined by the Contractor at each grade stake.

- (2) After installation of the cover and grading materials, the final grade elevations shall be verified by the Contractor on the 50-foot grid.
- (3) At the discretion of the Engineer, borings or probes may be taken after completion of the cover and grading activity at any 50-foot grid intersect to determine the actual total thickness of the cover in the area designated to receive cover material. If such borings or probes indicate that the total clay cover thickness is less than 12 inches, the Contractor shall be required to correct any deficiencies on the basis of the probes or borings. The Contractor shall correct any such deficiency within one (1) week after receiving notification from the Engineer of the deficiency.

3.03 SURFACE PREPARATION

- A. All areas within which cover and grading will be accomplished shall initially be cleared. All vegetation cleared from landfills surface shall be chipped and uniformed spread over the graded refuse.

3.04 GRADING AND COVER PLACEMENT AND COMPACTION

- A. Grading and Cover materials (Type A) shall be installed as shown on the Contract Drawings. These materials shall be compacted to the density determined during the soil compaction experiment. In-place density testing as required in accordance with the soil compaction experiment shall be performed by the Contractor with nine (9) in-place moisture-density tests made for every acre of compacted area per lift. Cover materials not meeting the densities determined during the soil compaction experiment shall be reworked as necessary and retested until such densities are achieved.
- B. Grading and Cover materials shall be installed in lift thicknesses not to exceed six (6) inches.
- C. A minimum of one (1) falling head permeability test (ASTM D-2434) shall be completed on each acre of compacted area. It is recommended that a one hundred (100) foot grid system be established to facilitate the permeability testing. Materials not meeting the required permeability shall be retested until such permeabilities are achieved.

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3.05 INSTALLATION

A. General

1. In all areas where cover and grading activities are performed, a resulting minimum slope of four (4) percent shall be constructed. Grading shall be performed such that satisfactory surface water drainage occurs during precipitation events in accordance with the Erosion Control Section.
2. Any settlement that occurs in the covered or graded area shall be refilled and compacted as directed by the Engineer.

B. Procedure

1. The water content of the cover and grading material shall be controlled during placement within the range of three (3) percent dry and three (3) percent wet of optimum moisture content. The Contractor shall perform all necessary work to adjust the placement water content within this range. Water content shall be checked by the Contractor on a daily basis.
2. Material shall be placed in a uniform lift to the extent possible to meet the final grades, and compacted using a sheepsfoot roller as described in 3.01 Soil Compaction Experiment.
3. Balls or clumps of cover material (Type A Fill) shall not exceed four (4) inches in greatest diameter. Any material exceeding these dimensions measured along any face shall be removed from the cover materials prior to cover placement and shall be considered spoil.
4. Lifts which do not meet the compaction requirements of this Section shall be removed at the Contractor's expense.
5. Where required, the Contractor shall add sufficient offsite water during the compaction effort to assure proper density. If due to rain or other causes, the material exceeds the optimum moisture content range for satisfactory compaction, it shall be allowed to dry, assisted by discing or harrowing, if necessary, before compaction is resumed.
6. If the compacted surface of any lift is too wet for proper compaction of the succeeding layer, the Contractor shall remove the lift, allow it to dry, or work the material with suitable equipment to reduce the water content to the allowable water content range. The lift must then be recompacted before placement of a succeeding lift.
7. The Contractor shall be required to seal the working surface from surface water infiltration at the end of each day or when a rain is expected. Sealing shall be accomplished by rolling the cover material with a smooth drum

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- roller or by applying polyethylene sheeting. Surface ponding of runoff on the cover surface will not be allowed.
8. Whenever the Contractor has sealed a lift, prior to placement of the next lift, the Contractor shall scarify the surface to a depth of two (2) inches with a harrow scarifier or other suitable equipment to provide a satisfactory surface for each succeeding lift.
 9. Compaction or consolidation achieved by traveling trucks, machines or other equipment shall not be accepted unless such procedures are approved by the Engineer and the compaction requirements of this Section are achieved.
 10. Following installation of the cover and grading material, spot elevations shall be taken on the material surface at the locations as directed by the Engineer, and as directed in Subsection 3.02 - Field Control of the Final Cover and Grading Contours.
 11. The Contractor shall minimize the exposed surface of the landfill in order to minimize the volatilization of PCBs and prevent their migration from the site.
 12. Filter fabric shall be placed on the landfill's graded surface before the installation of the clay cover. Fabric installation shall be in accordance with Section 02713.

3.06 STORAGE OF COVER AND GRADING MATERIALS

- A. All materials brought on-site for use as cover or grading material shall be stored at locations approved by the Engineer. Stored materials shall be kept neatly piled and trimmed.

3.07 HAULING MATERIALS ON STREETS

- A. When materials are hauled over public streets or pavements, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the streets and pavements clean and free from dirt, mud, stone and other hauled material. The Contractor is responsible for obtaining all state, county, and town permits, or variances to allow transport of any and all materials or equipment on public roadways.

3.08 DUST CONTROL

In the event that it becomes necessary in the opinion of the Engineer to provide the watering of surfaces to control the release of dust, such services shall be performed by the Contractor.

- END OF SECTION -

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