



**TRI**  
ENVIRONMENTAL, INC.

**CQA  
TRAINING  
WEEK**

**ONLINE REGISTRATION AVAILABLE**

**LINER INTEGRITY SURVEYS/  
ASSESSMENTS (LISA)**  
Days 1 & 2

**CONSTRUCTION QA/QC for  
GEOSYNTHETIC INSTALLATIONS**  
Day 3

**CONSTRUCTION QA/QC FOR  
COMPACTED CLAY LINER  
& GCL INSTALLATION**  
Day 4

**GEOSYNTHETIC CERTIFICATION  
INSTITUTE - INSPECTORS CERTIFICATION  
PROGRAM (GCI-ICP) EXAM**  
Day 5

Accredited Geosynthetics Laboratories  
Accreditation Designation # GAI-LAP-001



v020717

**LOCATION**

TRI/Environmental, Inc. | Bldg. A Facility | 9063 Bee Caves Rd. | Austin, TX 78733, USA

[www.GeosyntheticsTesting.com](http://www.GeosyntheticsTesting.com)

Create a new revenue center and provide growing, in-demand services to clients. LISA complements existing services offered by most CQA firms practicing in waste management. Water resource conservation, lined tanks, mining, and other sectors are now using LISA too.



This will be the **ONLY LISA** class to include the hands-on leak location practice at our test pad facility.



## LISA TRAINING, DAYS 1 & 2

A Liner Integrity Survey (Electrical Leak Location) is a state-of-the-art, nondestructive method of locating leaks in installed geomembranes. LIS equipment, rooted in geophysical measurement techniques, tests exposed and soil or water-covered geomembranes. TRI's training course disseminates the theoretical and hands-on knowledge required to perform and control the quality of LIS methods and equipment.

The course includes classroom and field training in multiple on-site test cells which simulate a variety of installed geomembrane conditions.

The Liner Integrity Surveys/Assessments (LISA) class provides the most up-to-date information on survey methods and standards (e.g., ASTM). It is ideal for companies interested in adding this service to their business lines, design engineers, CQA firms, site owners, and other stakeholders in geomembrane-utilizing sectors.

### LISA Certification

A multi-part certification process has been designed for survey performers. Graduates of this program:

- Understand the basis of geo-electrical leak testing
- Select the most appropriate LISA methodology under a variety of site circumstances
- Are able to perform each LISA method
- Know how to generate LISA reports
- Have on-going access to the resources of TRI as they begin to perform surveys for clients

The course, offered by the TRI-Corp Liner Integrity Center (T-CLIC), assists those who are interested in adding LISA to their business, as well as those who review LISA results for regulatory or client approval.

A proctored Level 2 ELIS Certification Exam will be offered for interested participants.

**Professionals who benefit from this course:**

- Specifying/Certifying Engineers
- Construction/Quality Assurance
- Project Managers
- Installers/Contractors
- Third-Party Inspectors
- Regulators



### **FIELD CQC / CQA TRAINING, DAYS 3 & 4**

These two 1-day courses may be taken singly or as a package. They are designed specifically for those who need a detailed understanding of proper CQC and CQA procedures at waste containment facilities.

The courses provide ideal preparation for the Geosynthetic Certification Institute's Inspectors Certification Program (GCI-ICP) exam.

Gain comprehensive understanding of:

- Preparing CQC/CQA plans
- Reviewing CQC/CQA plans
- Performing CQC/CQA observations and tests
- Reviewing field CQC/CQA procedures

Each course presents material that complements the other. Day 1 focuses on installation of geomembranes, geotextiles, geocomposites, geogrids, and geo-appurtenances. It includes demonstrations of geomembrane seaming and seam peel and shear testing. Day 2 focuses on the installation of compacted clay and geosynthetic clay liners (GCLs). Special emphasis will be given to establishing rationale and standard operating procedures for field inspections, documentation of test and visual observations, and implementation of CQA plans. A broad appreciation for the manufacture and installation of containment facility materials will be provided. Additionally, a tour of TRI's Geosynthetic Testing and Research Laboratories will support class curriculum through test demonstrations, details on some TRI internal R&D projects, and discussion of other relevant topics.



ONLINE REGISTRATION IS AVAILABLE

FOR THE COURSE AND EXAM HERE

## GCI-ICP CERTIFICATION EXAM, DAY 5

CQA course students will be allowed to sit for the Geosynthetic Certification Institute-Inspectors Certification Program (GCI-ICP) exams immediately following the CQA courses. All exam-interested students MUST REGISTER with the Geosynthetic Institute (GSI) and pay GSI's certification fee before the test. TRI does NOT collect this fee. Contact GSI (+1 610 522 8440) for more information.

## Exceptional Professional Development

LISA training and CQA of geosynthetics complement and expand opportunities for engineering consulting and design practice. CQA Week participants will be provided a certificate of course completion, suitable for use in proposals and statements of qualifications for CQC/CQA work. These unique programs provide professional growth and exceptional business development opportunities.

## WHERE TO STAY

- Holiday Inn Express Hotel & Suites, Austin-Sunset Valley, 4892 US Highway 290 West, Austin, TX 78733, 1 800 315 2621, 10 miles from airport, 9.9 miles from short course, NO shuttle service
- Extended StayAmerica Austin – Southwest, 5100 US Hwy. 290 W., Austin, TX 78735, Telephone: 512- 892-4272, 15.7 miles from airport, 9.54 miles from short course, NO shuttle service
- Sonesta Bee Cave Austin – 12525 Bee Cave Parkway, Bee Cave, TX 78738, Telephone: 512-483-5900, Call for a Reduced Rate - code: TXRES, 20 miles from airport, 5.2 miles from short course, NO shuttle service

## ABOUT TRI

TRI/Environmental, Inc. (TRI) has been active in geosynthetics testing, inspection and research and development for 20 years. TRI is an independent, third-party laboratory unaffiliated with any manufacturing, engineering/consulting, or construction management firm.

## REGISTRATION

Download registration forms for the courses and exams at:  
[www.GeosyntheticsTesting.com/](http://www.GeosyntheticsTesting.com/)

Online registration will be available.



Sam Allen



Abigail Gilson



Jeffrey Kuhn



Mark Sieracke

### **Sam Allen**

#### ***Vice President and Division Manager***

Sam Allen is the Vice President of Texas Research International's (TRI) Geosynthetics Services Division. He has served as Chairman of ASTM Committee D35 on Geosynthetics and currently serves on the Board of Directors of the Geosynthetic Institute (GSI).

### **Abigail Gilson, M.S., P.E.**

#### ***Senior Engineer for TRI/Environmental***

Abigail Gilson is a Senior Engineer for TRI/Environmental, Inc. and directs TRI's global liner integrity services. She has 13+ years and 90 million+ square feet of liner integrity survey / leak location experience. She has presented at conferences, published papers, and taught short courses around the world regarding the technical aspects of LIS methodologies. She is an expert in the LISA equipment offered by TRI, and she oversees equipment acquisition, operator certification, and field training.

### **Dr. Jeffrey Kuhn, P.E.**

#### ***Director of TRI Geotechnical Laboratory***

Dr. Jeffrey A. Kuhn is the Geotechnical Laboratory Director for TRI/Environmental, Inc. His doctoral work principally focused on alternative/evapotranspirative cover design and evaluation for the EPA, and he performed research with expansive clays for the Texas Department of Transportation (TxDOT). Prior to joining TRI, he served as a consulting engineer, where he worked on the design and installation of the Circuit of the Americas Formula One Race Track over expansive clays with tight differential movement criteria. Since 2012, he's led the expansion of TRI's geotechnical laboratory capabilities and reach within the geotechnical community.

### **Mark Sieracke, P.E.**

#### ***Landfill Design and CQA Consultant***

Mark D. Sieracke, P.E. is an industry-recognized expert in the fields of landfill design and CQA. Mark serves as a Principal and Solid Waste Practice Area Manager for Weaver Consultants Group. Mark has served as a Technical Reviewer of the US EPA Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities (EPA/600/R- 93/182, Sept. 1993). He has served as a hands-on CQA practitioner, certifying engineer, and consultant for 1000+ acres of geosynthetic installations. He contributes routinely to landfill failure investigations and constructability reviews for design engineers. Mark serves on the Waste Management Inc. (WMI) Geosynthetic Task Force, creating the corporate standards for CQA.

## LISA - SHORT COURSE OUTLINE DAY 1 & 2

DAY 1	
8:30 – 8:45 AM	Welcome
8:45 – 9:15 AM	Field Demo of all methods at test pads
9:15 – 9:30 AM	Introduction
9:30 – 10:00 AM	Significance of LIS
10:00 – 10:30 AM	LIS Terminology, History and Background
10:30 – 10:45 AM	Break
10:45 – 11:00 AM	Applications
11:00 – 11:15 AM	Leak Statistics
11:15 – 11:45 AM	Electricity 101
11:45 AM – 12:15 PM	Bare Geomembrane Methods Instruction
12:15 – 1:00 PM	Lunch (provided)
1:00 – 3:00 PM	Bare Geomembrane Methods Field Practice
3:00 – 3:15 PM	Break
3:15 – 3:45 PM	Dipole Method Instruction
3:45 – 4:15 PM	Method Standards
4:15 – 4:30 PM	Method Limitations and Boundary Conditions during Survey Performance
4:30 – 4:45 PM	Designing for and Specifying LIS
4:45 – 5:00 PM	Questions/Answers/Discussion (in classroom)
5:30–6:30 PM	Tour of TRI's Accredited Geosynthetics Testing Laboratory
6:30 – 9:00 PM	Tex-Mex Bash (provided)
Day 2	
8:30 AM – 12:00 PM	Dipole Method – soil and water-covered Sensitivity Testing and Survey
12:00 – 12:45 PM	Lunch (provided)
12:45 – 1:15 PM	Boundary Conditions during Survey Performance
1:15 – 2:30 PM	Designing for and Specifying LIS
2:30 – 2:45 PM	Break
2:45 – 3:00 PM	Blind Actual Leaks
3:00 – 3:15 PM	Leak Location Equipment
3:15 – 3:45 PM	Case Histories
3:45 – 4:15 PM	Case Histories
4:15 – 4:30 PM	Final Q&A
6:30 – 9:00 PM	Proctored Level 2 ELIS Certification Exam

## CQA FOR GEOSYNTHETIC INSTALLATIONS SHORT COURSE OUTLINE DAY 3

DAY 3		
7:30 – 8:00 AM	Registration	
8:00 – 8:15 AM	Welcome and Introductions	Allen
8:15 – 8:30 AM	CQA Principles and Philosophy <i>(Responsibilities, appreciation of role, professional considerations and on-site protocol, conflict resolution, etc.)</i>	Sieracke
8:30 – 9:30 AM	Background of Geosynthetics and Manufacturing <i>(Polymers to products, material properties, product manufacturing)</i>	Allen
9:30 – 10:30 AM	HDPE & LLDPE & fPP Geomembranes & Seams <i>(Types and specifications, shipping/receiving, unloading, storage &amp; installation)</i>	Sieracke
10:30 – 10:45 AM	Break	Sieracke
10:45 – 11:15 AM	HDPE & LLDPE & fPP Geomembranes & Seams - Continued	
11:15 AM – 12:15 PM	Welding Demonstration/Seam Testing <i>(Double track fusion welds, extrusion welds, "T" welds, seam sampling, peel and shear testing, peel incursion and strain measurements, modes of failure, break codes, field vs. laboratory testing)</i>	Sieracke & Installer
12:15 – 1:00 PM	Lunch (provided)	
1:00 – 2:00 PM	Special Guest Lecture	
2:00 – 2:30 PM	PVC Geomembranes & Seams <i>(Types and specifications, shipping/receiving, unloading, storage &amp; installation)</i>	Allen
2:30 – 3:30 PM	Geotextiles, Geonets/Geocomposites, Geogrids, Pipe, Erosion Control <i>(Types and specifications, shipping/receiving, unloading, storage &amp; installation)</i>	Allen
3:30 – 3:45 PM	Break	
3:45 – 4:30 PM	Protection and Soil Cover	Sieracke
4:30 – 4:45 PM	CQA Paperwork and Record Keeping <i>(Importance of documentation, communication records, examples of record keeping and documentation, checklists)</i>	Sieracke
4:45 – 5:00 PM	Discussion	
5:00 – 6:00 PM	Tour of TRI Geosynthetic Testing and Research Laboratories <i>(test demonstrations, explanation of some TRI internal R&amp;D projects, etc.)</i>	
6:00 – 8:00 PM	Texas BBQ Dinner (provided)	

## CQA FOR COMPACTED CLAY & GEOSYNTHETIC CLAY LINER (GCL) INSTALLATIONS SHORT COURSE OUTLINE DAY 4

DAY 4	
8:00 – 8:30 AM	Registration
8:30 – 9:00 AM	Liner and Cover Systems <i>(Single liners/double liners/composite liners, leakage rates through soil, composite action with geomembranes, importance of drainage layer properties)</i>
9:00 – 10:30 AM	Compacted Clay <i>(Materials, factors affecting hydraulic conductivity, clod vs. particle orientation theory, keys to low hydraulic conductivity, water content-density criteria, recommended procedures for determining acceptable zone, influence of overburden stress, bonding of lifts, thickness)</i>
10:30 – 10:45 AM	Break
10:45 AM – 12:00 PM	Construction of Compacted Clay Liners and Covers <i>(Equipment, preprocessing of soil, soil moisture control, sieving, clod control, crushing/pulverizing materials, compaction, test pads)</i>
12:00 – 1:00 PM	Lunch <i>(provided)</i>
1:00 – 2:00 PM	CQA for Compacted Clay Liners and Covers <i>(CQA principles, CQA plan, tests, observations, field water content tests, field density tests, hydraulic conductivity compliance tests, frequency of tests, sampling pattern, outliers, corrective action, role of test pads, final certification)</i>
2:00 – 3:00 PM	History of GCLs <i>(Commercially-produced GCLs, geosynthetic materials, manufacturing of GCLs, manufacturing quality control, recommended specifications)</i>
3:00 – 3:15 PM	Break
3:15 – 4:00 PM	Bentonite <i>(Measures of and tests for bentonite quality, recommended specifications for bentonite in GCLs, contaminant-resistant bentonite)</i>
4:00 – 5:00 PM	Installation of GCLs <i>(Transportation, handling, storage, subgrade preparation, placement procedures, seaming protection, construction quality control and assurance, observations, types of tests, frequency of testing, field case history)</i>
5:00 – 5:30 PM	Open discussion



## CERTIFICATION EXAM: GEOSYNTHETIC CERTIFICATION INSTITUTE – INSPECTORS CERTIFICATION PROGRAM (GCI-ICP) DAY 5

### DAY 5

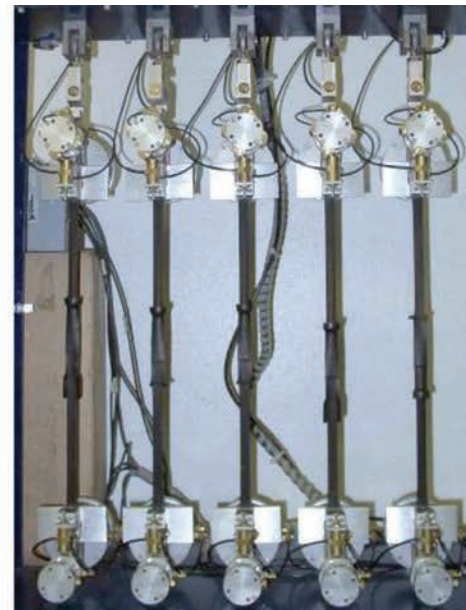
7:45 – 8:00 AM	Registration and Introduction
8:00 – 10:00 AM	Geosynthetic Exam
10:00 – 10:25 AM	Break
10:30 – 11:30 AM	Compacted Clay Liner (CCL) Exam

### Information regarding exams

- ALL students wishing to sit for the exam(s) MUST FIRST register for certification through the Geosynthetic Institute (GSI) and pay the applicable fees directly to GSI (phone: +1-610-522-8440). GSI registration must be received by the GSI 7-10 days before the Day 5 exam(s).
- Students are REQUIRED to bring a government-issued photo ID prior to entering the testing room. They must also supply the Proctor with a photocopy of the ID when turning in the test.

### Time allowance and structure

- Students will be given two hours to take the geosynthetic test. There are 140 questions. One must answer 70% of the questions correctly in order to pass. Only one correct answer is possible for each question.
- Students will be given one hour to take the compacted clay liner test, which involves 30 questions. At least 70% of the questions must be answered correctly in order to pass. There is only one correct answer for each question.
- The test is a multiple-choice test. Students must circle the correct answer (and only one answer) for each question. They must not select multiple answers for the same question.



**SHORT COURSE / GCI EXAM COST / TUITION (SEE REGISTRATION FORM)**

**Liner Integrity Survey Short Course**

Days 1 & 2, 1 registrant per company . . . . .	\$1350.00/person
Days 1 & 2, 2 registrants per company . . . . .	\$1250.00/person
Days 1 & 2, 3+ registrants per company . . . . .	\$1095.00/person
Day 2, Level 2 Certification Exam . . . . .	\$500.00/person

**CQC/CQA Short Courses and CQA Exam**

Days 3 & 4, both courses, 1 registrant per company . . . . .	\$850.00/person
Days 3 & 4, both courses, 2 registrants per company . . . . .	\$800.00/person
Days 3 & 4, both courses, 3+ registrants per company . . . . .	\$725.00/person
Days 3 & 4, both courses, government . . . . .	\$275.00/person
One course (day) only, 1 registrant per company . . . . .	\$550.00/person
One course (day) only, 2 registrants per company . . . . .	\$500.00/person
One course (day) only, 3 + registrants per company . . . . .	\$425.00/person
One course (day) only, government . . . . .	\$.175.00/person

**GCI Exam**

Day 5, TRI fee for one applicant only per company . . . . .	\$.50.00/person*
Day 5, TRI fee for 2+ applicants per company . . . . .	\$.35.00/person*

\*The exam costs above DO NOT reflect the TOTAL cost for sitting for the GCI exam, only TRI's exam proctoring cost.

The GCI exam is part of the GCI CQA technician certification program. Because of this, one MUST REGISTER with the Geosynthetic Institute (GSI) and pay its required certification fee in order to take this exam. TRI does NOT collect the fee for GSI; that fee must be paid directly to GSI. Call +1 610-522-8440 for more information.