TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

31 January 2010

Dear Industry Colleagues,

Happy New Year!

In keeping with tradition, we take this time to offer you best wishes for a successful 2010, and news from TRI. We have just completed a successful 2009 effort and are giving thanks for the many blessings we have received in the face of substantial economic challenges associated with the global economy. TRI has not only survived but has continued to adapt and grow for continued service to our clients.

Staff Service to Industry

Sam Allen was re-elected to the Board of Directors of the Geosynthetic Institute as he finished his six year term as Chairman of the ASTM Committee D35 on Geosynthetics in late January 2010. In addition, Rick Thomas has been appointed to several Plastic Pipe Institute committees which is testament to his expertise in resin and recycled plastic technologies. Joel Sprague, P.E., TRI's Senior Engineer, continues to serve as Chairman of SubCommittee D35.01 on Geosynthetic Mechanical Properties while Richard Lacey, P.E, TRI's Quality Engineer serves as the Task Group Chairman for Hydraulic Transmissivity.

Of special note was 2009's unequalled TRI staff performance resulting in turnaround time records for all geotechnical, geosynthetic conformance/verification, and erosion control product testing. This was a result of the staff's long term tenure at TRI, vigorous equipment maintenance, achieved system efficiencies and 24-hour full time laboratory operations during peak demand periods.

TRI was pleased to continue our support of a graduate student at the University of Texas at Austin for geosynthetics-related research. TRI is now sponsoring our 6th student in this regard, with previous students achieving graduation and successful careers at many of our client's firms including Golder, AMEC, GeoSyntec and URS.

Laboratory Equipment, Infrastructure, Credentials and Growing Technologies

A laboratory's responsiveness is based largely on its own internal resources. Our growth in this regard is testament to your critical support and our continuing reputation as "the industry's lab". For this we are profoundly grateful.

Interface Friction / Direct Shear Testing

TRI's geosynthetic interface friction laboratory experienced an exceptional year in 2009. We were pleased to add and employ key laboratory equipment that substantially increased our position as a full service and rapid turnaround time laboratory. Most significant of these additions was the use of TRI's three unique low-load friction test frames designed to negate the bias associated with test system friction and the need for drag correction. Among many other key additions was a new inventory of specialized gripping plates that provide sheared systems with free access to water, superior efficiency of normal load distribution, and sure-lock gripping

based on the Allen & Fox (2007) research. TRI also added a GeoTest large scale direct shear box which has allowed us to contrast and compare the three major commercially available large scale shear boxes at loads between 1000 and 25000 psf and initiate research to further articulate these findings to the user community.

TRI's world-class friction testing lab now houses fifteen interface friction direct shear boxes. This capacity has assisted with TRI's unequalled turnaround time and service excellence as well as ongoing research projects. In addition to differing shear box designs, research efforts include ongoing GCL research investigating the hydration and accelerated consolidation procedures for GCLs and GCL interfaces, as well as sensitivity studies related to hydraulic design inputs for landfill cap slopes and related toe-drain design.

Geotechnical Testing

TRI's AASHTO accredited geotechnical laboratory has quickly become a preferred industry resource for varied projects including wind energy farms, earthen dams, and MSW landfills. TRI performs multi-stage, iso & anisotropic (K_o) triaxial shear strength tests. New for 2010 is our ability to test soil specimens with our direct simple shear apparatus. This laboratory enjoys 13 traditional 1-D consolidation frames and constant rate of strain consolidation capabilities. With three direct shear boxes TRI determines peak and residual strength for single and multi-stage specimens. In addition to this we have approximately 60 triaxial permeability chambers with permeameters for fastest turn around time.

Unsaturated Soils Testing

As evapotranspirative cover system become more and more common we have added the ability to determine the soil water characteristic curve using the hanging column, triaxial pressure plate, chilled mirror hygrometer, and the humidity chamber. TRI understands that different landfill closure systems exist and our testing capabilities are keeping pace with these new design needs.

Creep and Stress Rupture Testing

TRI continued to upgrade and expand its accelerated creep testing capabilities. The Stepped Isothermal Method (SIM) was developed at TRI and we remain the leaders in this important technology as both the pipe and geosynthetic reinforcement industries use this test for compliance testing. In addition to added SIM test chambers, TRI added several very large conventional creep frames for the testing of punched-drawn polyolefin uniaxial geogrids.

Sustained loading creep-rupture testing

Finally, as the thickness vs. time characteristics for geosynthetic planar drains are in increasing demand, TRI has responded with conventional and accelerated compression creep frames for

normal compressive loading as well as manufactured slope loading representing field specific evaluations.

Large-Scale Erosion Control Testing Laboratory

While 2006 achieved the successful development and activation of our large-scale erosion and sediment control testing facility, TRI's Denver Downs Research Facility (DDRF), outside of Greenville, South Carolina, achieved the first independent laboratory accreditation for this type of testing and research facility. On September 28, 2009, DDRF was granted the very first GAI-LAP accreditation for large scale erosion control testing procedures. TRI's DDRF accreditation includes the following tests.

DDRF covered slope erosion test facility

ASTM D5141 – 09, *Standard Test Method for Determining Filtering Efficiency and Flow Rate of the Filtration Component of a Sediment Retention Device Using Site-Specific Soil*

ASTM D6459 – 07, *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion*

ASTM D7351 – 07, *Standard Test Method for Determination of Sediment Retention Device Effectiveness in Sheet Flow Applications*

ASTM D6460 – 07, *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion*

In 2009, DDRF received a number of significant upgrades that accomplished three important goals.

1) The 3:1 slope testing facility is now housed in a covered structure with wind resistant walls (when needed) enabling year round testing to meet rapid turnaround time requirements.
2) The channel testing facility was upgraded to include test channels at 20, 30 and 40% grades, enabling better product characterization by variable slope inclination and hydraulic stress exposure.
3) A new wave tank facility was designed and constructed to research wave action on slopes, spillways and beachheads. This unique facility allows independent, third party investigations of new product ideas as well as failure analysis.

DDRF has never been more equipped and ready to accommodate the growing erosion control and water management industries. Additional information, including DDRF accreditation documentation, may be accessed at www.erosiontest.com.

Conformance/Verification Testing

Key to the continued 2009 growth of TRI conformance testing services was the significant increase of international ISO method driven testing, as well as large one-stop testing programs by very large multi-facility geosynthetic users. This growth has facilitated continued development of staff expertise, a growing repertoire of significant industry tests, a continuing active and robust quality improvement program, and a wealth of project management expertise for unparalleled customer service.

Several test procedures were added to TRI's GAI-LAP accreditation in 2009 including the following.

- ASTM D7056 *Standard Test Method for Determining the Tensile Shear Strength of Pre-Fabricated Bituminous Geomembrane Seams*
- ASTM D7101 *Standard Index Test Method for Determination of Unvegetated Rolled Erosion Control Product (RECP) Ability to Protect Soil from Rain Splash and Associated Runoff Under Bench-Scale Conditions*
- ASTM D7207 *Standard Test Method for Determination of Unvegetated Rolled Erosion Control Product (RECP) Ability to Protect Sand from Hydraulically-Induced Shear Stresses under Bench-Scale Conditions*
- ASTM D7238 *Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus*
- ASTM D7272 *Standard Test Method for Determining the Integrity of Seams Used in Joining Geomembranes by Pre-manufactured Taped Methods*
- ASTM D7275 *Standard Test Method for Tensile Properties of Bituminous Geomembranes (BGM)*
- ASTM D7322 *Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions*
- ASTM D7361 *Standard Test Method for Accelerated Compressive Creep of Geosynthetic Materials Based on Time-Temperature Superposition Using the Stepped Isothermal Method*
- ASTM D7406 *Standard Test Method for Time-Dependent (Creep) Deformation Under Constant Pressure for Geosynthetic Drainage Products*
- ASTM D7409 *Standard Test Method for Carboxyl End Group Content of Polyethylene Terephthalate (PET) Yarns*
- ASTM D7466 *Standard Test Method for Measuring the Asperity Height of Textured Geomembrane*
- ISO 527 *Plastics -- Determination of tensile properties*
- ISO 9864 *Geosynthetics -- Test method for the determination of mass per unit area of geotextiles and geotextile-related products*
- ISO 11058 *Geotextiles and geotextile-related products -- Determination of water permeability characteristics normal to the plane, without load*

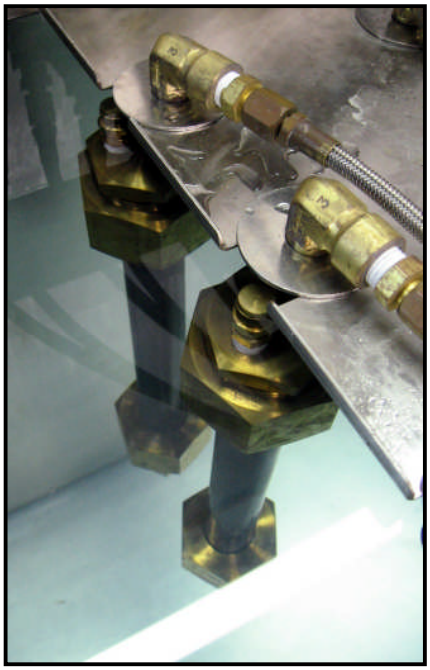
- ISO 12956 *Geotextiles and geotextile-related products -- Determination of the characteristic opening size*
- ISO 12958 *Geotextiles and geotextile-related products -- Determination of water flow capacity in their plane*
- ISO 12960 *Geotextiles and geotextile-related products -- Screening test method for determining the resistance to liquids*
- ISO 13426 *Geotextiles and geotextile-related products -- Strength of internal structural junctions -- Part 2: Geocomposites (Geocells)*
- ISO 13433 *Geosynthetics -- Dynamic perforation test (cone drop test)*

The significant increase in international work also facilitated the growth of in-plant sampling services, now established for geosynthetic manufacturing plants in countries around the world including Australia, and Egypt. Additional project management offices are now established in New Zealand, Egypt and Brazil.

TRI's addition of the tests above to our 2009-2010 accreditation continues our status as the number one accredited geosynthetics laboratory having more tests accredited than any other independent, third party testing facility, a testament to the continuing relevance and robust work of TRI's testing and research systems.

Plastic Pipe Testing Services

In 2009, TRI's continued its growth in pipe and pipe resin testing services via the addition of hydrostatic design basis burst (HDB) and long-term rupture testing. This crucial testing establishes the foundation of listed products in the gas pipe and pressure pipe industries, and TRI's services in this important area are already being engaged. TRI now offers a full compliment of plastic pipe testing services including the following.



HDB testing

- Hydrostatic Regression Testing according to ASTM D1598 and analysis according to D2837
- Hydrostatic Regression Testing and analysis according to ISO 9080
- Quick Burst testing according to ASTM D1599
- Sustained Pressure Testing (ASTM D1598 & ISO 1167)
- Accelerated Aging
- Slow Crack Growth Resistance
- Hydrostatic Design Basis (HDB) validation (PPI TR-3 Part X)

These tests work in concert with our already established service testing to AASHTO's National Transportation Product Evaluation Program (NTPEP) via our independent laboratory testing of plastic pipe and resins. TRI's experience with the study and testing of recycled resin streams is marking the completion of NCHRP Research Project 04-32 studying the feasibility of and developing a specification for the use of recycled HDPE in corrugated plastic pipe for highway applications. This research has been under the direction of Mr. Rick Thomas of TRI and has

significantly increased activity in plastic blending, stress crack resistance testing and thermal analysis. This key area of further development at TRI has established our services as a relevant, high quality one-stop testing and research center for plastic pipe and resins.

Updates on 3G Liner Integrity Survey (Leak Location) Test Equipment

Last year TRI-ICORP announced the offering of leak location equipment manufactured specifically for this application and to directly assist the field technician performing a leak location survey. This equipment is now being used routinely by over 29 field surveying technicians and has performed exceptionally well. More significantly, the 3G ownership community is robust with technical exchange, experience reports and ongoing technology development. In 2010, TRI-ICORP is offering a newly developed drag probe for use with the 3G meter in deep ponds and will be presenting a new 3G web-site soon. Stay tuned for additional electrical resistivity test short courses and training events.

3G detection meter

Conclusion

TRI appreciates your support and business, and this opportunity to share with you our efforts to continually improve as your choice for geosynthetic testing and research services. We are committed to what we do here at TRI and continue each year to bringing you the best, independent, third-party, most responsive service, assisting you to realize success with geosynthetic and geotechnical projects.

Please contact us if you have any questions, suggestions, or comments. We look forward to working with you in 2010.

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www.GeosyntheticTesting.com
www.ErosionTest.com
www.GeotechTesting.com