BRC Eastside Common Areas Soil Remediation

Construction Quality Assurance

Basic Remediation COMPANY

Geosyntec consultants

engineers | scientists | innovators

Geosyntec consultants






Presentation Outline

- Definition: Construction Quality Assurance
- Earthwork CQA
- Subgrade CQA
- Geosynthetics CQA
- Operations Layer CQA
- Waste CQA
- CQA Reporting

Geosyntec consultants






Construction Quality Assurance

- **Definition:**
  - **Construction Quality Assurance (CQA) - A planned and systematic pattern of means and actions designed to assure adequate confidence that materials and/or services meet contractual and regulatory requirements and will perform satisfactorily in service.**

Geosyntec consultants






Earthwork Construction Activities

Backfill

Compaction – Jumping Jack

Compaction – Smooth Drum Vibratory Roller

Geosyntec consultants






Earthwork CQA Activities

Soil Testing

Particle Size	ASTM D422	Provides the percentage of a given particle size within a soil sample, used in soil classification
Atterberg Limits	ASTM D 4318	Provides plasticity information for clays and silts
Soil Classification	ASTM D 2487	Classifies the soil as sands, silts, gravel, etc. based on particle size
Modified Proctor	ASTM D 1557	Provides the maximum density of a given soil type

Modified Proctor Test

Modified Proctor Hammer

Proctor Mold

Geosyntec consultants






Earthwork In-Place CQA Testing

Sand Cone Compaction Testing by ASTM D1556

Nuclear Density Testing by ASTM D6938

Geosyntec consultants






Subgrade Preparation Activities

The subgrade is fine-graded and tested for compaction.

Floor is proof-rolled and observed for protruding objects

Geosyntec consultants






Subgrade CQA Activities

Subgrade Acceptance Forms

ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

SUBGRADE ACCEPTANCE

PROJECT NAME: CAMU PHASE II — DATE: 11/24/08

PROJECT NUMBER: 07-11-1271 — TIME: 16:45

OWNER: BASIC REMEDIATION COMPANY

LOCATION: HENDERSON, NEVADA

I, undersigned a duly appointed representative of Environmental Specialties International, Inc., have visually observed the soil subgrade surface described below, and found it to be an acceptable surface on which to install geomembrane.

The certification is based on observations of the subgrade only. No subterranean inspections or tests have been performed by Environmental Specialties International, Inc. and ESI makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Environmental Specialties International, Inc. accepts no responsibility for conformance of the subgrade to this project's specifications.

Area Being Accepted:

From panel # 133

To panel # 146

ESI REPRESENTATIVE: NAME: ISMAEL BUITRON — TITLE: SUBCONTRACTOR — SIGNATURE:

ENTACT REPRESENTATIVE: NAME: MIKE WILSON — TITLE: FIELD ENGINEER — SIGNATURE:

OWNERS REPRESENTATIVE: NAME: Robert D — TITLE: SUP — SIGNATURE: Robert Brown

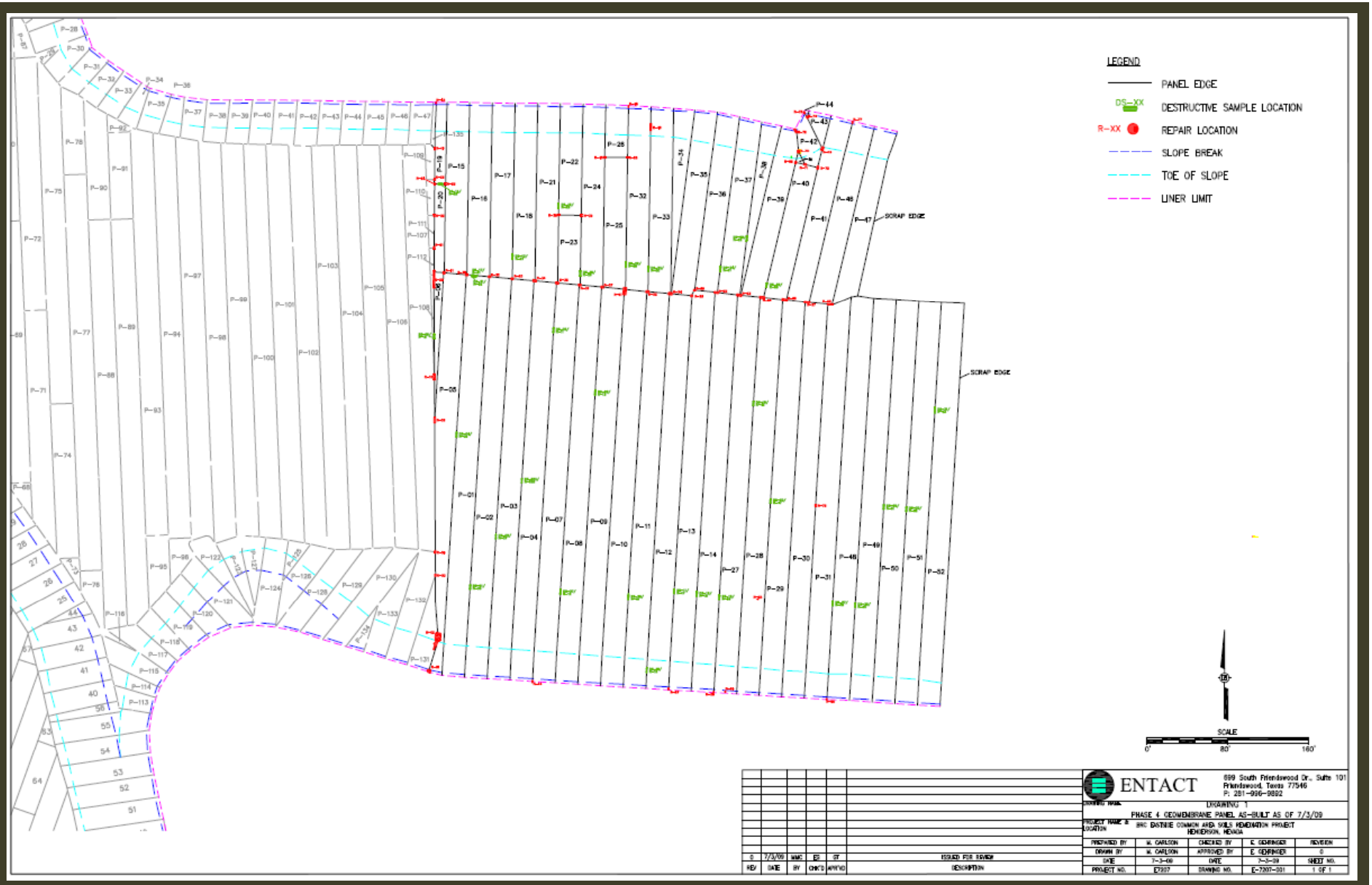
SUBMITTED TO WESTON SOLUTIONS: NAME: CHRIS WATTS — TITLE: ASST. PM — SIGNATURE:

Visual Inspection

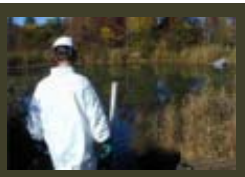
Geosyntec consultants





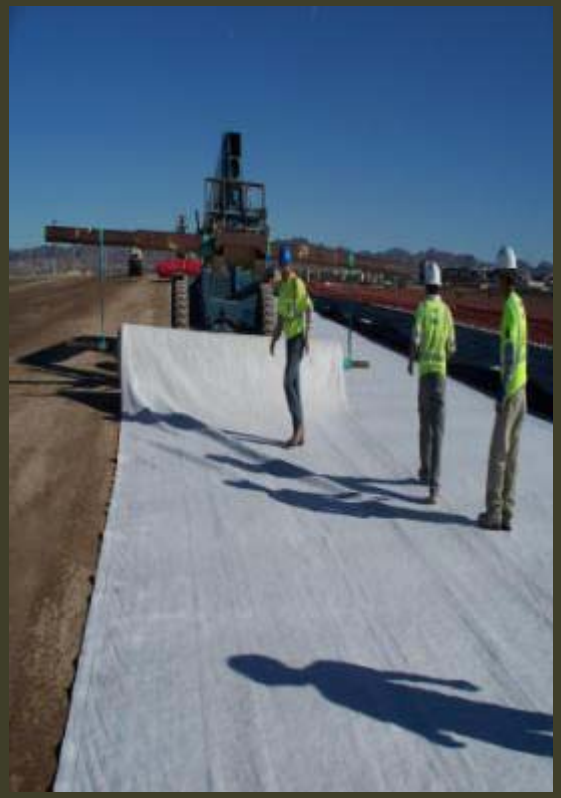
Geosyntec consultants



Geosynthetic Activities

Geosynthetic Clay Liner Installation



Geomembrane Installation

Geocomposite Installation

Geosyntec consultants






Geosynthetic Clay Liner CQA Activities

- **Manufacturer's documentation review**
- **Subgrade preparation**
- **Confirmation sampling - independent lab confirms minimum requirements are met**
- **Interface shear testing**
- **On-site material inventory**
- **Overlap and bentonite seal**
- **GCL Hydration**

Geosyntec consultants






Geomembrane CQA Activities

- **Prior to material arriving onsite:**
  - **Manufacturer's documentation review**
  - **Confirmation sampling - independent lab confirms minimum requirements are met**
  - **Interface shear testing**

- **Once onsite:**
  - **On-site material inventory**
  - **Documenting: seams, trial welds, repairs, non destructive and destructive tests, panel placement**

Geosyntec consultants



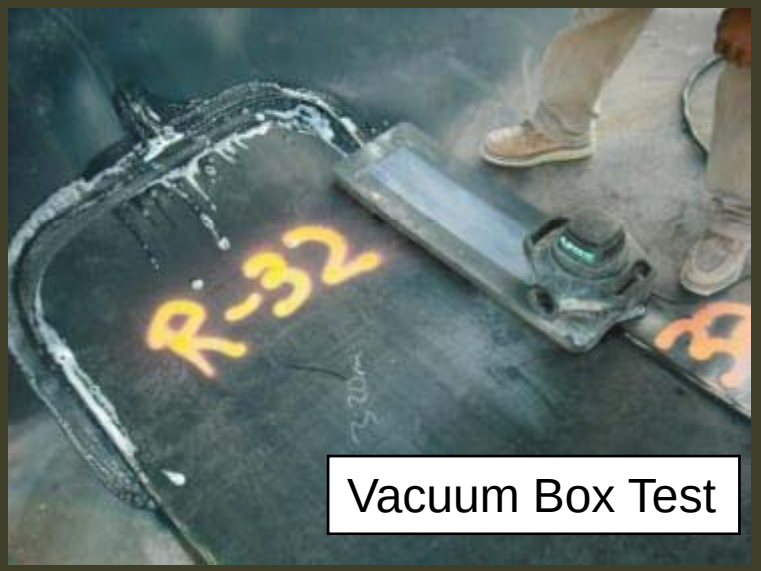



Geomembrane Seaming and Testing

Fusion Welding

Air Test

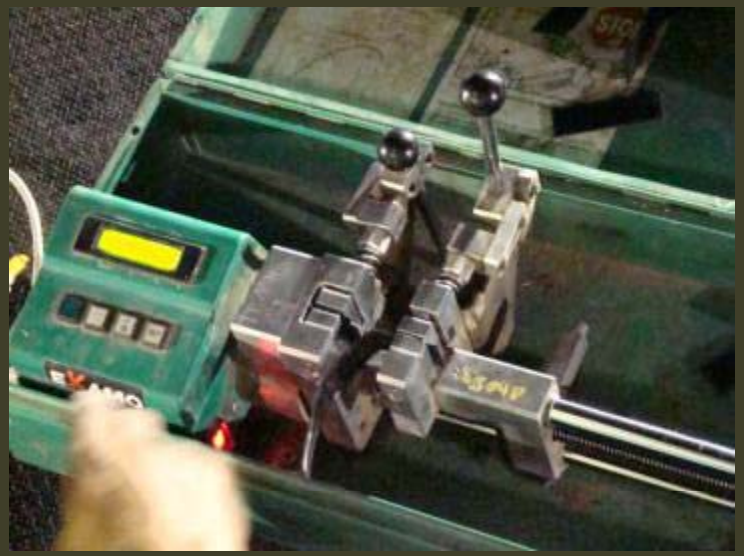
Extrusion Welding



Vacuum Box Test

Geomembrane CQA Testing

On-site Destructive Testing



Laboratory Destructive Testing

	PARAMETER		TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	PROJECT SPEC.
	Sample ID:	DS-39							
	Weld:	Heat Fusion							
Side A	Peel Strength (ppi)		139	137	143	139	138	Peel A 139	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
Side B	Peel Strength (ppi)		131	135	135	133	136	Peel B 134	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
	Shear Strength (ppi)		182	185	182	184	179	Shear 182	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		

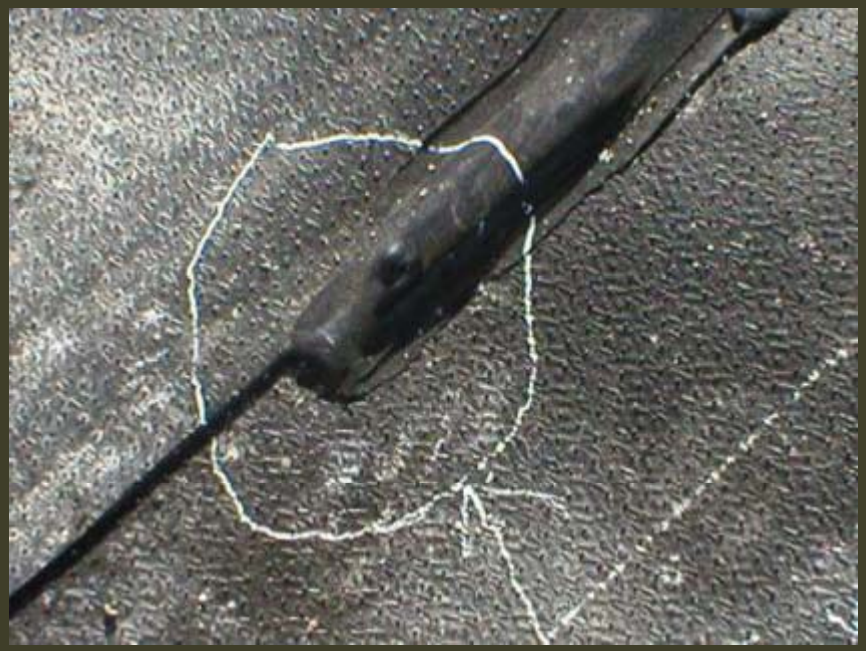
Geosyntec consultants






Geomembrane CQA Review

Visual Seam Monitoring



Defect Observation

Geosyntec consultants






Geomembrane CQA Documentation

Data Input

PDAs are used to collect and store the following in the project database:

- Material Inventory: Roll number, size
- Panel placement: Roll number, location, size
- Seams: time, seaming equipment, installer ID, lengths, panels, non-destructive tests
- Repairs: time, equipment, installer ID, size, location
- Destructive tests: field test results, lab test results, location, associate repairs, installer ID
- Trial Welds: time, equipment, testing results, installer ID

Geosyntec consultants






Geomembrane CQA Documentation

Example: Seaming Data Output

Geosyntec consultants

Production Seam Log

BRC Basic Remediation Company

Project: BRC-CAMU Phase II
Location: Henderson, NV
Description: Geomembrane Liner System

ProjNo: SC0313
TaskNo: 08/03

Material Type: gml : 2 Specifications: Seam Pressure: 25-30 psi for 5 min < 3 psi loss Vacuum Box: 5 psi for 10 seconds

Primary / Secondary: Primary Series: 2

Production Seam					Location			Nondestructive Test					
Date	*Time*	*Mach. ID*	*Oper. ID*	*Ext/ Fus:*	*SeamNo* Series-Seam1-Seam2-Begin-End	*Length* (ft.)	*QA ID*	*Location*	*Detail*	*Oper.*	*Result*	*Action*	*QA ID*
11/6/2008	11:29	1210	JC	F	2-052-053-000-100	100	CL	0-100	30\30	BRS	P	AT	RKD
11/6/2008	11:37	1208	JC	F	2-046-055-000-026	26	RKD	0-26	30\30	BRS	P	AT	RKD
11/6/2008	11:38	1210	SR	F	2-054-055-000-031	31	RKD	0-		S	P	AT	RKD
11/6/2008	11:45	1208	JC	F	2-046-054-000-042	42	RKD	0-		S	P	AT	RKD
11/6/2008	11:50	1208	JC	F	2-046-053-000-026	26	RKD	0-26	30\30	BRS	P	AT	RKD
11/6/2008	15:30	1210	JC	F	2-056-057-000-200	200	CL	0-200	30\30	BRS	P	AT	RKD
11/6/2008	15:35	1210	SR	F	2-056-057-200-398	198	CL	200-398	30\30	BRS	P	AT	RKD
					2-042-057-000-011	11	RKD	0-11		BRS	P	AT	RKD
					2-042-056-000-010	10	RKD	0-10		BRS	P	AT	RKD
					2-039-056-000-021	21	RKD	0-21	30\30	BRS	P	AT	RKD
11/7/2008	8:04	1208	JC	F	2-038-056-000-022	22	CL	0-22	30\30	BRS	P	AT	CL
11/7/2008	8:08	1208	JC	F	2-037-056-000-022	22	CL	0-22	30\30	BRS	P	AT	CL
11/7/2008	8:13	1208	JC	F	2-036-056-000-022	22	CL	0-22	30\30	BRS	P	AT	CL
11/7/2008	8:17	1208	JC	F	2-035-056-000-022	22	CL	0-22	30\30	BRS	P	AT	CL
11/7/2008	8:25	1208	JC	F	2-034-056-000-022	22	CL	0-22	30\30	BRS	P	AT	CL
11/7/2008	8:29	1208	JC	F	2-033-056-000-022	22	CL	0-22	30\30	BRS	P	AT	CL

Thursday, December 04, 2008 *Page 5 of 27*

Phase-Panel 1- Panel 2 – Start – End

Air Test (AT) – Beginning pressure/end pressure

CQA Monitor Initials

Pass/Fail

Welding Machine Number

Installer's Operator's Initials

Geosyntec consultants






Geocomposite CQA

Seam Monitoring

Documentation:

- Prior to material arriving onsite:
  - Manufacturer's documentation review
  - Confirmation sampling - independent lab confirms minimum requirements are met
  - Interface shear testing
- Once onsite:
  - On-site material inventory

Geosyntec consultants






Operations Layer Construction Activities

<1 inch Material Screening

Material Placement

Geosyntec consultants






Operations Layer CQA Activities

Layer Thickness Monitoring

Maximum Particle Size Monitoring

Geosyntec consultants

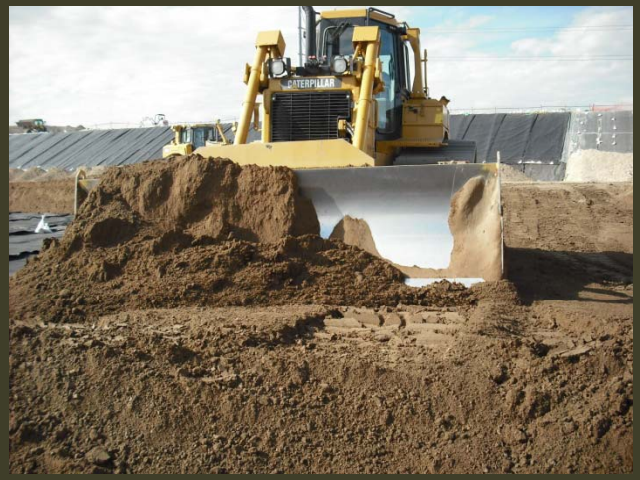





Waste Placement Construction Activities

Hauling

Placement



Compaction

Geosyntec consultants






Waste Placement CQA Activities

Onsite Waste Testing

- **Percent Solids Testing**
  - **1 per 5000 cy of a waste type**
  - **Performed after sludge/sediment drying and mixing activities**
  - **Confirms waste material will not generate liquid after placement in CAMU**

Geosyntec consultants






Waste Placement CQA Activities

Test Pad Construction

- Test pad used to generate method specification for waste placement.
- Test pad confirms the following is adequate for compaction:
  - 3 passes with compactor
  - Material should not rut when 40-ton truck is driven on compacted material

Geosyntec consultants

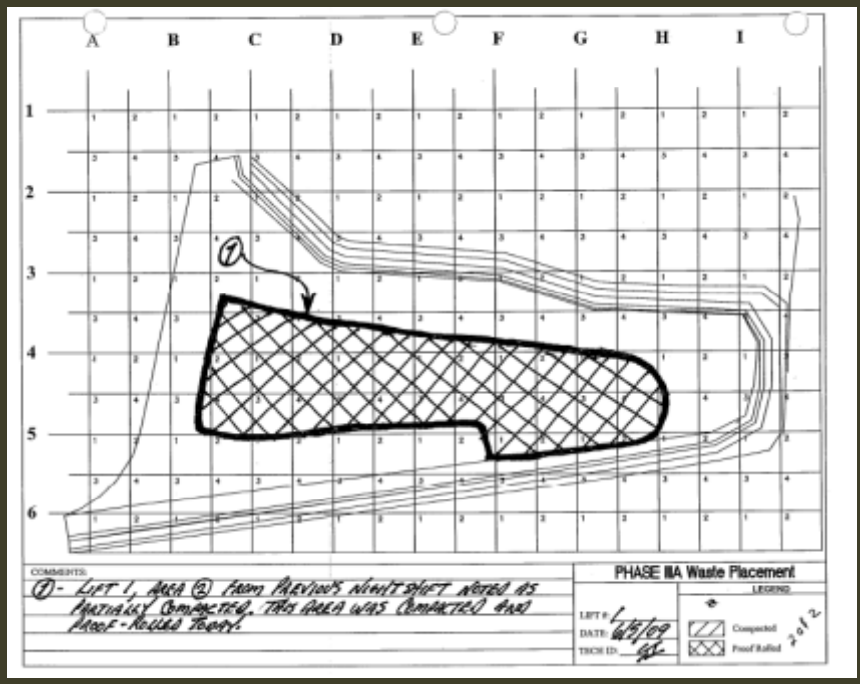





Waste Placement CQA Activities

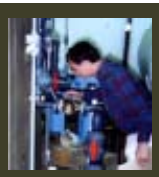
Proof Rolling

Documentation



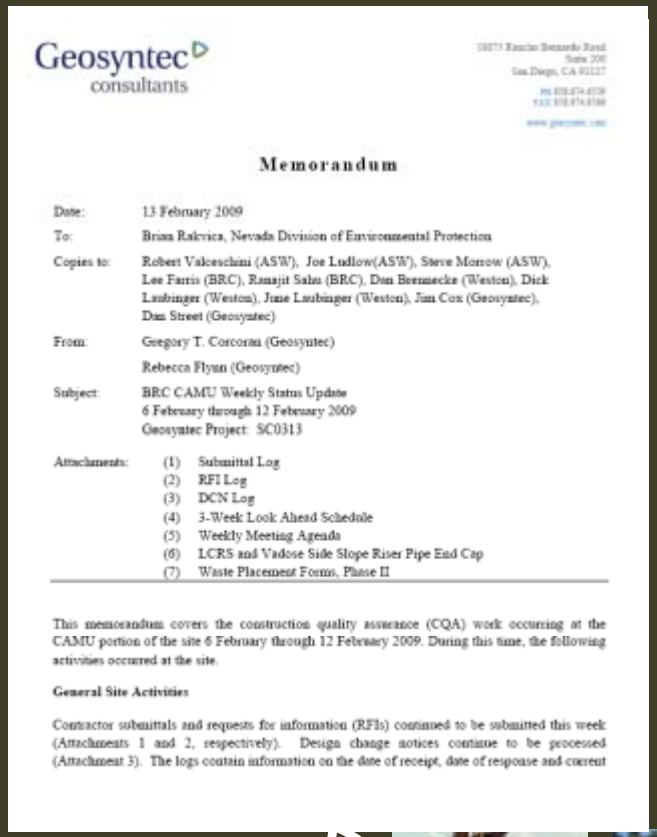
Geosyntec consultants






CQA Documentation

Weekly Summary Memorandums



Geosyntec consultants

Memorandum

Date: 13 February 2009

To: Brian Rakvica, Nevada Division of Environmental Protection

Copies to: Robert Valceschini (ASW), Joe Ludlow(ASW), Steve Morrow (ASW), Lee Farris (BRC), Ranajit Sahu (BRC), Dan Beermecke (Weston), Dick Laubinger (Weston), June Laubinger (Weston), Jim Cox (Geosyntec), Dan Street (Geosyntec)

From: Gregory T. Corcoran (Geosyntec)
Rebecca Flynn (Geosyntec)

Subject: BRC CAMU Weekly Status Update
6 February through 12 February 2009
Geosyntec Project: SC0313

Attachments:
(1) Submittal Log
(2) RFI Log
(3) DCN Log
(4) 3-Week Look Ahead Schedule
(5) Weekly Meeting Agenda
(6) LCRS and Vadose Side Slope Riser Pipe End Cap
(7) Waste Placement Forms, Phase II

This memorandum covers the construction quality assurance (CQA) work occurring at the CAMU portion of the site 6 February through 12 February 2009. During this time, the following activities occurred at the site.

General Site Activities

Contractor submittals and requests for information (RFIs) continued to be submitted this week (Attachments 1 and 2, respectively). Design change notices continue to be processed (Attachment 3). The logs contain information on the date of receipt, date of response and current

- **Summarizes:**
  - **Activities by phase**
  - **Upcoming schedule**
  - **Submittals, design changes, and requests for information received**
  - **Results of waste testing**

Geosyntec consultants






CQA Documentation

CQA Report

- Submitted after each Phase
- Waste placement not allowed until report is approved
- Summarizes:
  - CQA Activities
  - Submittals
  - Design changes
  - Requests for Information
  - As-built data
  - Warranties

Ge
consultants