IHSS GROUP SW-2
ORIGINAL LANDFILL (IHSS-115)
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
CONSTRUCTION COMPLETION AND CERTIFICATION REPORT

ATTACHMENT A OF THE
DRAFT CLOSEOUT REPORT

VOLUME III

Prepared for:

KAISER-HILL COMPANY, LLC
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
12101 Airport Way, Unit B
Broomfield, CO 80021

Prepared by:

TETRA TECH, INC.
1900 South Sunset Street, Suite 1-F
Longmont, Colorado 80501

Tetra Tech Job No. 19-4886.002.00

September 2005

TETRA TECH, INC.

Tetra Tech, Inc. is an Equal Opportunity Employer

RECEIVED
OCT - 5 2005
ADMIN RECORD

1/434

APPENDIX F

CONSTRUCTION QUALITY CONTROL DOCUMENTATION

2

APPENDIX F-1: DAILY QC REPORTS

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 033-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/16/05 S (M) T W T F S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** High

GAI PERSONNEL HOURS CHARGED:

Michael Place (0600-1530, 9.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Excavation to Competent Material:** Envirocon used to Hitachi 450, and Cat 345 excavators to remove loose soils from the footprint of the buttress fill area. Material was loaded into Cat 633 scrapers and hauled to a fill area..

SUMMARY OF QC TESTING:

Took a sample of Centennials economy road base material for use as a potential buttress fill into the lab for grain size analysis. The sample name is CERB-1

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with the Michael Keating of Kaiser Hill to discuss the possibility of using Pioneer pit fines as regrade fill on the slopes of the Original Landfill. Stated a few possible resulting changes that might be required if pit fines replace the alluvial material. First if the materials are protorable then density test may be required, Second if density testing is required nuke gauge technitions may be required to be wearing Level C PPE and potentially need additional training, and third since the regrade fill was supposed to be one of the only activities at night Desity testing will be required at night creating a safety hazard. Kaiser Hill will request permission to use the Pioneer pit fines from the EPA and CDPHE using a method spec on compaction tomorrow at the weekly meeting.

CQC Monitor: _____ **Date:** 5-17-05
Approved by: _____ **Date:** 5-17-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 033-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/17/05 S M (T) W T F S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0600-1700, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Excavation to Competent Material:** Envirocon used to Hitachi 450, and Cat 345 excavators to remove loose soils from the footprint of the buttress fill area. Material was hauled out by Volvos.
- **Stabilization of Buttress Footprint:** Envirocon used Volvos to haul in 1.5" gravel to stabilize the footprint of the buttress fill and build up the base of the foot print to a level enough plane to allow for geogrid installation. Material was place by a Cat D6 LGP dozer.

SUMMARY OF QC TESTING:

Took two samples of La Farge's pit fines for use as buttress fill. The sample names are LPF-1 and LPF-2.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with the EPA, CDPHE, Earth Tech Kaiser Hill and Envirocon for the weekly progress meeting. Kaiser Hill gave a proposal to the regulators of using Pioneer pit fines as regrade fill on the slopes of the Landfill. Kaiser Hill also proposed that since the material will be used as regrade fill only that a method spec be used instead of running density tests on the slopes, which will be part of the exclusion zone and have additional PPE requirements. The EPA and CDPHE stated no objection as long as Earth Tech agreed to sign off on the material.

CQC Monitor: _____ **Date:** 5-18-05
Approved by: _____ **Date:** 5-18-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 033-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/18/05 S M T (W) T F S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Moderate

GAI PERSONNEL HOURS CHARGED:

Michael Place (0600-1830, 12.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Excavation to Competent Material:** Envirocon used to Hitachi 450, and Cat 345 excavators to remove loose soils from the footprint of the buttress fill area. Material was hauled out by Volvos and stockpiled on the east end of the site.
- **Stabilization of Buttress Footprint:** Envirocon used a Cat 966 front end loader and a Cat D6 dozer to place 1.5" gravel to stabilize the footprint of the buttress fill. Alluvial fill was placed on stabilized area to bring the footprint up to grade in preparation for geogrid installation. Material was place by a Cat D6 LGP dozer and the alluvium was compacted by an Cat 825 sheep foot compactor.

SUMMARY OF QC TESTING:

Took nine samples today, four Pioneer pit fines samples, and five La Farge pit fines samples. All samples were sent into the lab for atterbergs, proctors, grain size, and consolidated undrained triaxial compression (c/u triax) tests (PSE-3&4, and PSW-3&4). Also the six previously tested samples had extra testing assigned, four from pioneer and two form La Farge (LPF-3 to 7). These samples had c/u triax tests assigned.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

6

Other Meetings: Met with Kaiser Hill, Envirocon, Earth Tech, and Tetra Tech to discuss the excavation of fill within the footprint of the buttress. Jack Woo of Kaiser Hill decided that the area of the footprint west of a line trending north of the survey perimeter point 6017 was competent enough to have 1.5" gravel placed on it. Also the rest of the area would need to have most of the saturated material removed and then the excavated area would need to be brought up to the necessary elevation for geogrid placement by placing 1.5" gravel in the low areas.

CQC Monitor: _____ **Date:** 5-19-05
Approved by: _____ **Date:** 5-19-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 033-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/19/05 S M T W (T) F S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0600-1700, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Excavation to Competent Material:** Envirocon a Cat 345 excavator to remove loose soils from the footprint of the buttress fill area. Material was hauled out by Volvos and stock piled on the east end of the site.
- **Excavation in Waste Area:** Envirocon used a Hitachi 450 excavator to excavated and regrade fill material in the waste area 250' north of the toe of the proposed buttress fill area.
- **Stabilization of Buttress Footprint:** Envirocon used a Cat 966 front end loader and a Cat D6 dozer to place 1.5" gravel to stabilize the footprint of the buttress fill. Alluvial fill was placed on stabilized area to bring the footprint up to grade in preparation for geogrid installation. Material was place by a Cat D6 LGP dozer and the alluvium was compacted by a Cat 825 sheep foot compactor.
- **SID Ditch:** Envirocon used an Cat 825 sheep foot compactor to place and compact fill in part of the surface water intercept diversion ditch (SID ditch).
- **Test Pad for Regrade Fill:** Envirocon hauled in 10 loads of Pioneer pit fines for use in constructing a 50'x50' test pad. A Cat 825 sheep foot compactor was used to compact the fill

SUMMARY OF QC TESTING:

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD: None.

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

7

Other Meetings: *Percolation. Tests:* Met with the EPA, CDPHE, Kaiser Hill, Tetra Tech, Earth Tech, and Envirocon to observe two field percolation tests conducted by URS on the stream alluvial material on the footprint of the buttress fill area. Result will be calculated and passed on to the parties involved tomorrow.
Footprint: Met with Kaiser Hill, Tetra Tech, Earth Tech, and Envirocon to discuss the approval of more of the footprint for geogrid placement. Jack Woo of Kaiser Hill decided to approvedto a north south trending line from the survey point 6018 and to its west.

CQC Monitor: _____ **Date:** 5-20-05
Approved by: _____ **Date:** 5-20-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 033-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/20/05 S M T W T (F) S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0600-1700, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Excavation to Competent Material:** Envirocon a Cat 345 excavator to remove loose soils from the footprint of the buttress fill area. Material was hauled out by Volvos and stock piled on the east end of the site.
- **Excavation in Waste Area:** Envirocon used a Hitachi 345 excavator to excavated and regrade fill material in the waste area 250' north of the toe of the proposed buttress fill area.
- **SID Ditch:** Envirocon used an Cat 825 sheep foot compactor to place and compact fill in part of the surface water intercept diversion ditch (SID ditch).
- **Test Pad for Regrade Fill:** Envirocon hauled in 6 additional loads of Pioneer pit fines for use in constructing a 50'x50' test pad. The test pad as split into two sections, one was compacted by an Cat 825 sheep foot compactor, and the other by a Cat 815 sheep foot compactor.

SUMMARY OF QC TESTING:

Density Tests

Test #	% off MC	% Comp.	Pass/Fail
PTP-1	1.1	97%	PASS
PTP-2	1.8	96%	PASS
PTP-3	1.7	97%	PASS
PTP-4	1.9	98%	PASS
PTP-5	1.6	98%	PASS
PTP-6	1.8	97%	PASS

PTP-1 & 2 are on a section of the test pad with 3 passes by a Cat 815 sheep foot compactor.
PTP-3 & 4 are on a section of the test pad with 2 passes by a Cat 825 sheep foot compactor.
PTP-5 & 6 are on a section of the test pad with 2 passes by a Cat 815 sheep foot compactor.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD: None.

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with Tetra Tech, Earth Tech and Envirocon to discuss the results from the nuclear density tests conducted on the test pad. Determined that 2 passes for both the Cat 825 or the 815 sheep foot compactors will be sufficient for achieving 95% compaction of a standard proctor on the Pioneer pit tines.

CQC Monitor: _____ **Date:** 5/23/05
Approved by: _____ **Date:** 5-23-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/23/05 S (M) T W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1600, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Clear and Grub in Waste Area:** Envirocon used a Hitachi 345 excavator to excavate and regrade fill material in the waste area 250' north of the toe of the proposed buttress fill area on the east end. The excavation included removing fill from the SID ditch and from the slopes around it.
- **SID Ditch:** Envirocon used an Cat 825 sheep foot compactor to place and compact fill in part of the surface water intercept diversion ditch (SID ditch).

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD: None.

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: *Weekly Construction meeting.* Met with Kaiser Hill, Tetra Tech, Earth Tech, and Flatirons surveying to discuss Kaiser Hill told Tetra Tech to come up with a rough outline to give to the regulators at the monthly progress meeting on the 1st of June.
Footprint: Jack Woo of Kaiser Hill approved the entire footprint of the buttress fill for geogrid placement. QA, QC and Earth Tech agreed that the footprint was down to competent material

CQC Monitor: _____ **Date:** _____
Approved by: _____ **Date:** 5-24-05
File No. _____

9

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/23/05 S (M) T W T F S

SHIFT: Night (1530-0130)

PRECIPITATION: **AM:** none **PM:** Thunderstorm

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Buttress Area:** Envirocon used a D6 to regrade buttress area.
- **SID Ditch:** Envirocon used a Cat 345 excavator and a D9 dozer to spread material in part of the Southern Interceptor Ditch (SID ditch).
- **Cut/ Fill:** Envirocon used 2 side dumps and 2 belly dumps to bring in Rocky Flats Alluvium for fill material and an 825 sheep foot compactor to spread and compact the material on the east side of the landfill.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 5/24/05
Approved by: [signature] **Date:** 5/24/05
File No.

10

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/24/05 S M (T) W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1530, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Regrade:** Envirocon used a Cat D9 to place fill hauled in by side dumps from Centennial to the northeastern portion of the landfill. Cat 815, and 825 sheep foot compactors were used to compact fill in and around the SID ditch.
- **Wet Spot Removal:** Envirocon used a Cat 345 track-hoe to dig up wet material from a wet spot in the north eastern region of the landfill. The material was spread out on the slopes by a Cat 815 sheep foot compactor to allow the material time to dry.
- **Waste Area:** A D9 was used to regrade fill inside the exclusion zone.
- **Geogrid:** Envirocon used laborers to place geogrid on the footprint of the buttress fill area. The geogrid was place with an overlap of a minimum of 2 feet. Placement started on the west end of the buttress footprint and went east.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD: None.

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

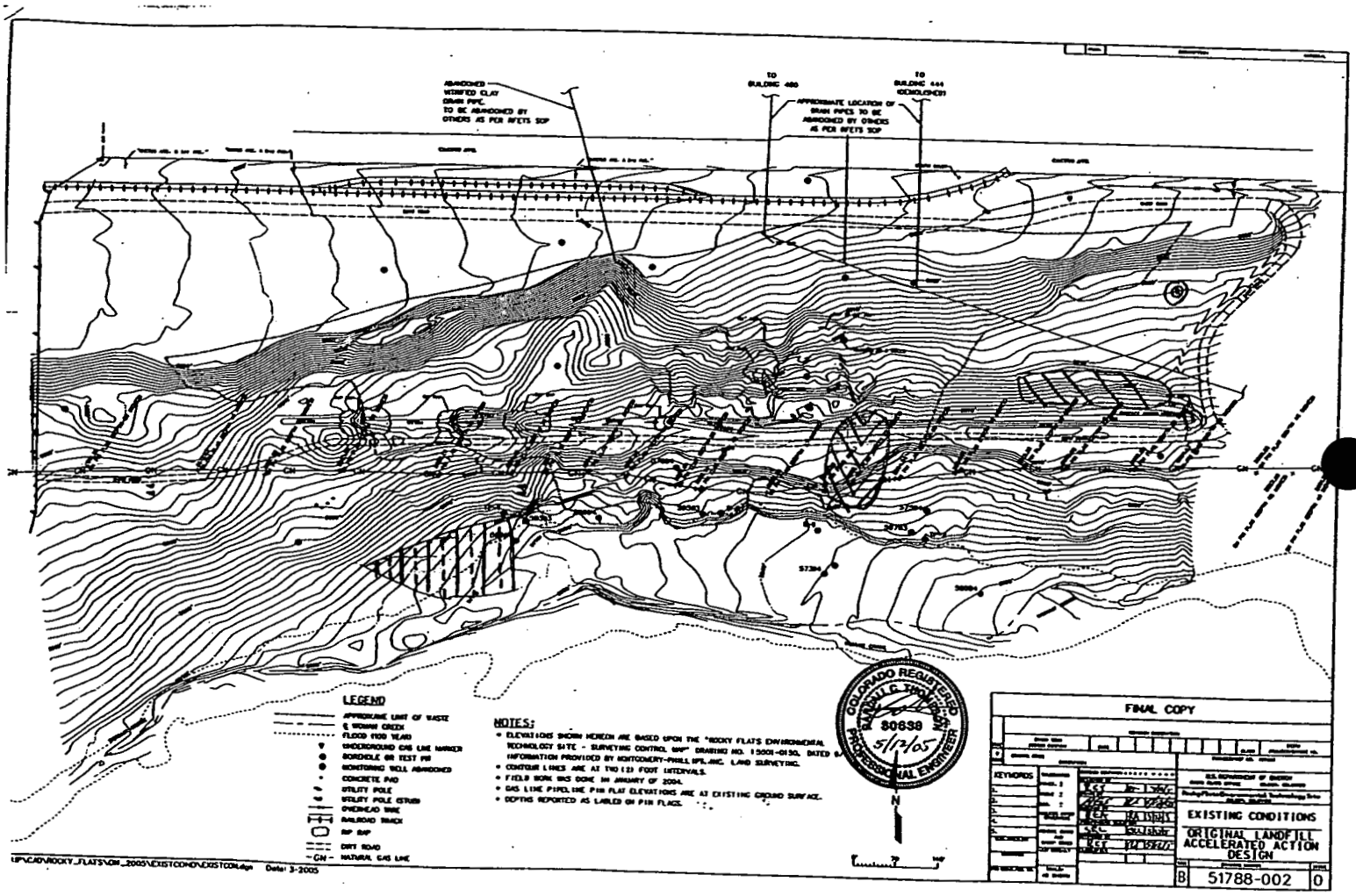
Other Meetings: none.

CQC Monitor: _____ **Date:** 5-25-05
Approved by: _____ **Date:** 5-25-05
File No. _____

11

ORIGINAL LANDFILL
ROCKY FLATS

5-24-05 DAY



Fill Area

wet spot Removal

Geogrid Placement

Waste Area Regrade

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/24/05 S M (T) W T F S

SHIFT: Night (1530-0130)

PRECIPITATION: **AM:** none **PM:** Thunderstorm

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Buttress Area:** Envirocon used a D5 dozer to regrade the buttress footprint. They used a Cat 140H to rip the area and placed geo-grid in the area, shingling north and eastward.
- **Waste Area:** Envirocon used a D5 and a D6 dozer to cut material in the waste area north of the buttress fill and pushed the material to the north. They also used a Cat 345 track hoe to remove material and place it in the SID ditch.
- **Cut/ Fill:** Envirocon had 3 belly dumps and 2 side dumps bring in Rocky Flats Alluvium from the Centennial pit and used an 825 sheepsfoot compactor to spread and compact the material on the northeast side of the landfill.
- **Geosynthetics:** One truckload of geosynthetics arrived today.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

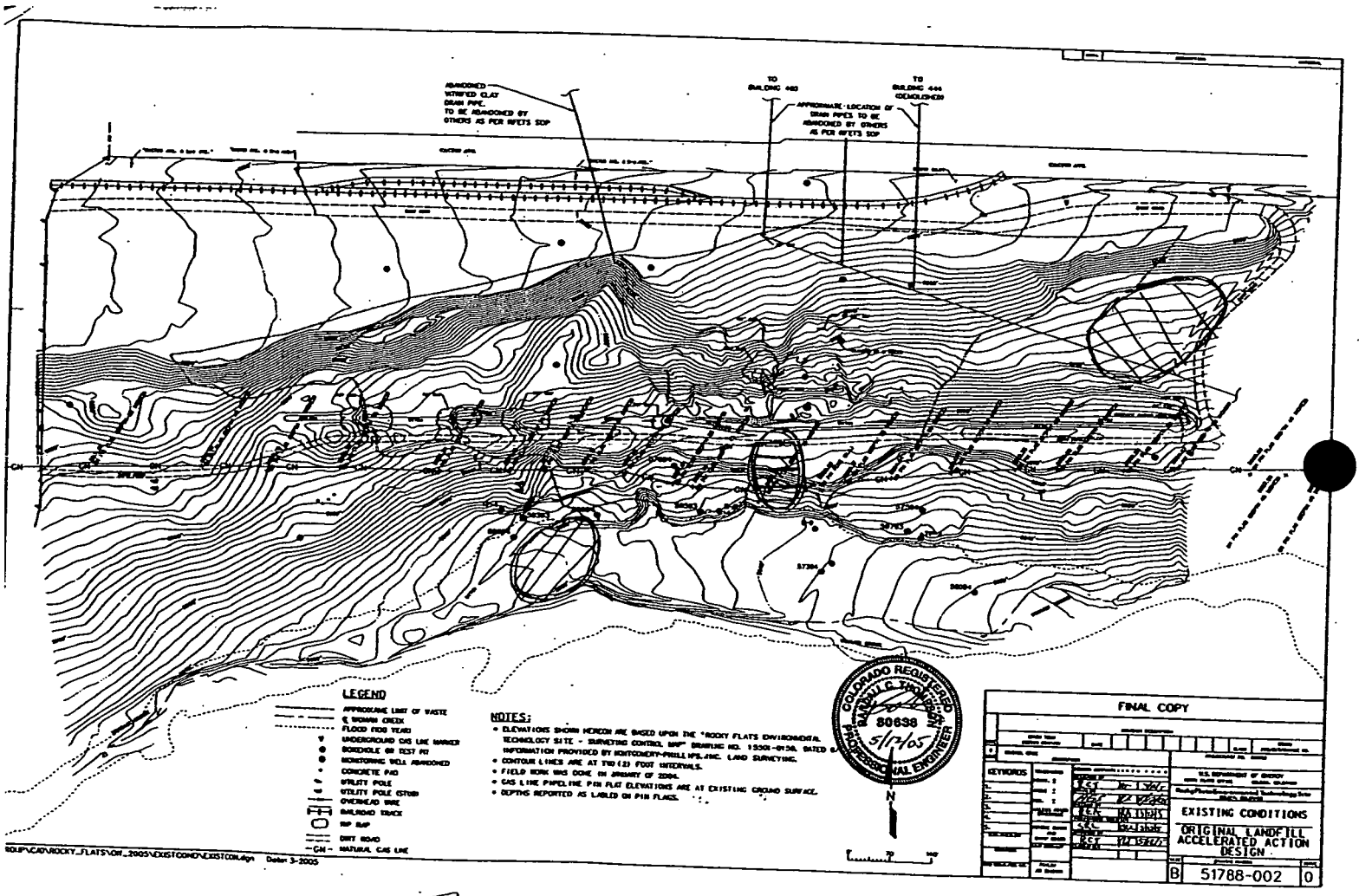
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 5/25/05
Approved by: [signature] **Date:** 5-25-05
File No.

12

ORIGINAL LANDFILL
ROCKY FLATS

5/24/05 night



- Geonet and rockfill

- Rocky Flats Alluvium regrade

- waste removal

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/25/05 S M T (W) T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used a Cat D9 to place fill hauled in by side dumps from Centennial to the northeastern portion of the landfill. Also a Cat D6 dozer was used to place some fill in the southeastern portion of the landfill to build the buttress key in slope. Cat 815, and 825 sheep foot compactors were used to compact fill on the slope near the SID ditch.
- **Waste Area:** A D9 was used to regrade fill inside the exclusion zone.
- **Geogrid:** Envirocon had to remove 150 feet of geogrid placed during the previous night shift. The geogrid was placed on overly rutted ground and on top of large boulders. Two front end loaders, a Komatsu, and a Cat 966, were used to remove boulders from the surface, fill in voids in the surface and finally to scarify the surface with the teeth on their buckets.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD: None.

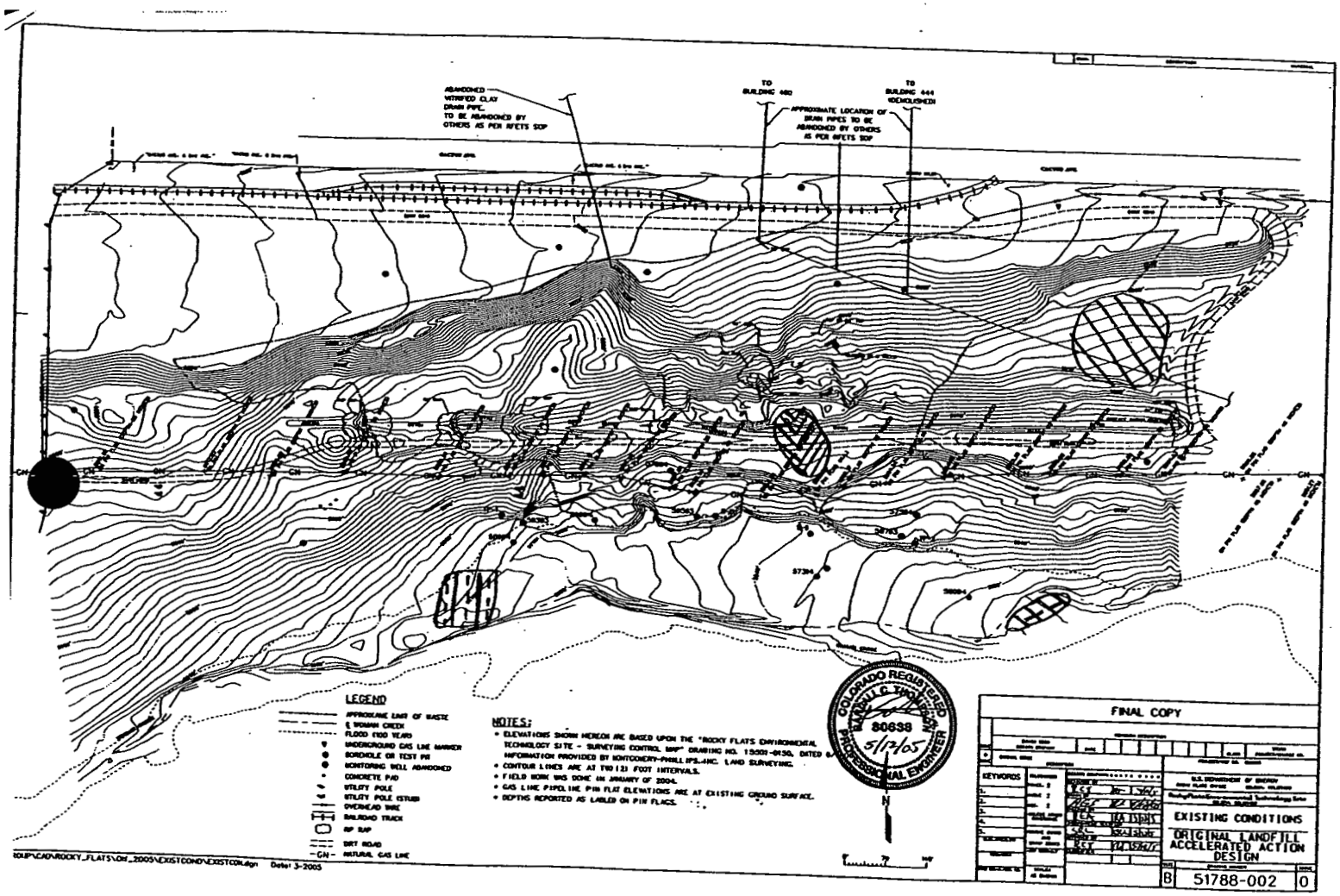
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with Earth Tech and Kaiser Hill to discuss triaxial testing on the various buttress fill sources. Randy Thompson and Ryan Archibald of Earth Tech stated that triaxial tests will not be required on all samples and that they wish to select which samples they would like to have triaxial tests conducted on.

CQC Monitor: _____ **Date:** 5-26-05
Approved by: _____ **Date:** 5-26-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

5-25-05



Fill Placement

Geogrid Subsurface Repair

Waste Area Regrade

14

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/25/05 S M T (W) T F S

SHIFT: Night (1530-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Buttress Area:** Envirocon used a Cat 966G front end loader to scarify the area and placed geo-grid in the area, shingling north and eastward from stake 3+25 to 5+75. They placed rock material with a Cat 345 track hoe. A wet spot at approximately 6+00 was identified and left uncovered by geogrid.
- **Waste Area:** Envirocon covered the eastern section of the waste area exclusion zone with 1 foot of Rocky Flats Alluvium using 3 side dumps and 2 belly dumps. They spread the material with a D6 and a D9 dozer. They stockpiled alluvium with a D6 and D10 dozer outside the exclusion zone.
- **Cut/ Fill:** Envirocon began cutting the waste area northwest of the buttress fill area just below the upper road with a D9 dozer.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

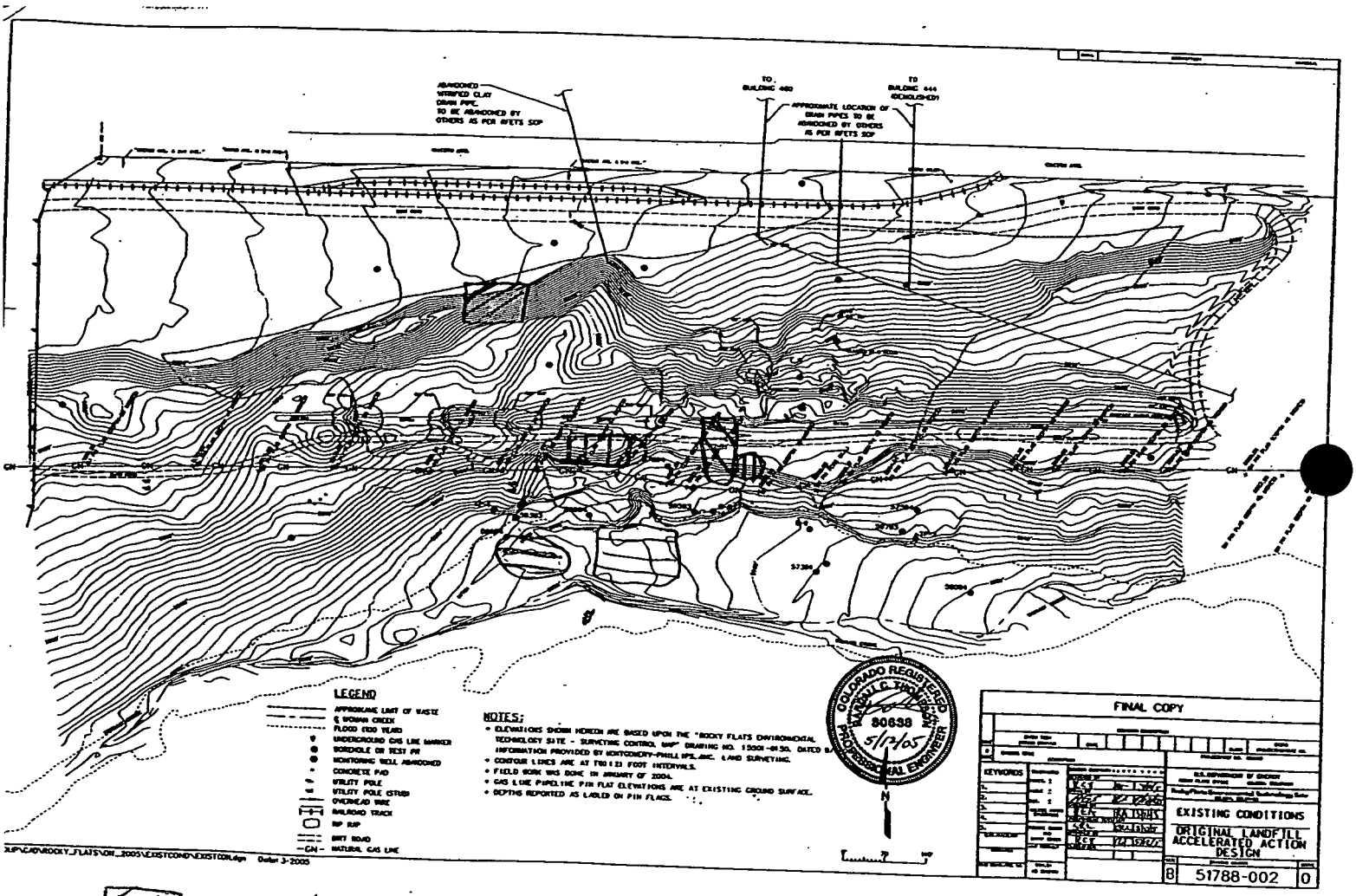
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 5/26/05
Approved by: [signature] **Date:** 5/26/05
File No.

Rocky Flats OLF

5/25/05



- Cut/Fill

- Waste area Fill

- Geogrid placement/rock Fill

- waste area compaction

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/26/05 S M T W (T) F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used a Cat D9 dozer to place fill near the western end of the central road through the site. The fill was brought in form two sources, one from Centennial (alluvium) and the other from Pioneer (pit fines), and compacted by two Cat 825 sheep foot compactors and one 815 sheep foot compactor. At least two passes were made on all fill placed onto site.
- **Waste Area:** A D9 was used to regrade fill inside the exclusion zone on the western end of the Landfill.
- **Geogrid:** Envirocon used a Cat 966 front end loader and a Cat D6 dozer to place 1.5" gravel on top of geogrid starting from the west end of the buttress footprint.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD: None.

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

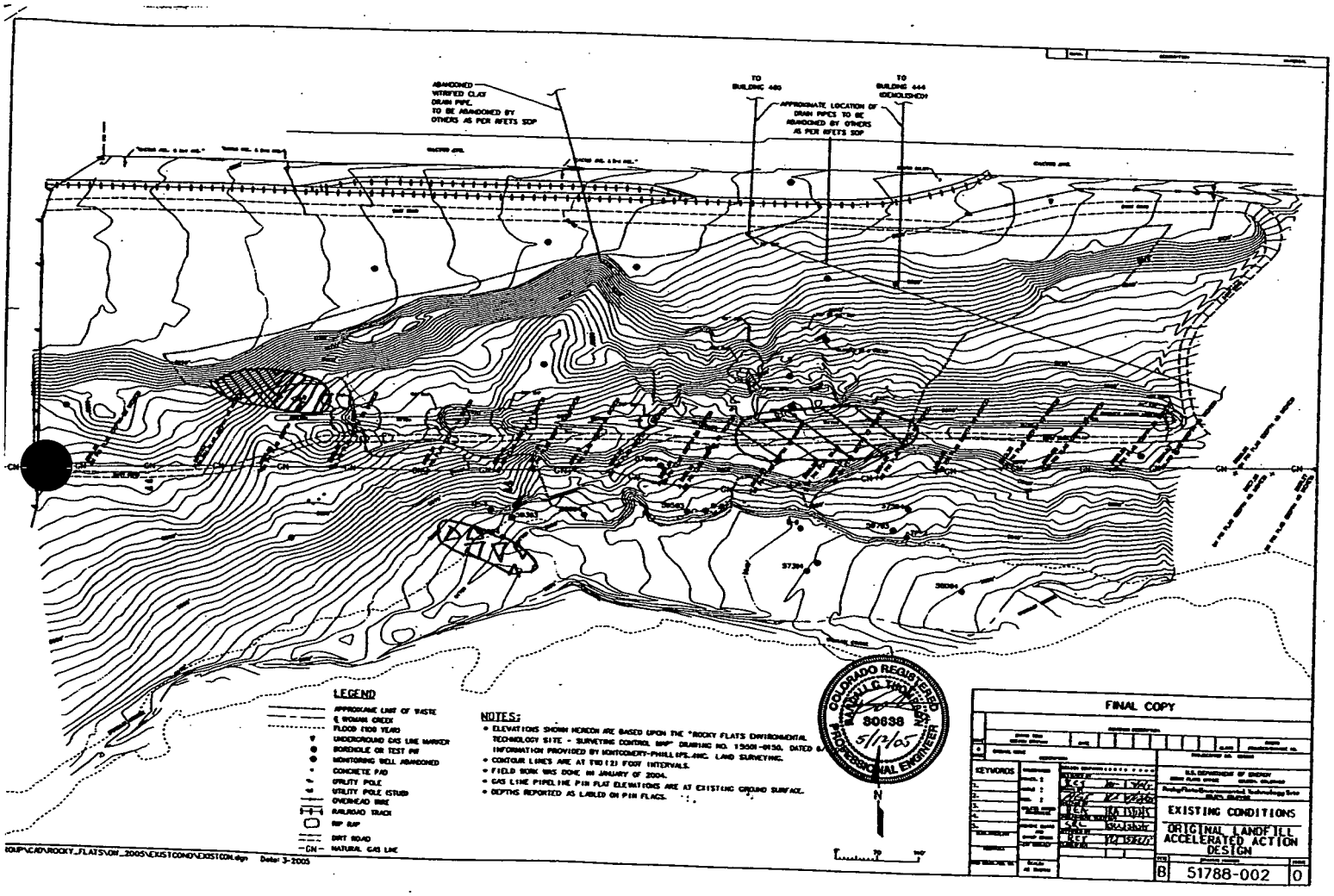
16

Other Meetings: Met with Earth Tech about the triaxial test on Pioneer, La Farge and Centennial Pit fines. Earth Tech decided that they wanted to reprioritize the samples putting the emphasis on the two Centennial sample triaxial tests and getting back to us about the other triaxial tests to be run.

CQC Monitor: _____ **Date:** 5-27-05
Approved by: _____ **Date:** 5-27-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

5-26-05



Waste Area Regrade

Cut to Fill

1.5" Gravel Placement on Geogrid

17

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/26/05 S M T W (T) F S

SHIFT: Night (1530-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1330- 0200, 12.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Regrade:** Envirocon compacted material using an 825 sheepsfoot compactor in the eastern part of the landfill.
- **Waste Area:** Envirocon spread Rocky Flats Alluvium and pit fines using a D6 dozer along the southern half of the haul road in the waste area. 4 side dumps and 2 belly dumps brought in Rocky Flats Alluvium from the Centennial pit. Additional waste was covered with one foot of material and the entire area was compacted with an 825 sheepsfoot.
- **Cut/ Fill:** Envirocon used a D9 dozer was to regrade fill inside the exclusion zone on the western end of the Landfill. The material was compacted with a Cat 825 sheepsfoot.
- **Buttress Area:** Envirocon placed drain rock in the geogrid area with a Komansu 420 front end loader to stake 2+50. They continued to place geogrid from stake 5+75 to 7+00.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

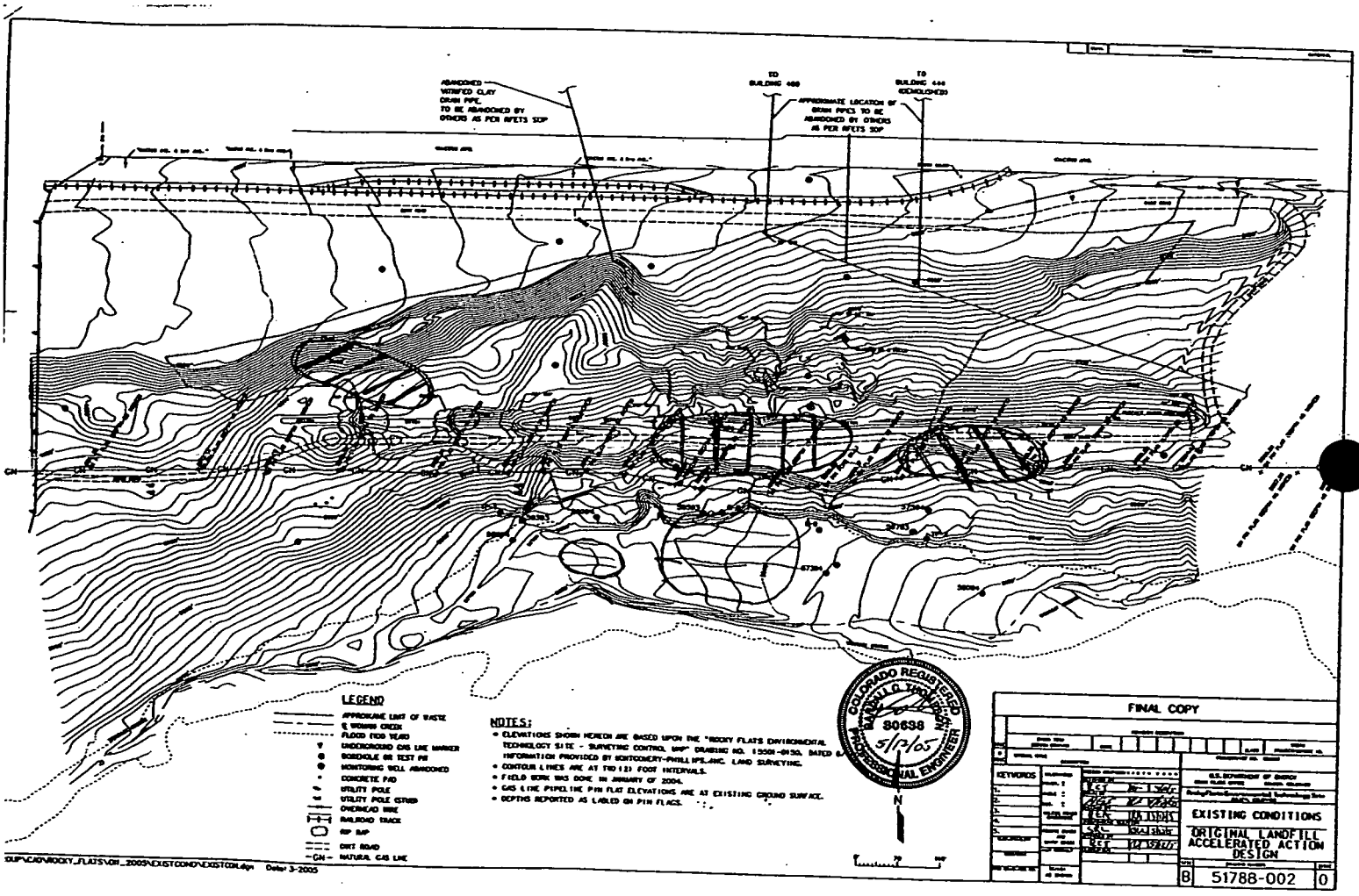
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 5/27/05
Approved by: [illegible] **Date:** 5-27-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

5/26/05



- Geogrid/Drain rock placement

- cut/Fill

- regrade

- Waste area

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/27/05 S M T W T (F) S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used a Cat D10 dozer to place fill near the northeastern corner of the site. The fill was brought in form two sources, one from Centennial (alluvium) and the other from Pioneer (pit fines), and compacted by two Cat 825 sheep foot compactors. At least two passes were made on all fill placed onto site.
- **Waste Area:** A D9 was used to regrade fill inside the exclusion zone on the western end of the Landfill.
- **Geogrid:** Envirocon used two Cat 966G front end loader to place 1.5" gravel on top of geogrid of the buttress footprint. Gravel was placed out to Station 3+00.

SUMMARY OF QC TESTING:

Took one sample of 1.5" gravel for QC gradation, sample name was DR-1

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

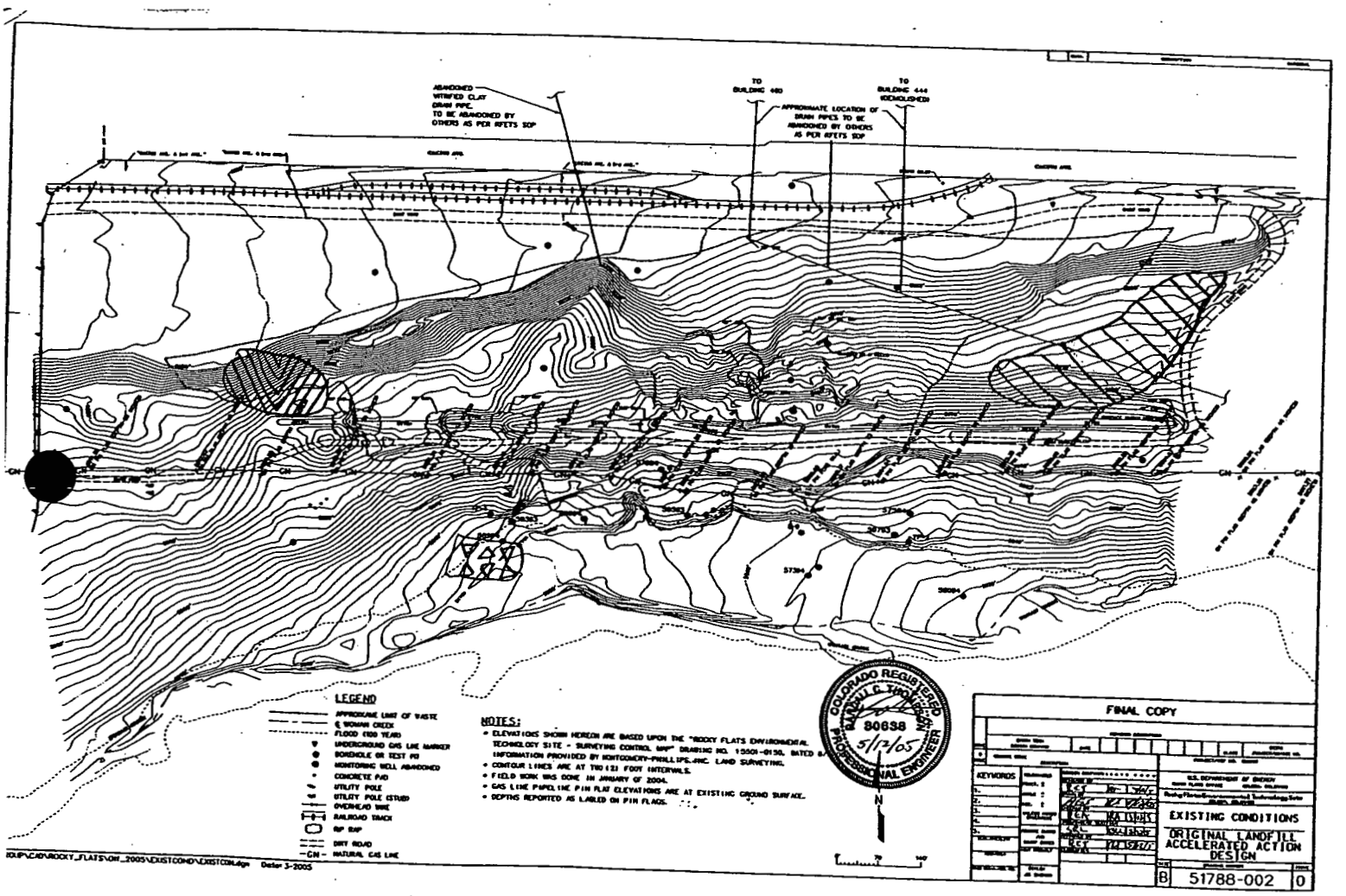
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Discussed with Earth Tech the results form the gradations run on the 1.5" gravel. Both samples had more than 5% retained on the 3/8 screen on both samples putting them out of spec. Earth Tech requested that Golder grab a sample of 1.5" drainage gravel from the placement area to see how the material in the field compares to the stockpile characterization samples.

CQC Monitor: _____ **Date:** 5-27-05
Approved by: _____ **Date:** 5-27-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

5-27-05



Waste Area Regrade

Cut to Fill

1.5" Gravel Placement on Geogrid

20

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/27/05 S M T W T (F) S

SHIFT: Night (1530-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Regrade:** Envirocon spread Rocky Flats Alluvium with a D10 dozer, a D6 dozer and a front end loader. They brought the material in with 6 side dumps, and 2 belly dumps. They compacted material using an 825 sheepsfoot compactor in the eastern part of the landfill extending into the middle section. They covered in the SID ditch with the material.
- **Cut/ Fill:** Envirocon used a D9 dozer and a Cat345 excavator to regrade fill inside the exclusion zone on the western end of the Landfill. The material was compacted with a Cat 825 sheepsfoot.
- **Buttress Area:** Envirocon removed excess material from the buttress area and placed in the SID ditch using a Cat 966 and a Komansu 420 front end loader.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

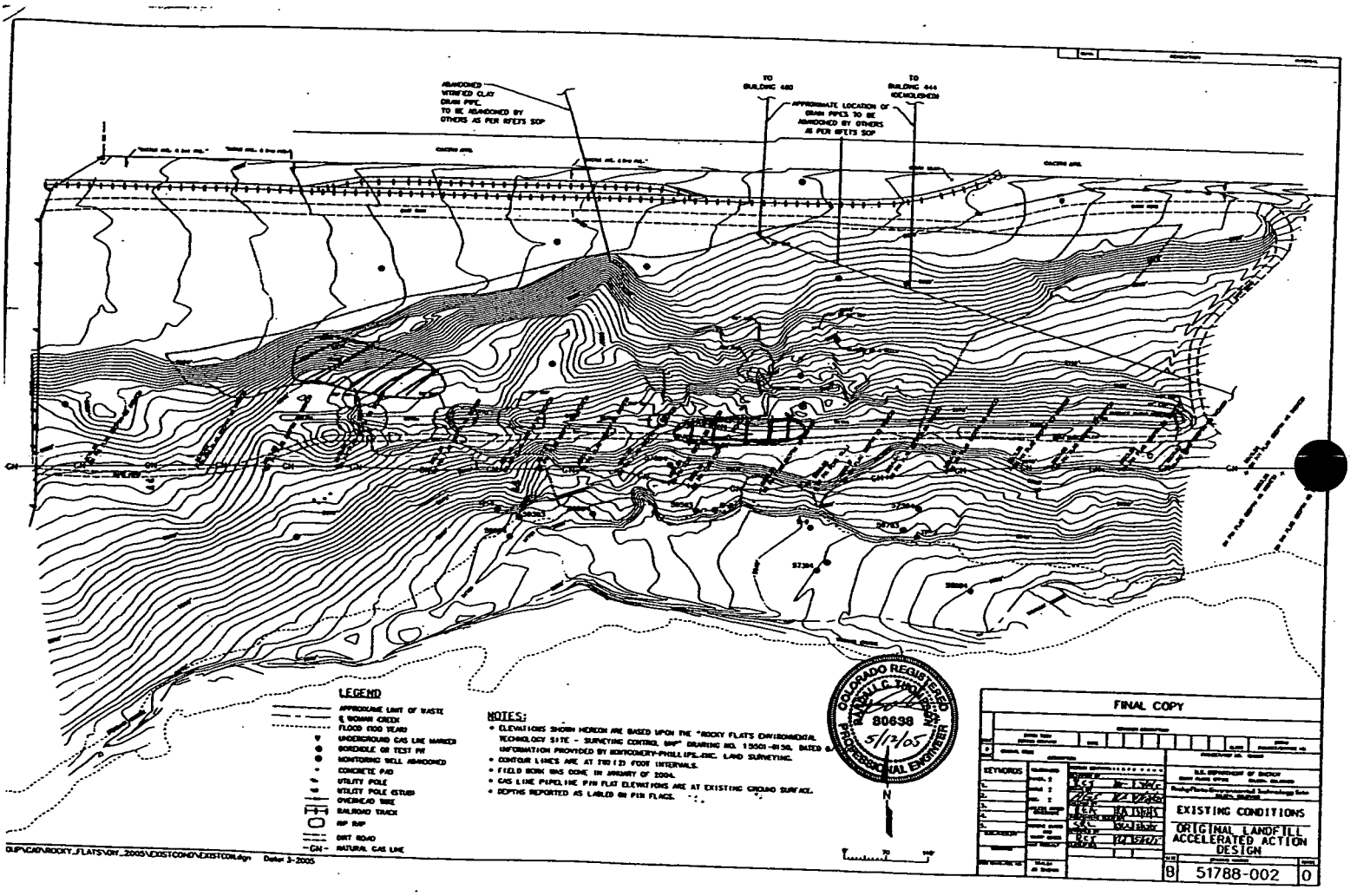
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 5/28/05
Approved by: [signature] **Date:** 5-28-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

5/27/05



- Cut/Fill inside ez.

- regrade

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/31/05 S M (T) W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1530, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used a Cat D10 dozer to place fill near the northeastern corner of the site. The fill was brought in form two sources, one from Centennial (alluvium) and the other from Pioneer (pit fines), and compacted by Cat 815, and 825 sheep foot compactors. A minimum of 4 passes were made on all fill placed onto site.
- **Waste Area:** A Cat D9 dozer, a Cat 815 sheep foot compactor and a cat 825 sheep foot compactor were used to regrade fill inside the exclusion zone on the western end of the Landfill.
- **Geogrid:** Envirocon used a Cat 966G front end loader to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 3+50. The haul was cut off early because the material being hauled in started having too many clay balls in it.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

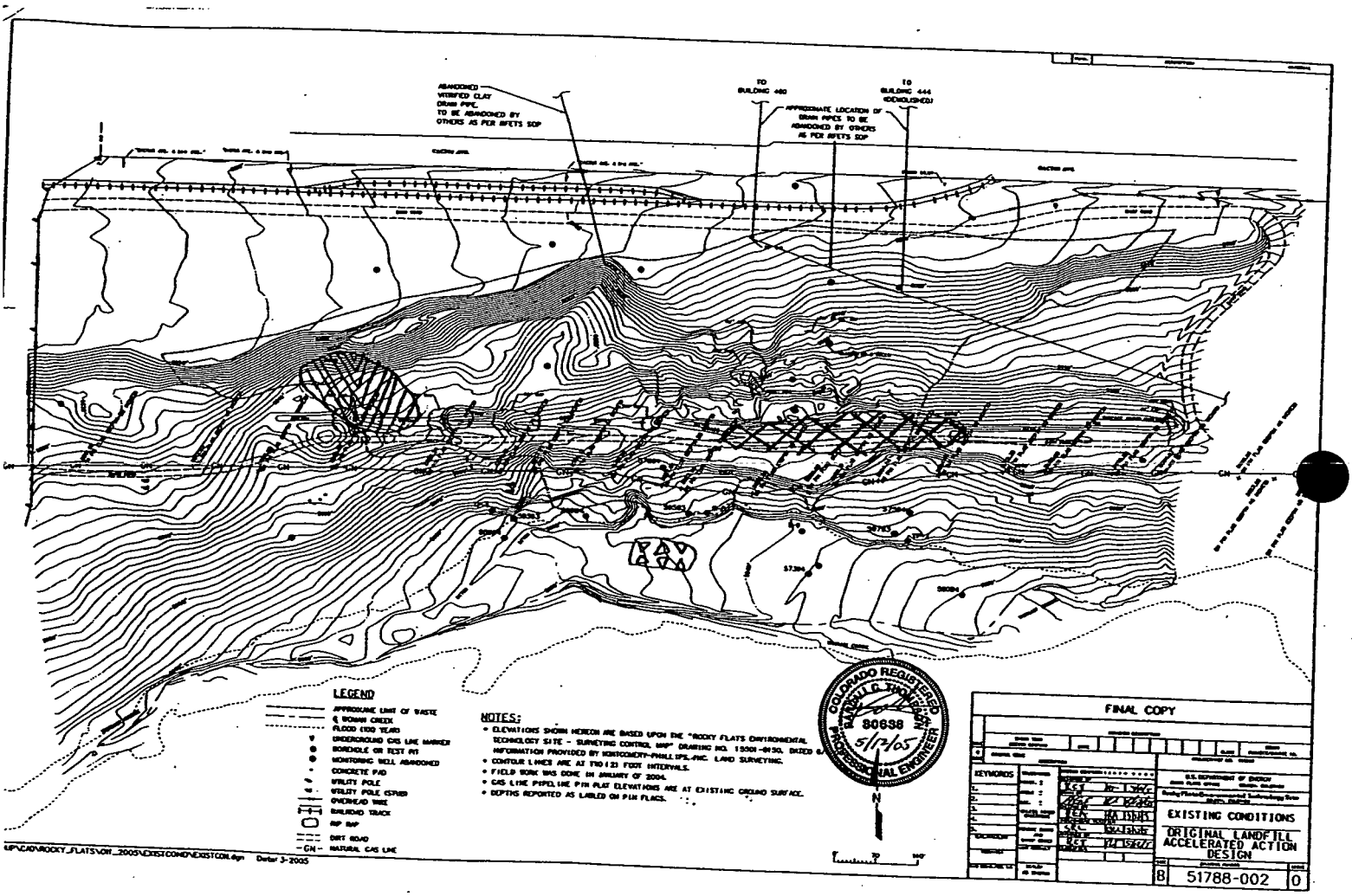
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: None.

CQC Monitor: [signature] **Date:** 5-31-05
Approved by: [signature] **Date:** 5-31-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

5-31-05



Waste Area Regrade

Fill Area

1.5" Rock Placement on Geogrid

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 5/31/05 S M (T) W T F S

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partially Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0230, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Regrade:** Envirocon brought in Rocky Flats Alluvium from Centennial with 4 side dumps and 4 belly dumps and spread with a D10 and a D6 dozer. They compacted the material using an 825 sheepsfoot compactor in the middle section. They covered in the SID ditch with the material.
- **Cut/ Fill:** Envirocon used a D10 and a D9 dozer to spread material in the northwestern corner of the landfill in the exclusion zone. They also used a Cat 345 track hoe to move material and an 825 sheepsfoot to compact the material.
- **Buttress Area:** Envirocon brought in 6 tandem dump trucks from Pioneer and 3 belly dumps and 4 side dumps from Centennial to bring in drain rock. They spread the material using a D6 dozer. Several areas of geo-grid were observed to have been torn and folded over by either the dozer or the trucks. The area affected was 50 feet north of the south edge of the landfill from stake 5+00 to 6+00 along a seam length. The area was uncovered with a Deere 310G backhoe. Three areas that were torn were patched and drain rock was placed on top of the patches to hold them in place. This was verbally approved by Patrick Neidermeyer of Tetra Tech in lieu of using zip ties to hold the patches into place. Geo-grid was placed from station 6+00 to 7+00.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

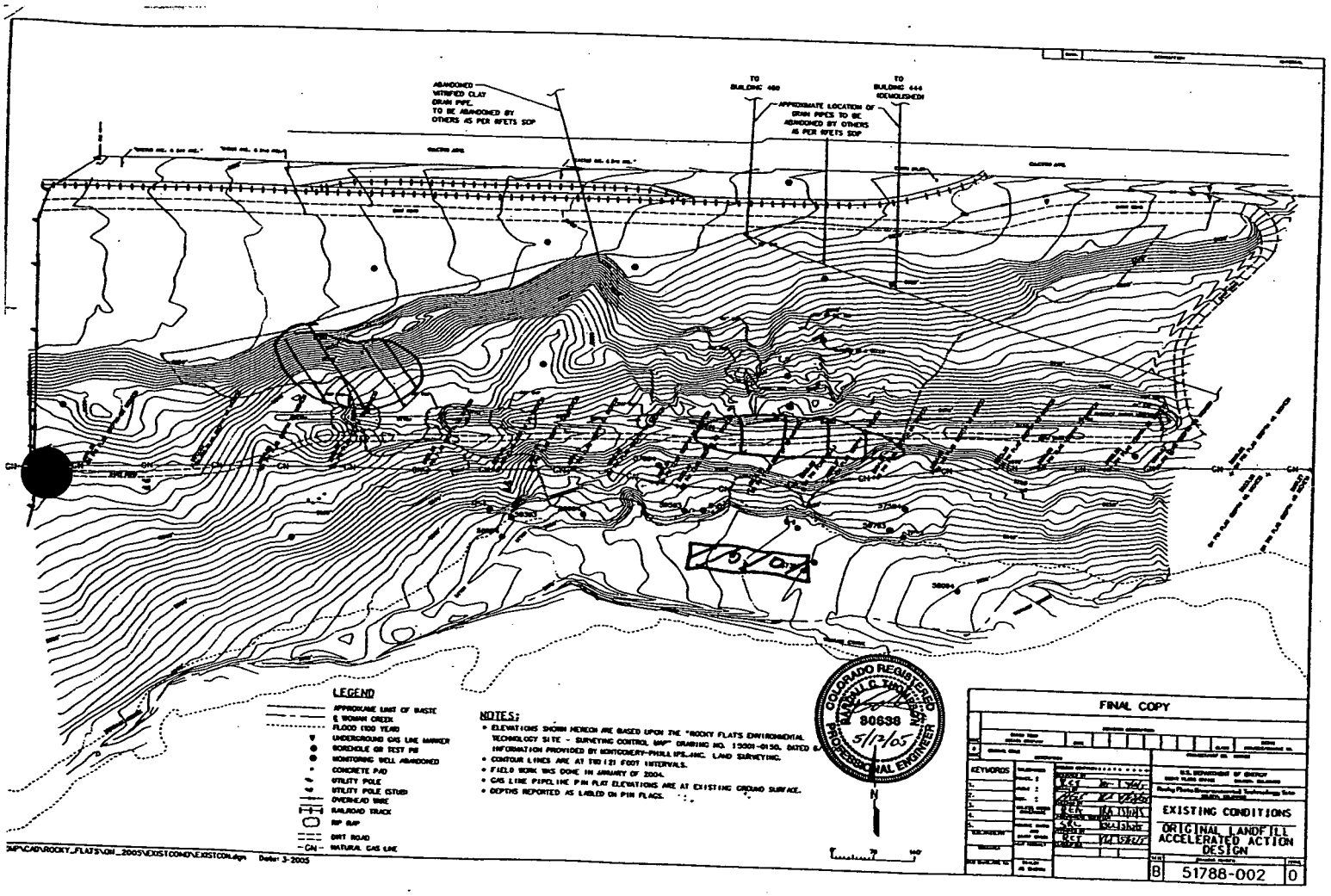
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt [illegible] Date: 6/1/05
Approved by: [illegible] Date: 6-1-05
File No.

GOLDER ASSOCIATES

ORIGINAL LANDFILL
ROCKY FLATS

5/31/05



- rock placement
- Patches

- Alluvium placement

- regrade

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/1/05 S M T W (T) F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1600, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used a three sheep-foot compactors, two 815's and an 825, to place and compact fill in the central portion of the landfill above where the SID ditch was. The fill was brought in form two sources, one from Centennial (alluvium) and the other from Pioneer (pit fines). A minimum of 4 passes were made on all fill placed onto site.
- **Waste Area:** Envirocon used Cat D9 and Cat D10 dozers to regrade fill in the waste area.
- **Geogrid:** Envirocon used a Cat D6 dozer to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 6+50 and up the northern slope of the buttress footprint.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

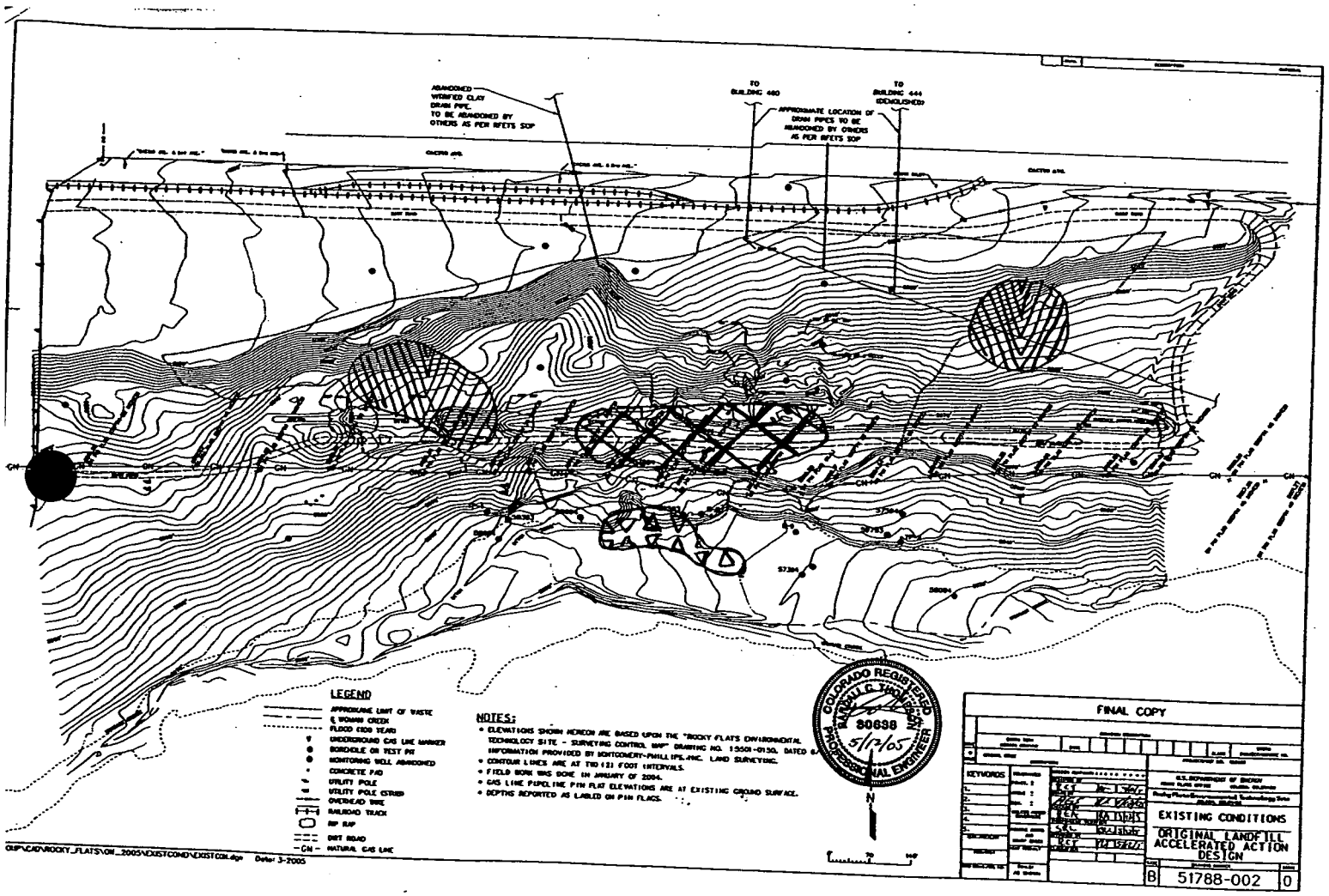
Other Meetings: *Drain Rock:* Met with Tetra Tech, Earth Tech and Envirocon and informed Envirocon that some of the material that was hauled in on the previous day was too high in the fines content in places. All parties came to an agreement that the areas that seemed to have greater fines content should be removed by a loader and replaced with fresh much cleaner drain rock.

Regulator meeting. Met with the EPA, CDPHE, Earth Tech, Tetra Tech, Envirocon, and DOE to discuss the construction progress for the last week. The main discussion topic was escorting of personnel down into the Landfill. The EPA wanted to know if it would be possible for their personnel to get the training necessary to allow them to walk around the site unescorted. Kaiser Hill informed them that there are no more rad. worker 2 training courses scheduled but the DOE representative stated that he would see if it would be acceptable for people without the rad. worker 2 training to walk into the site if they were not escorted but constantly in view of people who are rad worker 2 trained.

CQC Monitor: _____ **Date:** 6-2-05
Approved by: _____ **Date:** 6-2-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-1-05



Regrade in Exclusion Zone

Fill area

Gravel placement on Geogrid

26

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/01/05 S M T (W) T F S

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partially Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Regrade:** Envirocon brought in Rocky Flats Alluvium with 3 side dumps and 5 belly dumps. They spread the material with a D6 and a D5 dozer.
- **Cut/ Fill:** Envirocon used a D9 and a D10 dozer, and a Cat 345 excavator to remove material along the middle haul road.
- **Buttress Area:** Envirocon placed geo-grid from stake 7+00 to 9+00. They brought in drain rock with 3 side dumps and 5 belly dumps. They also placed drain rock east and north on the geo-grid with a D5 and a D6 dozer and a Cat 140H motor grader.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

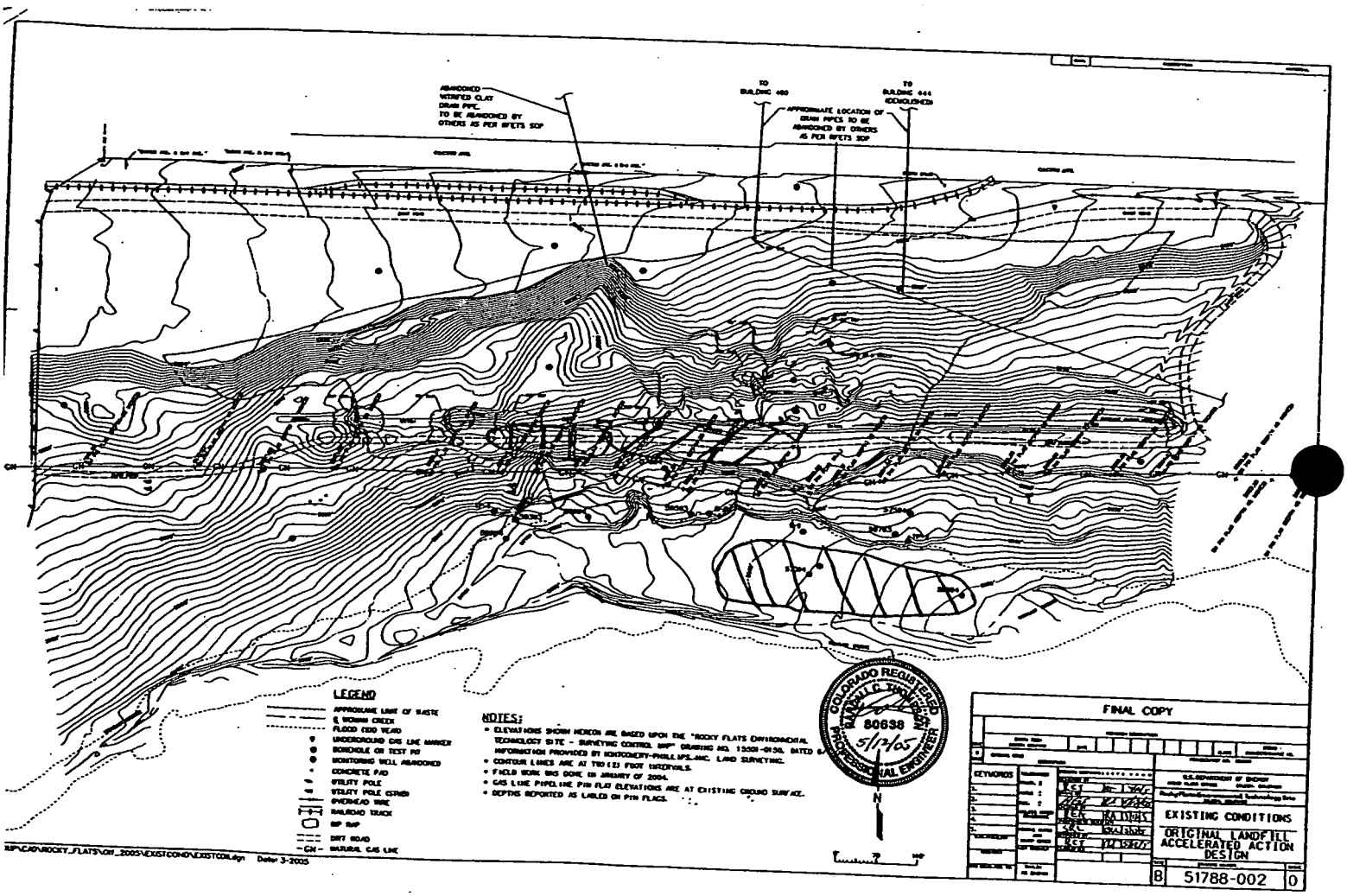
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 6/2/05
Approved by: [signature] **Date:** 6-2-05
File No.

27

ORIGINAL LANDFILL
ROCKY FLATS

6/1/05



- Geogrid and Drain Rock

- Regrade / RFA

- Cut / Fill

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/2/05 S M T W (T) F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1600, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used three sheep-foot compactors, two 815's and an 825, to place and compact fill in the central portion of the landfill above where the SID ditch was. The fill was brought in form two sources, one from Centennial (alluvium) and the other from Pioneer (pit fines). A minimum of 4 passes were made on all fill placed onto site.
- **Waste Area:** Envirocon used Cat D9 dozer and a Cat 345 excavator to regrade fill in the waste area.
- **Geogrid:** Envirocon used a Cat D5 dozer to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 7+50 and up the northern slope of the buttress footprint.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

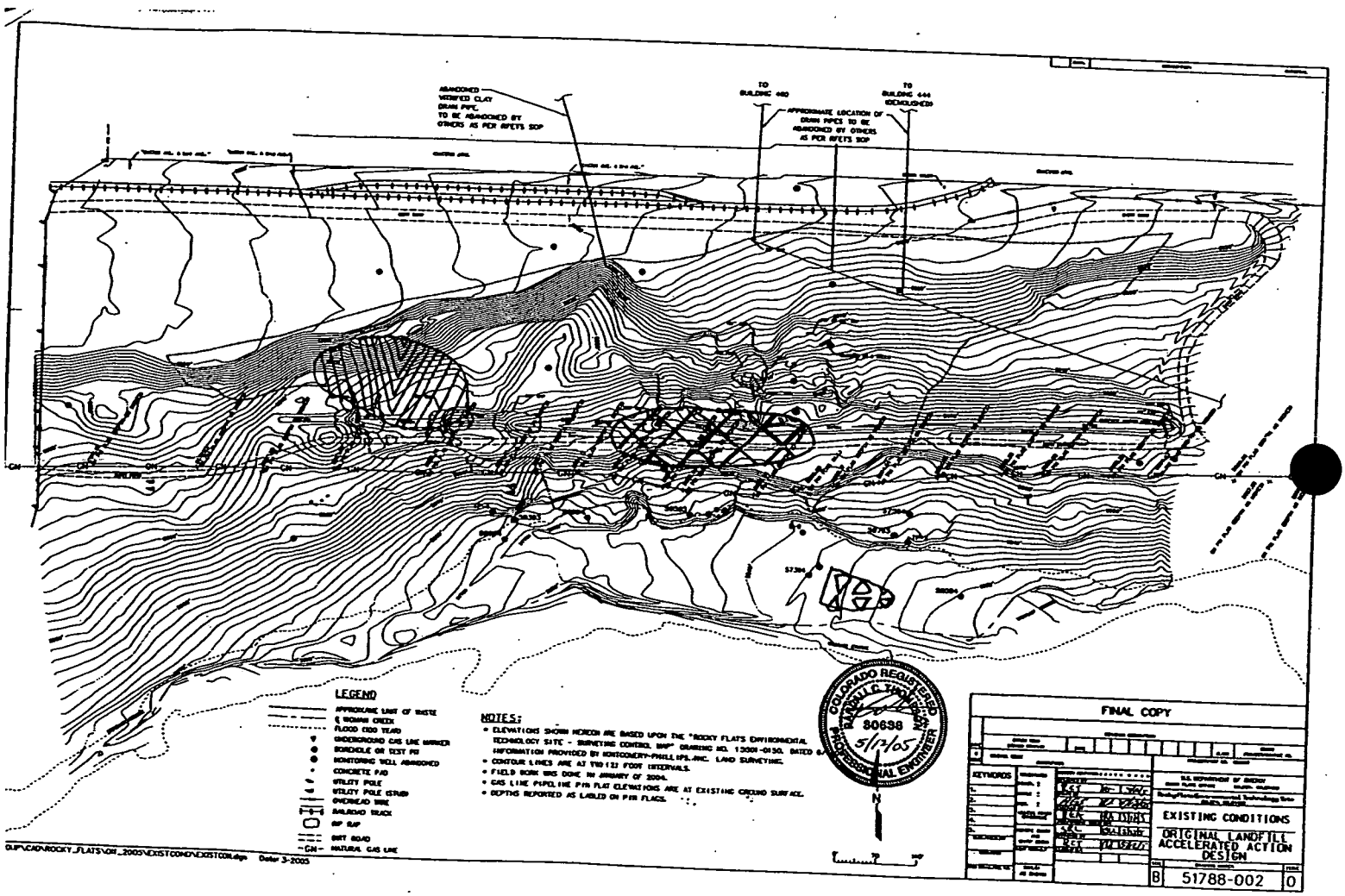
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with Steve McQueary about rad worker 1 training. A new session of rad worker 1 will be conducted on Tuesday the 7th of June. This training will allow personnel to move about the site unescorted. Golder personnel to be on site are being contacted to see if they are available to be on site Tuesday at 6:30 am.

CQC Monitor: _____ **Date:** 6-3-05
Approved by: _____ **Date:** 6-3-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-2-05



Waste Area Regrade

Fill Area

1.5" Gravel placement on Geogrid

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/02/05 S M T W (T) F S

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** Showers

CLOUD COVER: Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:** A D9 and a D10 dozer and a Cat 345 excavator spread material in the north-central part of the landfill in the exclusion zone. 5 belly dumps and 4 side dumps brought in Rocky Flats Alluvium from Centennial. A D8 dozer and a 966G front end loader spread the material in the northwest corner of the landfill. An 825 sheepsfoot compacted the alluvium.
- **Buttress Area:** Envirocon placed drain rock with a D5 dozer. They placed geo-grid from station 7+00 to 10+00. They ripped the area using a D5 dozer.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

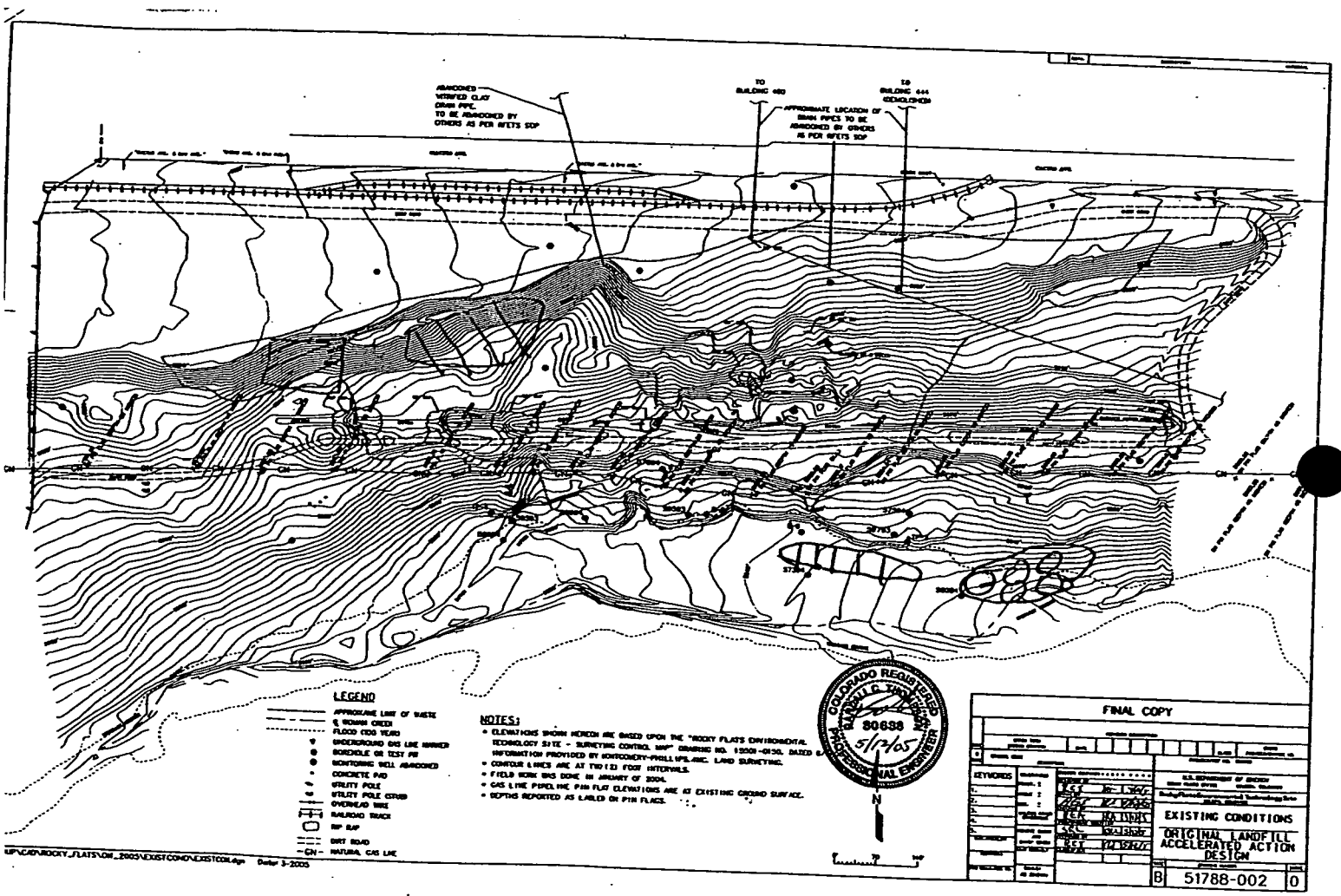
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 6/3/05
Approved by: [signature] **Date:** 6-3-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

6/2/05



- Fill

- Cut

- Drain Rock Placement

- Geo-grid placement

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/3/05 S M T W T (F) S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1530, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/Fill:** Envirocon used two sheep-foot compactors, a Cat 815 and a Cat 825, to place and compact fill in the central portion of the landfill above where the SID ditch was. The fill was brought in form two sources, one from Centennial (alluvium) and the other from Pioneer (pit fines). A minimum of 4 passes were made on all fill placed onto site.
- **Waste Area:** Envirocon used Cat D9, and Cat D10 dozers along with a Cat 345 excavator, and a Cat 825 sheep foot compactor to regrade fill in the waste area.
- **Geogrid:** Envirocon used a Cat D5 dozer to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 8+50 and up the northern slope of the buttress footprint.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

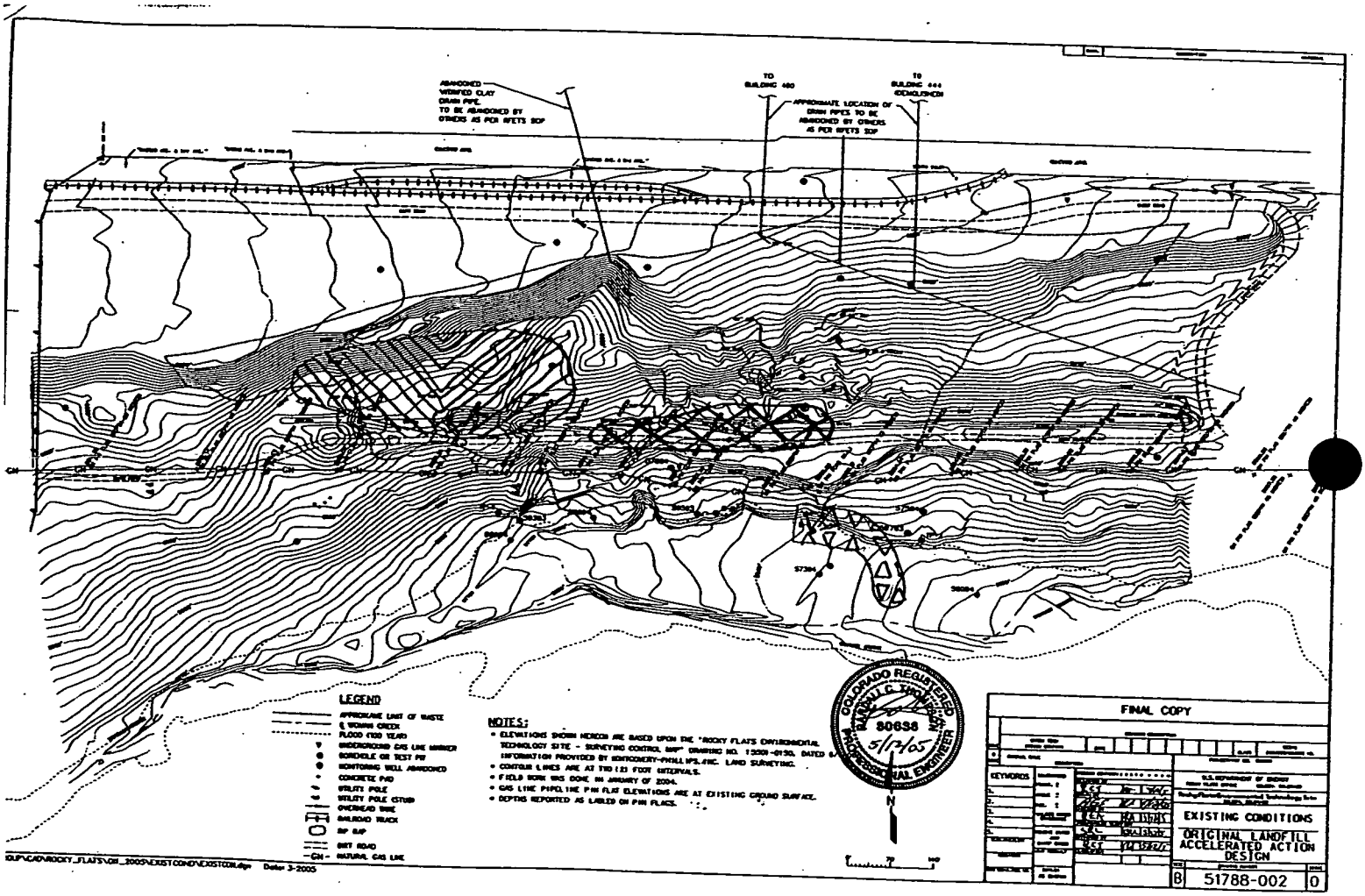
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Spoke with Steve McQueary of Envirocon about the rad worker 1 training class on Tuesday. Steve told me that the class was called off because the site was going to be downgraded on Monday to allow for people without rad worker training to enter. The only areas that will require rad worker training will be the exclusion zone areas.

CQC Monitor: _____ **Date:** 6-4-05
Approved by: _____ **Date:** 6-4-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-3-05



Waste Area Regrade

Regrade Fill Area

1.5" Gravel placement onto Geogrid

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/03/05 S M T W T (F) S

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** Rain

CLOUD COVER: Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1400- 1900, 5.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

Eliminate

- **Cut/ Fill:** 5 side dumps and 6 belly dumps brought in Rocky Flats Alluvium. A D8 dozer spread the material and an 825 compactor compacted it.
- **Buttress Area:** 6 tandem trucks brought in drain rock.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

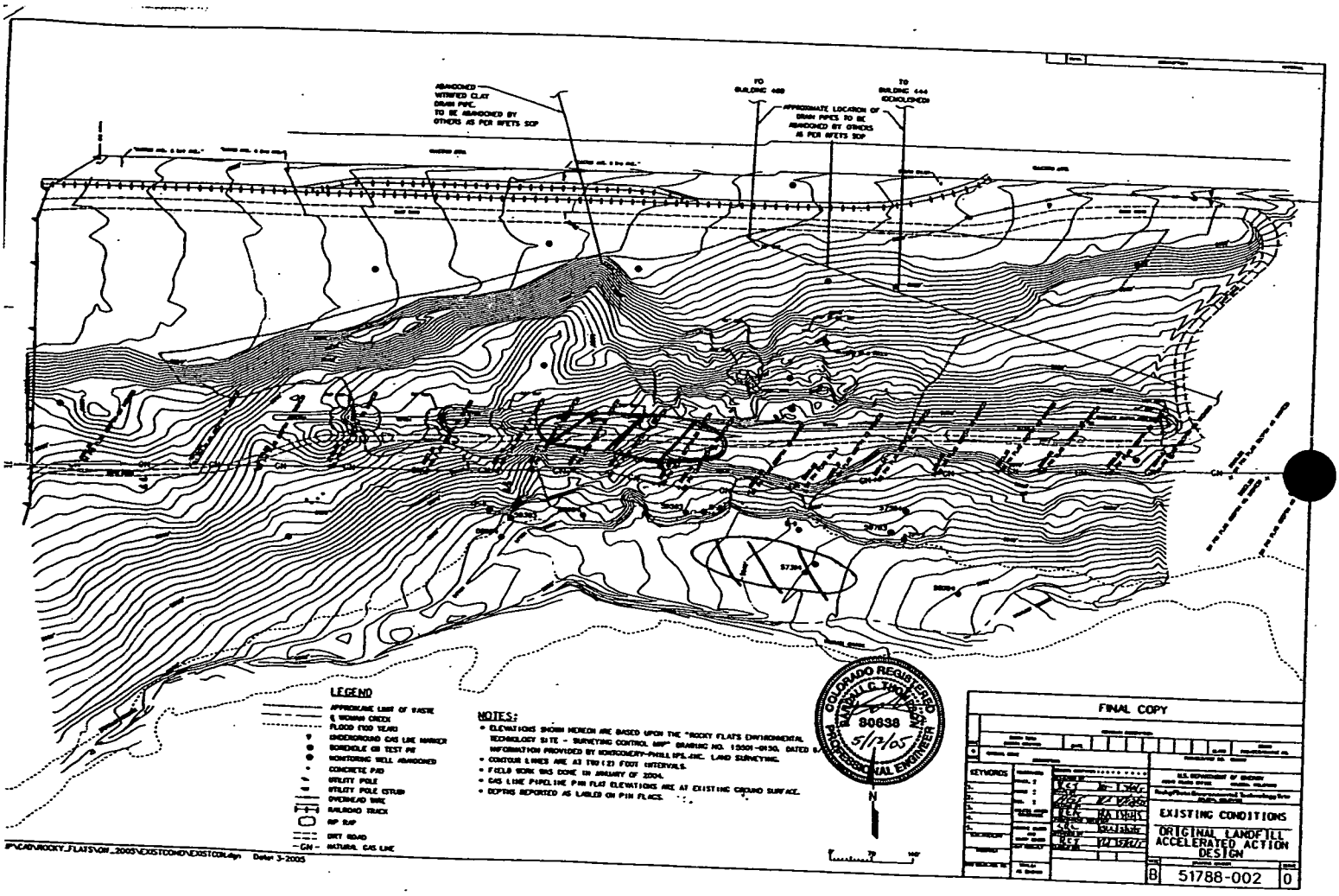
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 6/3/05
Approved by: [signature] **Date:** 6-3-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

6/3/05



- Cut/Fill

- Drain Rock

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/4/05 S M T W T F (S)

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** Rain **PM:** Drizzle

CLOUD COVER: Mostly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1600, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Waste Area:** Envirocon used Cat D9, and Cat D10 dozers, and a Cat 825 sheep foot compactor to regrade fill in the waste area.
- **Geogrid:** Envirocon used Cat D5 and Cat D6 dozers to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 8+75 and up the northern slope of the buttress footprint.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

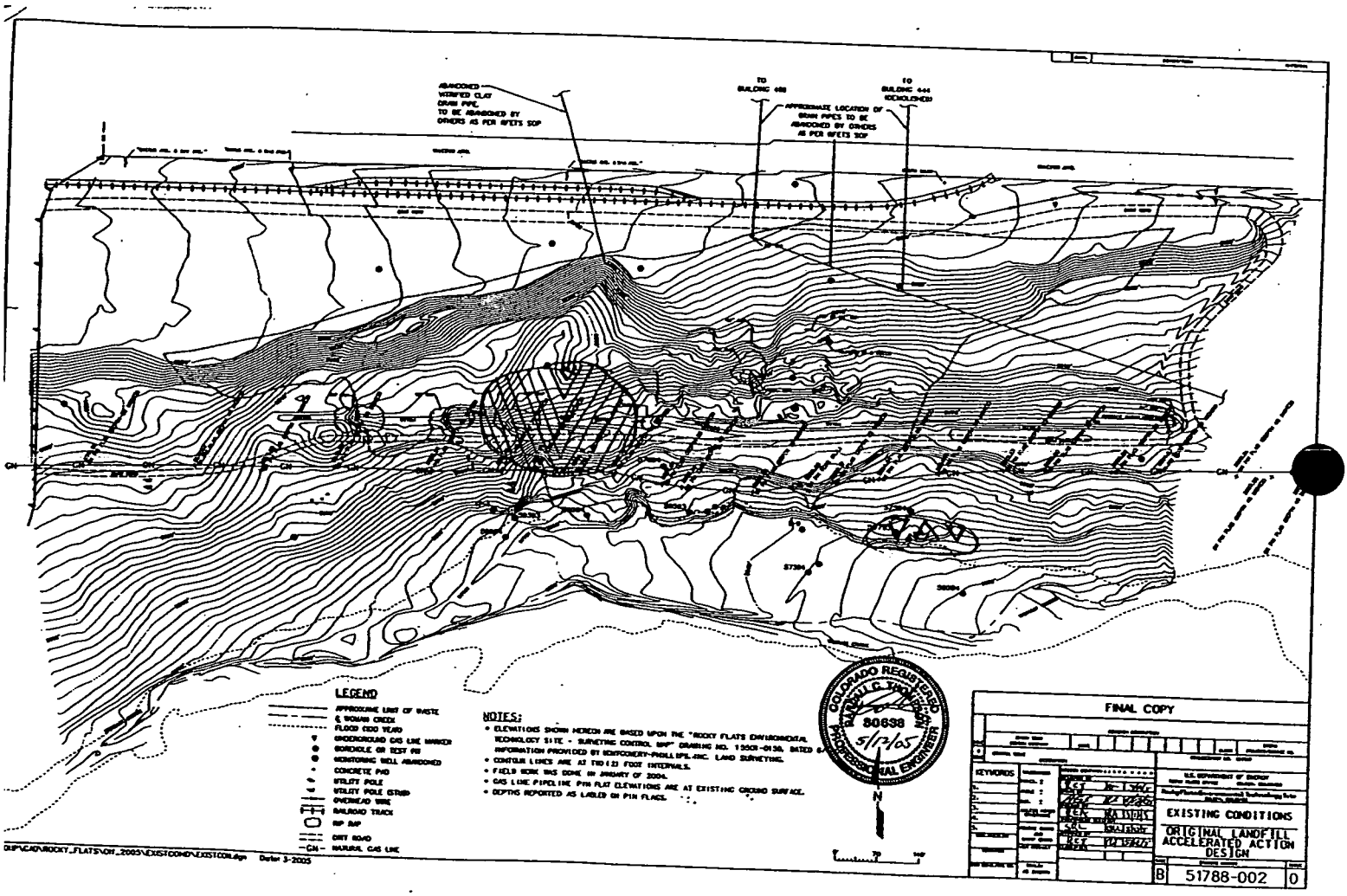
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: None.

CQC Monitor: _____ **Date:** 6-4-05
Approved by: _____ **Date:** 6-5-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-4-05



Waste Area Regrade

1.5" Gravel Placement on Geogrid

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/04/05 S M T W T F (S)

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

James Koffer (1400- 0100,11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:** A D8 dozer and an 825 compactor cleared wet material and stockpiled it to the east on the top. A D9 cut a high spot on the central haul road within the exclusion zone.
- **Buttress Area:** Drain rock was placed with a D6 and D5 and compacted with a smooth drum roller to station 8+25. There are large areas of aggregate drain rock that appear to have high amounts of fines and clay, not in compliance with specifications. A sample of drain rock was taken for analysis. Location of sample was staked and surveyed in by Flatirons.

SUMMARY OF QC TESTING: None.

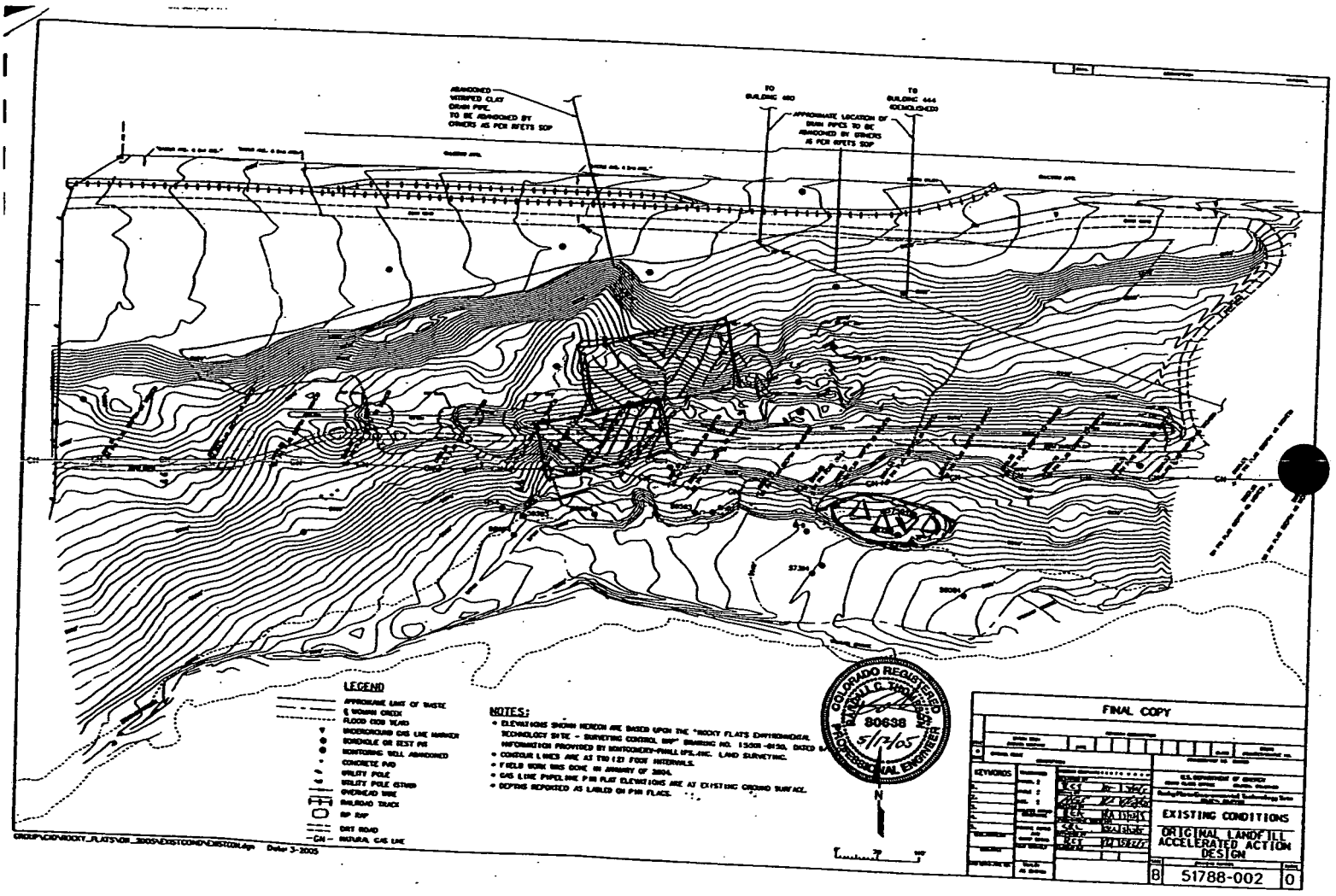
Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

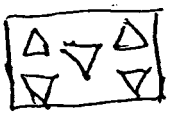
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: [signature] **Date:** 6-4-05
Approved by: [signature] **Date:** 6-6-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS



WASTE AREA REGRADE (EXCLUSION ZONE):



1.5" DRAINROCK placement on Geogrid

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/6/05 S (M) T W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Waste Area:** Envirocon used Cat D9, and Cat D10 dozers, Cat 345 excavator and a Cat 825 sheep foot compactor to regrade fill in the waste area.
- **Regrade Fill:** Envirocon used a Cat D8 dozer and a cat 825 sheep foot compactor to place and compact fill above the footprint of the buttress fill area.
- **Geogrid:** Envirocon used Cat D5 and Cat D6 dozers to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 9+50 and up the northern slope of the buttress footprint.

SUMMARY OF QC TESTING:

Took one sample of drainage rock to lab for gradation (DR-2).

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

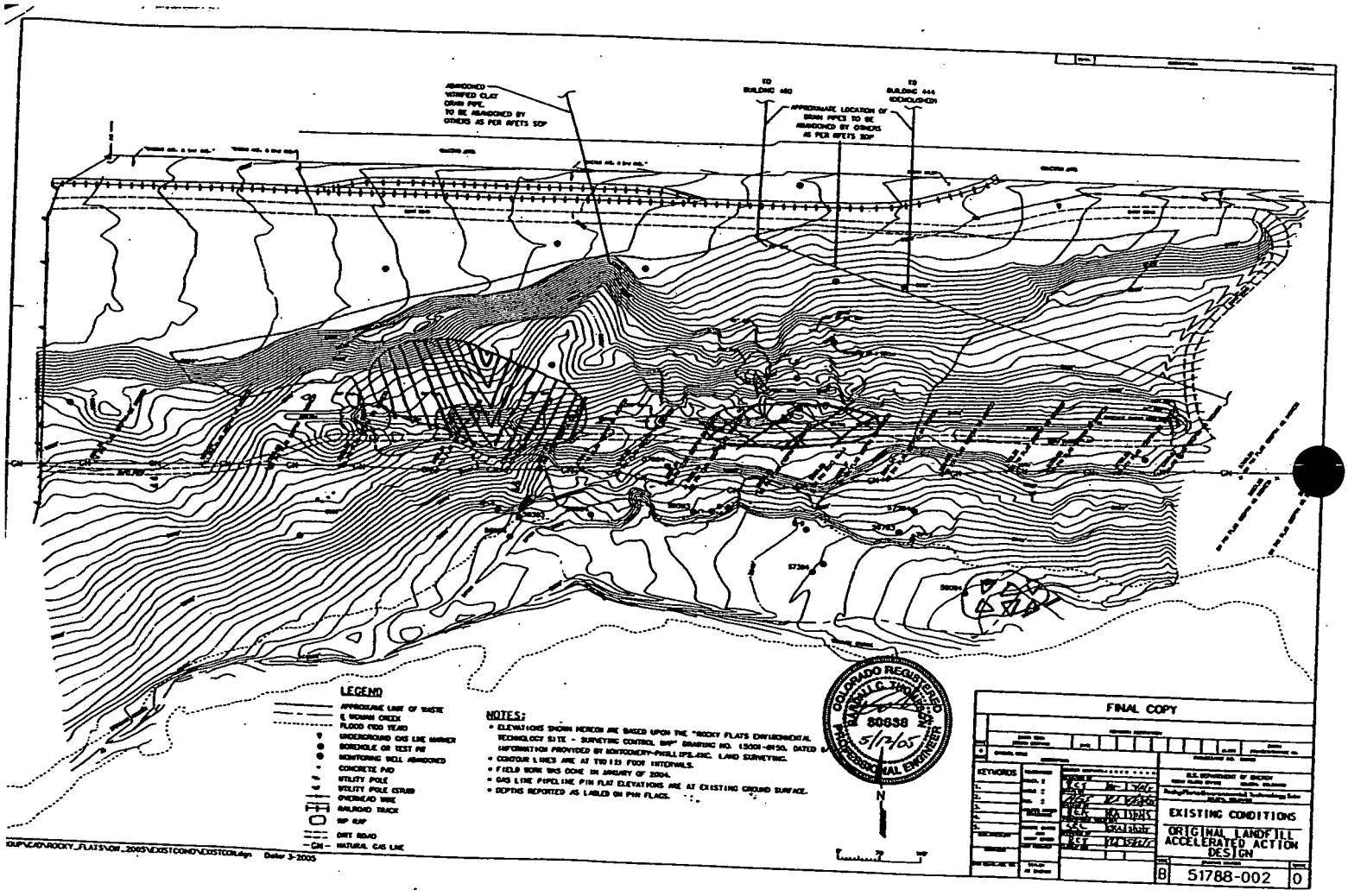
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Discussed the fines content of the drainage gravel with Kaiser Hill, Evirocon, Earth Tech, and tetra tech. Kaiser Hill and Envirocon decided to ask Golder to pull another gradation on the material and then submit an RFI to see if Earth Tech will accept the out of spec drainage rock placed in the buttress footprint.

CQC Monitor: _____ **Date:** 6-7-05
Approved by: _____ **Date:** 6-7-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-6-05



Regrade Fill

Waste Area Regrade

1.5" Gravel Placement on Geogrid

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/06/05 S (M) T W T F S

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly cloudy **WIND:** Strong gusts early

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

Eliminate

- **Cut/ Fill:** Envirocon used two D8 dozers and an 825 sheepsfoot compactor to spread and compact material in the northwest corner of the landfill. They used a D9 dozer to spread material in the north central section of the landfill above the middle haul road. They had 6 bellies and 3 side dumps bring in material.
- **Buttress Area:** Envirocon used a D5 dozer to spread drain rock around station 8+75.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

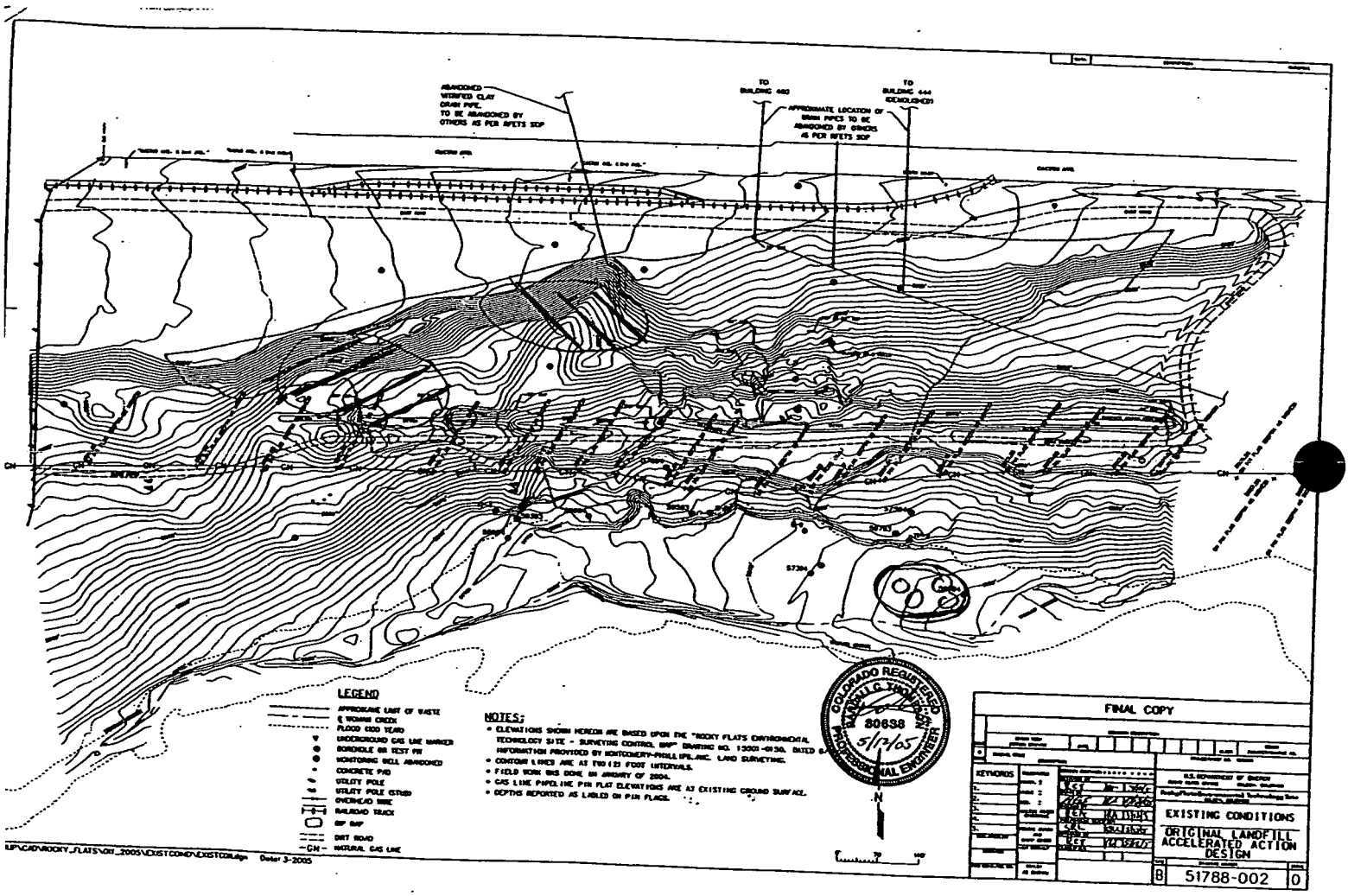
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 6/6/05
Approved by: [illegible] **Date:** 6-6-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

6/6/05



- Fill area

- cut area

- Drain rock placement

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/7/05 S M (T) W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1600, 11.5 hrs)
Ron Didonado (0700-1600, 9.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Waste Area:** Envirocon used Cat D9, and Cat D10 dozers, Cat 345 excavator and a Cat 825 sheep foot compactor to regrade fill in the waste area.
- **Regrade Fill:** Envirocon used a Cat 825 sheep foot compactor to place and compact fill above the footprint of the buttress fill area. A Cat 140H was also on hand to regrade the haul road.
- **Geogrid:** Envirocon used Cat D5 dozer to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by tandems from Centennial. Gravel was placed out to Station 10+00 and up the northern slope of the buttress footprint.

SUMMARY OF QC TESTING:

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

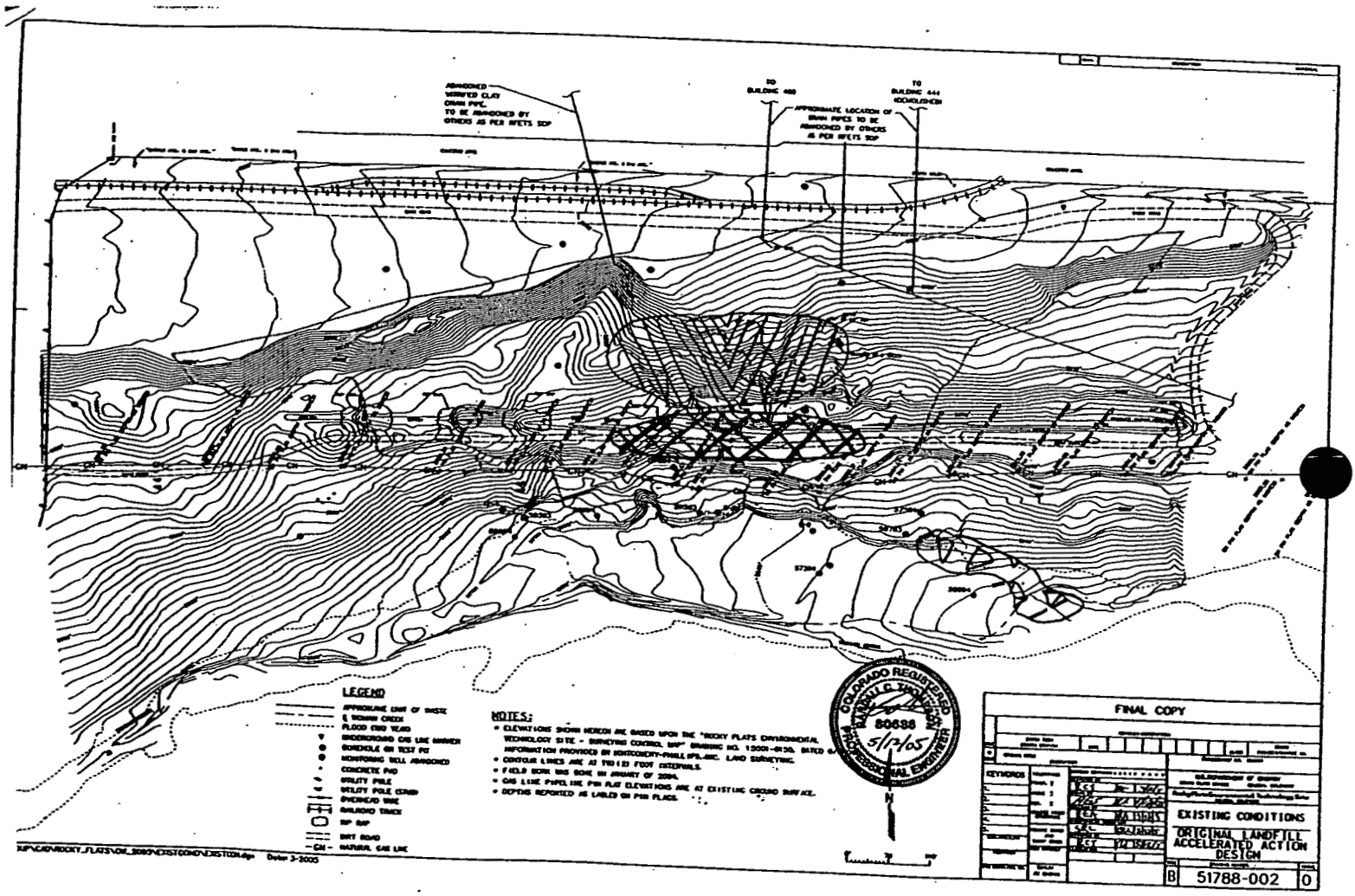
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: none

CQC Monitor: _____ **Date:** 6-7-05
Approved by: _____ **Date:** 6-7-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-7-05



Waste Area Regrade

1.5" gravel drain placement on Geogrid.

Fill Area

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/07/05 S M (T) W T F S

SHIFT: Night (1500-0130)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly cloudy **WIND:** light

GAI PERSONNEL HOURS CHARGED:

Matt Cashimer (1430- 0200, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

Eliminate

- **Cut/ Fill:** Envirocon used a D8 and a D10 dozer and an 825 sheepsfoot compactor to spread material in the east end. They brought the material in with 3 side dumps and 5 bellies. They used a D9 and D10 dozer to regrade material in the north central section of the landfill in the exclusion zone. They used an 825 sheepsfoot compactor to spread and compact the material in the exclusion zone.
- **Buttress Area:** Envirocon used a D6 dozer to spread drain rock around station 7+75. They brought in the drain rock with tandems and arctics.

SUMMARY OF QC TESTING: None.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance to the proper specifications. All requirements of the QC Tables have been observed and met.

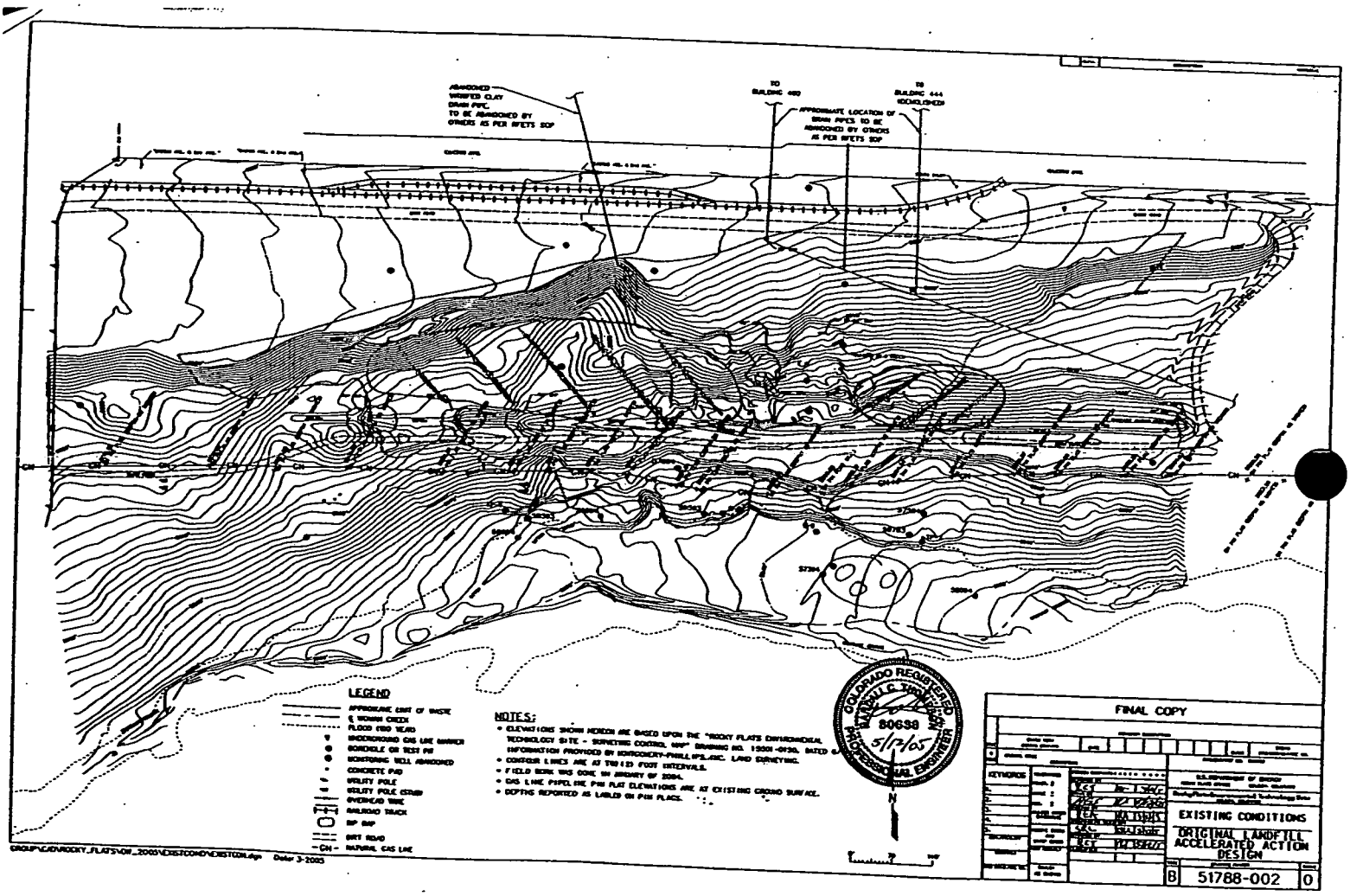
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

CQC Monitor: Matt Cashimer **Date:** 6/7/05
Approved by: [signature] **Date:** 6-8-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

6/7/05



Fill area

- Cut area

- Drain Rock

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/8/05 S M T (W) T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** Low

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1300, 9.0 hrs)
Ron Didonado (0700-1600, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Waste Area:** Envirocon used Cat D9, and Cat D10 dozers, Cat 345 excavator and a Cat 825 sheep foot compactor to regrade fill in the waste area.
- **Regrade Fill:** Envirocon used a Cat 825 sheep foot compactor to place and compact fill above the footprint of the buttress fill area. A Cat 140H was also on hand to regrade the haul road. End dumps and side dumps brought in alluvium from Centennial and pit fines from Pioneer to place as regrade fill.
- **Geogrid:** Envirocon used Cat D5 dozer to place 1.5" gravel on top of geogrid of the buttress footprint. Material was hauled in by Volvos from Centennial. Gravel was placed out along the southern edge of the buttress footprint. Geotextile fabric was placed along the southern edge of the Drainage gravel going east to west.

SUMMARY OF QC TESTING:

Took two QC samples on regrade fill materials. One sample was taken on the pit fines from Pioneer (RF-1P) and the other from the alluvium from Centennial (RF-2C).

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

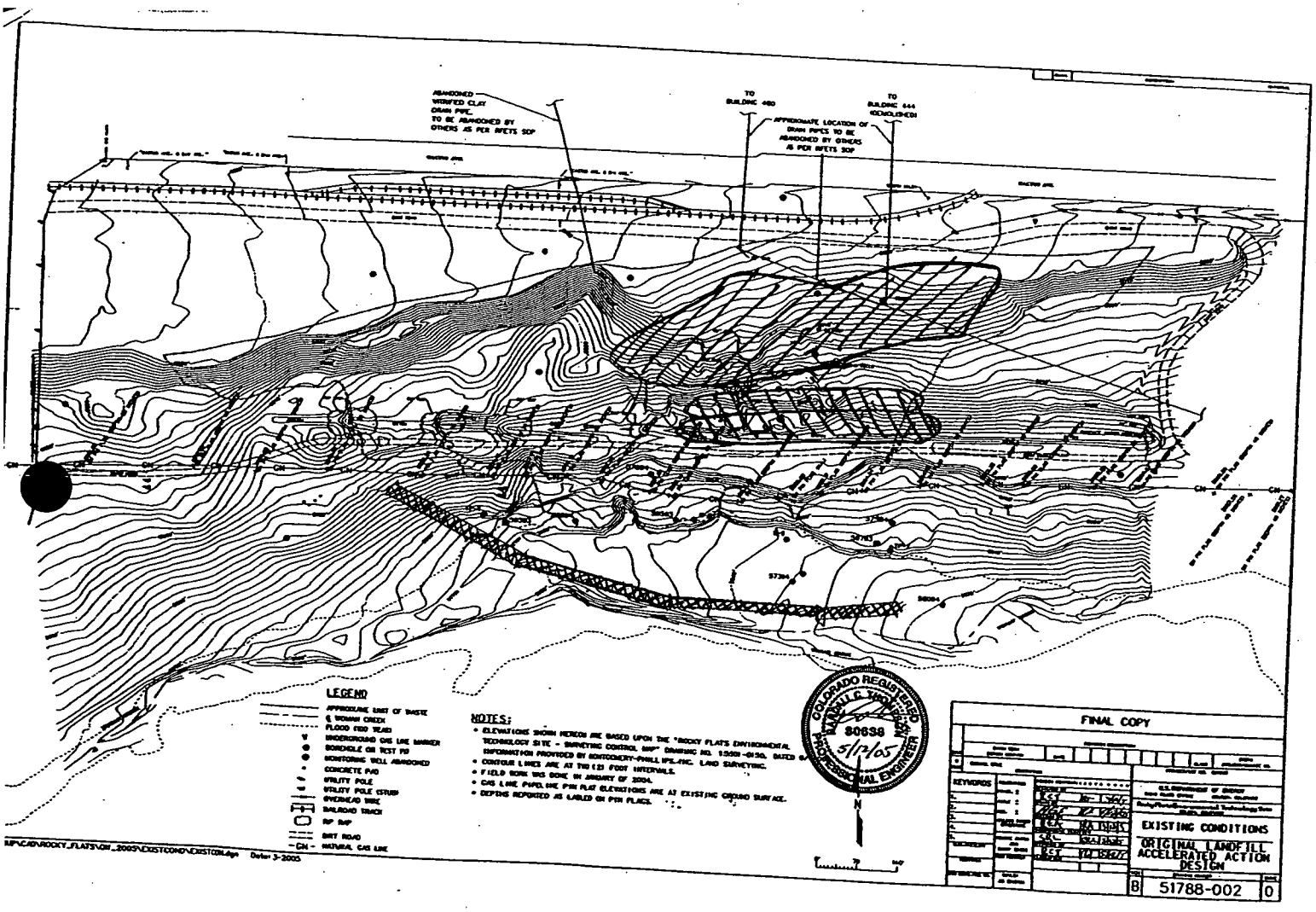
Other Meetings: Attended contractor / regulator meeting at 10:00 a.m. Items discussed included safety, schedule, QA/QC methods, etc.

Discuss generation of an Engineering Change Request in order to drop LA abrasion, sodium sulfate soundness, and absorption testing from the Drain Rock required testing.

CQC Monitor: _____ **Date:** 6-8-05
Approved by: _____ **Date:** 6-8-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6 - 08 - 05
Day Shift.



- GEOTEXTILE PLACEMENT

- REGRADING WASTE

- REGRADE FILL PLACEMENT

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/24/05 S M T W T (F) S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Mostly Clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Michael Place (0430-1600, 11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Buttress Fill:** Envirocon used a Cat 140 motor grader, a Cat D10 dozer, a Cat 815 compactor, and a Cat 825 compactor to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area.
- **2' Cover:** Envirocon used a Cat D5 Dozer to place alluvium in a 2 foot lift on top of regrade fill material in the northwestern section of the landfill.

SUMMARY OF QC TESTING:

Density Tests

Test #	% off MC	% Comp.	Pass/Fail
QC-BF-DT-52D	-0.8	98%	PASS
QC-BF-DT-56	1.8	97%	PASS
QC-BF-DT-57	0.6	99%	PASS
QC-BF-DT-58	1.7	98%	PASS
QC-BF-DT-59	1.8	97%	PASS
QC-BF-DT-60	-0.7	101%	PASS

QC-BF-DT-52D was a retest of QC-BF-DT-52 which finally met specifications.
Ran 1 sand cone test (QC-BF-SC-05) at the same location as nuclear density test QC-BF-DT-60.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

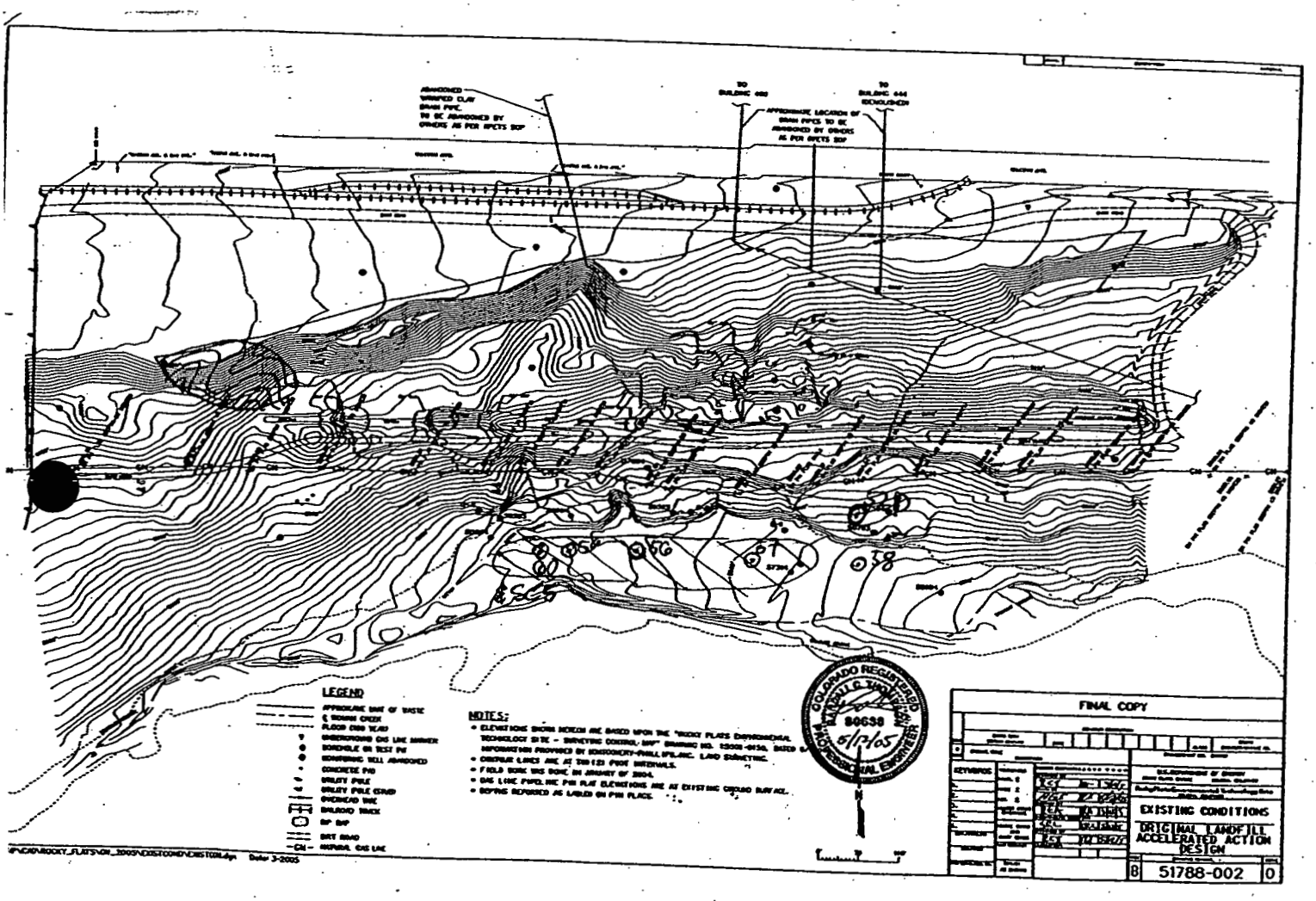
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: none.

CQC Monitor: _____ **Date:** 6-24-05
Approved by: _____ **Date:** 6-24-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-24-05



Buttress Fill area

2 foot Cover

41

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/24/05 S M T W T (F) S

SHIFT: Night (1500-0130)

SHUTDOWNS: 1700 to 2200 hours, lightning and rain shutdown

PRECIPITATION: **AM:** none **PM:** rain

CLOUD COVER: cloudy **WIND:** 5-10mph

GAI PERSONNEL HOURS CHARGED:

James Koffer (1430- 0200,11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  Two CAT D8 dozers and CAT D5 worked placing RF alluvium and grading the cap on the far west side of the project. Additionally two CAT earthmovers brought in stockpiled RF alluvium from the east end of the site. This work was performed after 2200 hours when the lightning caution was removed.

- **Buttress Area:** A Cat 815 compactor, a CAT D10 dozer worked to place buttress fill up over the geotextile on the east end of the buttress fill area. The material being hauled in and placed appeared wet, and again, at the request of the QA authority, several spot checks were made across the eastern half of the buttress fill slope. All of these were in excess of 14% moisture. The eastern quarter was in excess of 17% moisture. The same was done with the eastern half of the area across the flat; this was found to be about 16% moisture. This was again reported to the QA authority who requested that work be stopped until the material could be adequately ripped and windrowed to dry to proper moisture content prior to compaction. Envirocon ripped the length of the Buttress Fill area across the flat to dry the fill to proper moisture content for proper compaction. This took place in the very beginning of the shift, similar to the night of 6/23. The ripping was completed around 1700 hrs. No further work was done in the Buttress Fill area for the rest of the night.

- **Geotextile Fabric:** Envirocon continued to place geotextile over drain rock in advance of placing buttress fill material to the far east end of the drain rock.

SUMMARY OF QC TESTING:

Golder ran several spot nuclear moisture tests along the area of newly dumped and compacted natural fines in the eastern quarter of the Buttress Fill area. This was done at the request of the QA authority and Envirocon foreman. The material tested along the eastern quarter of the buttress slope and the eastern half of the flat was tested and found to be out of specification for moisture, no further material was placed or spread. Additionally, no QC density tests were run until the material could be ripped, dried, and replaced in accordance to specifications.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

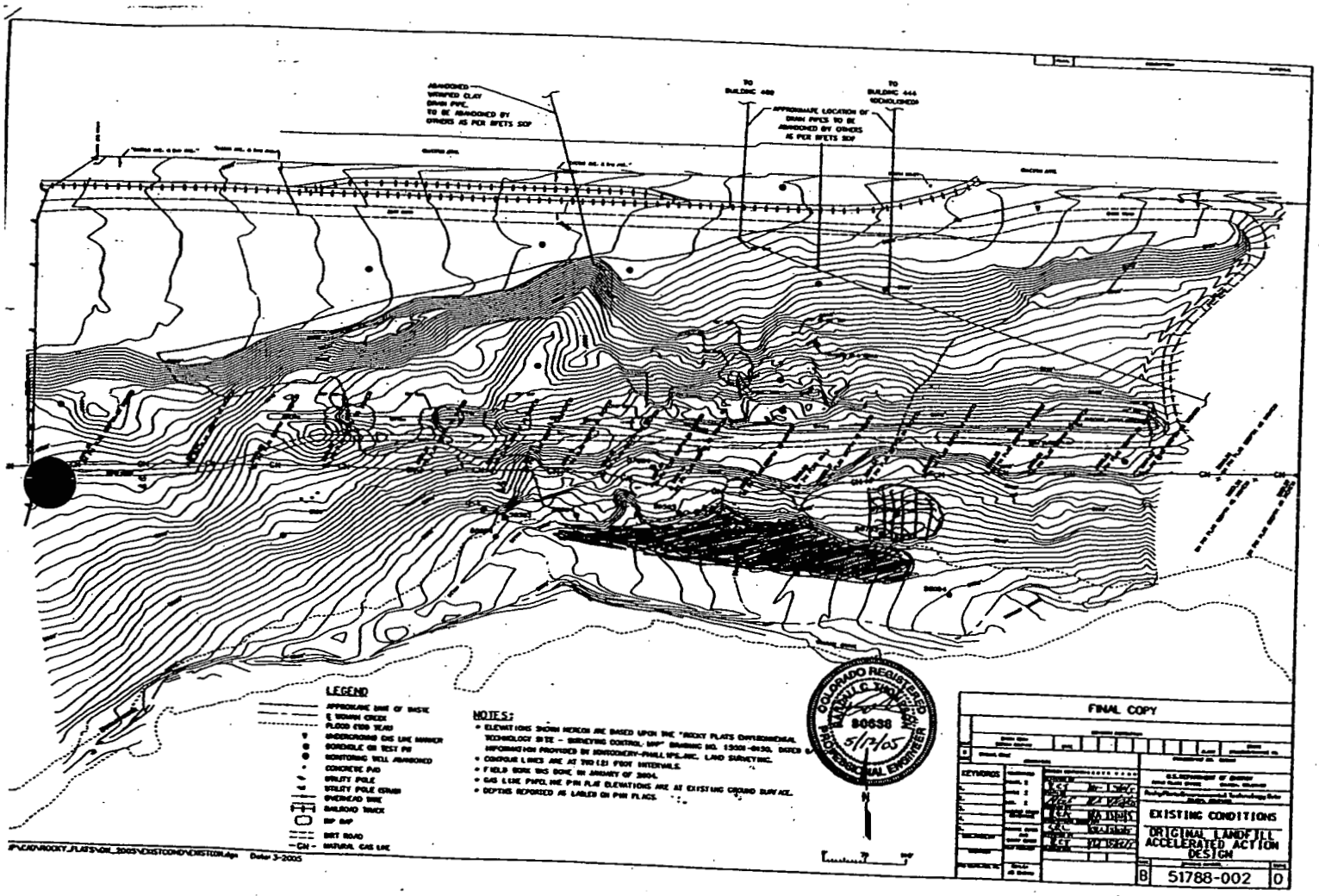
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Discussion with foreman: Discussed spot moisture test results with QA authority and the Envirocon foreman. It was agreed between these two that the material was too wet to be placed and compacted, similar to the discussion of 6/23. The material was ripped and windrowed to dry over the weekend.

CQC Monitor: _____ **Date:** 6/24/05
Approved by: _____ **Date:** 6/27/05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT 6/24/05



Geotextile PLACEMENT

Buttress fill material, ripped and windrowed for drying

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/27/05 S (M) T W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** A Cat D9 dozer, a Cat D10 dozer, and a Cat 966 loader, spread and placed cover fill materials from the from the temporary east stockpile by use of Cat 327 scrapers and Volvo articulated trucks. Later, the Articulated Volvo trucks were loaded at the Centennial plant with Rocky Flats Alluvium and were dumped at the bottom of the Regrade fill areas for placement and re-grading by the dozers.

- **Buttress Fill:** Envirocon used a Cat D5 dozer, a D9 dozer, a Cat 140 motor grader, a Cat 815 compactor, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. Volvo articulated trucks continued haulage of material to the area of the buttress fill embankment slopes. Areas of geotextile damage were repaired or replaced prior to placing additional Buttress fill materials above.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-61 through QC-BF-DT-81) on Buttress Fill materials. Test number QC-BF-DT-72 failed initial moisture and density testing and was later re-worked and retested with passing results prior to approval of placement of new buttress fill materials.

Golder obtained sample number BF-06 and transported it to the Golder laboratory for index testing. Golder obtained a sample QC-BF-DT-70 for oven dry moisture content testing.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

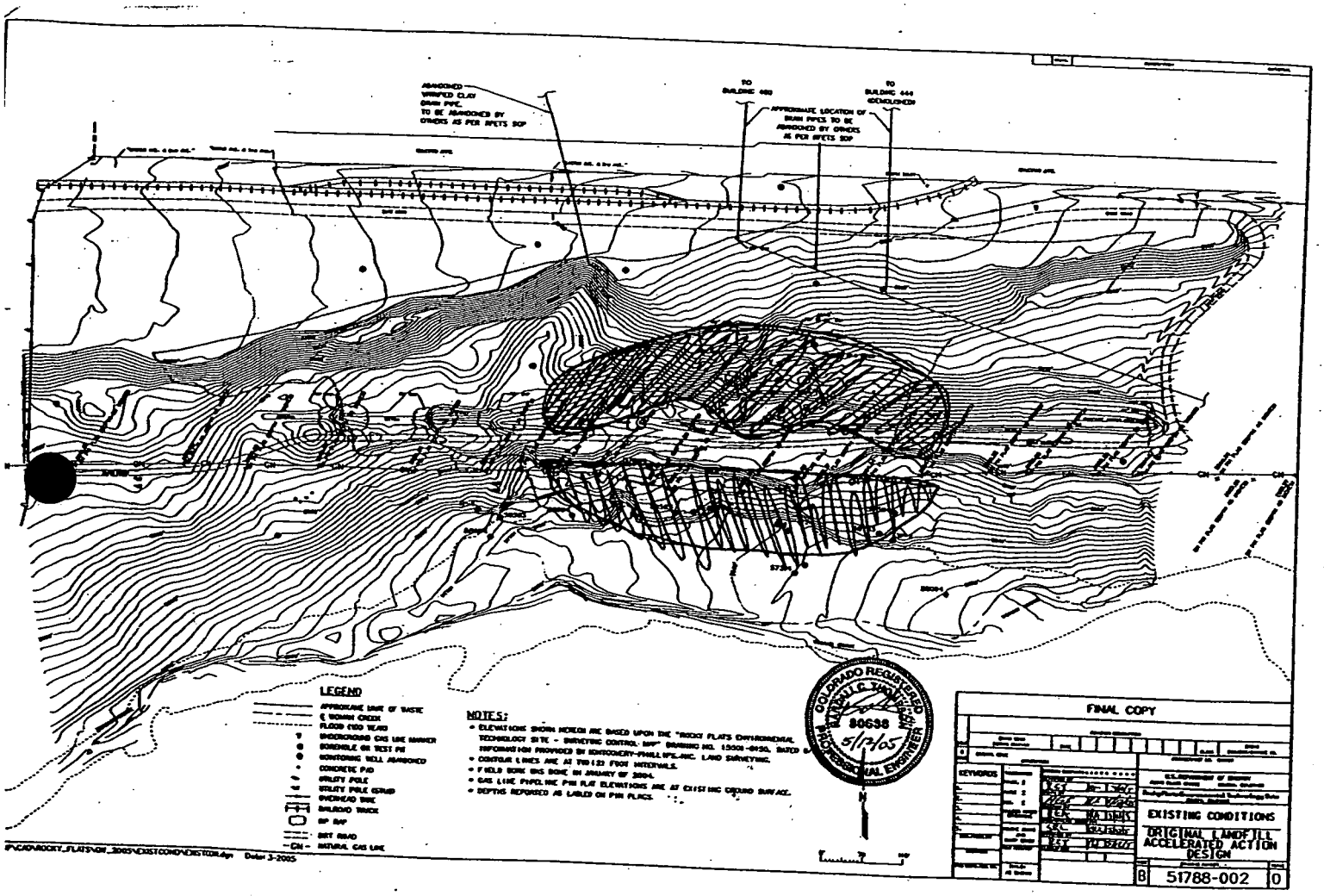
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Attended the Monday Construction coordination meeting at 10:00 am. Items discussed included new scraper haul of cover fill materials. Diversion channel construction of the west side of the landfill cap. Geotextile testing issues, health and safety, etc.

CQC Monitor: _____ **Date:** 6-27-05
Approved by: _____ **Date:** 6-27-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-27-05
Day Shift



- Cover Fill placement / Spreading

- Buttress Fill placement / spreading / compaction

45

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/27/05 S (M) T W T F S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** rain

CLOUD COVER: cloudy **WIND:** 5-10mph

GAI PERSONNEL HOURS CHARGED:

James Koffer (1430- 0200,11.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A CAT D8 dozer and four CAT scrapers worked placing RF alluvium on the upper center of the fill slope. After midnight, trucks started bringing in RF alluvium to this area also.

  Buttress Area: A Cat 825 compactor and a CAT D8 dozer worked to place buttress fill on the east end of the buttress fill area at the beginning of night shift. The material being hauled in was checked for moisture content. From 1725 hrs to 1805 hrs, the moisture content of the material coming from LaFarge ranged from 12.6% to 18.0% moisture. The truck tracks were measured near the toe of the slope and found to have a moisture content of 21.9% this was reported to the QA authority who requested that material be stockpiled and that material already placed on the flat be ripped and dried.
  Envirocon ripped the length of the Buttress Fill area across the flat to dry the fill to proper moisture content for proper compaction. This took place in last half of the shift.
  At around 2000 hrs, buttress fill material stopped coming from Lafarge, and material was brought in from Centennial. This material was checked and found to be significantly drier, ranging from 9.7%to 10.9%. This drier material was dumped along the toe of the slope, on top of material windrowed earlier. This material was then graded down together to allow it to dry over night. Additionally, the flat was graded, and wet material pushed into this windrow. No buttress material was brought in after 2400hrs.

SUMMARY OF QC TESTING:

Golder ran ten nuclear density tests in the eastern portion of the buttress.(QC-BF-DT-82,82A,82B,83,84,85,86,87,88,&89) Tests 82,83,86 failed for moisture content. Tests 82A, 87,

&89 failed for compaction.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

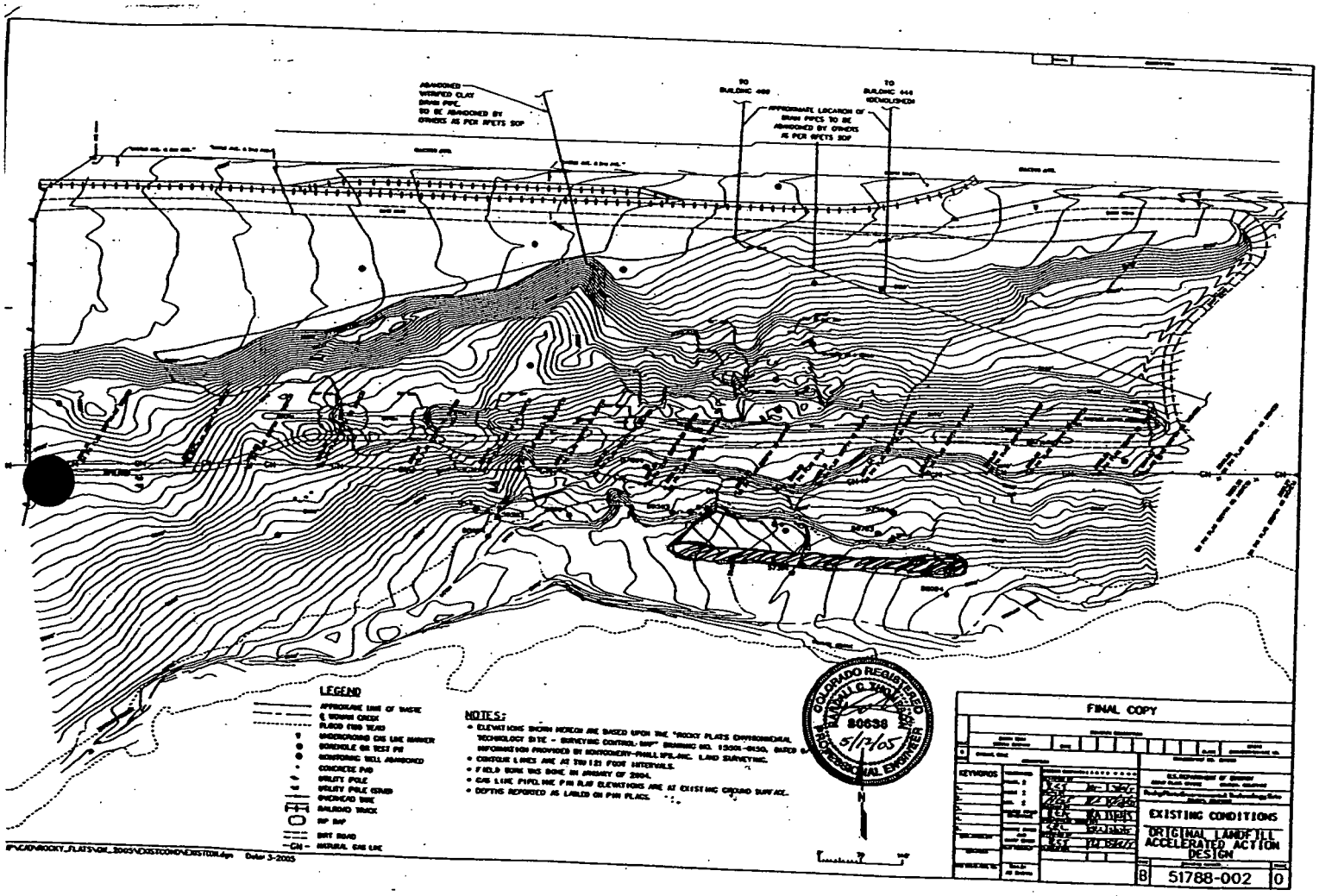
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Discussion with foreman: Discussed spot moisture test results with QA authority and the Envirocon foreman. It was agreed between these two that the material was too wet to be placed and compacted, similar to the discussion of 6/23 and 6/24. The material was ripped and windrowed to dry over night.

CQC Monitor: _____ **Date:** 6/27/05
Approved by: _____ **Date:** 6/28/05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT 6/27/05



WINDROWED MATERIAL (BUTTRESS FILL)

SPREAD MATERIAL FOR DRYING (BUTTRESS FILL)

47

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/28/05 S M (T) W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** A Cat D9 dozer, a Cat D10 dozer, and a Cat 966 loader, spread and placed cover fill materials from the Centennial Plant and from the temporary east stockpile by use of Cat 327 scrapers.

- **Buttress Fill:** Envirocon used a Cat D5 dozer, a D9 dozer, a Cat 140 motor grader, a Cat 815 compactor, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. Volvo articulated trucks continued haulage of material to the area of the buttress fill embankment slopes. Areas of geotextile damage were repaired in the morning prior to placing additional Buttress fill materials above. A Cat 345 track-hoe and a Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey.

SUMMARY OF QC TESTING:

Golder performed re-testing of in-situ nuclear moisture density tests QC-BF-DT-82, 83, 86, 87, and 89. Golder completed re-testing of the Buttress Fill materials for continued buttress fill placement at 8:30 a.m.

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-90 through QC-BF-DT-105) on Buttress Fill materials. No original tests failed initial moisture and was subsequently approved for placement of new buttress fill materials.

Golder obtained sample number BF-07 and transported it to the Golder laboratory for index testing. Golder obtained a sample QC-BF-DT-94 for oven dry moisture content testing. Golder performed a sand cone test (QC-BF-SC-06) of Density test 94 also and transported the sample to the lab for necessary index testing.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

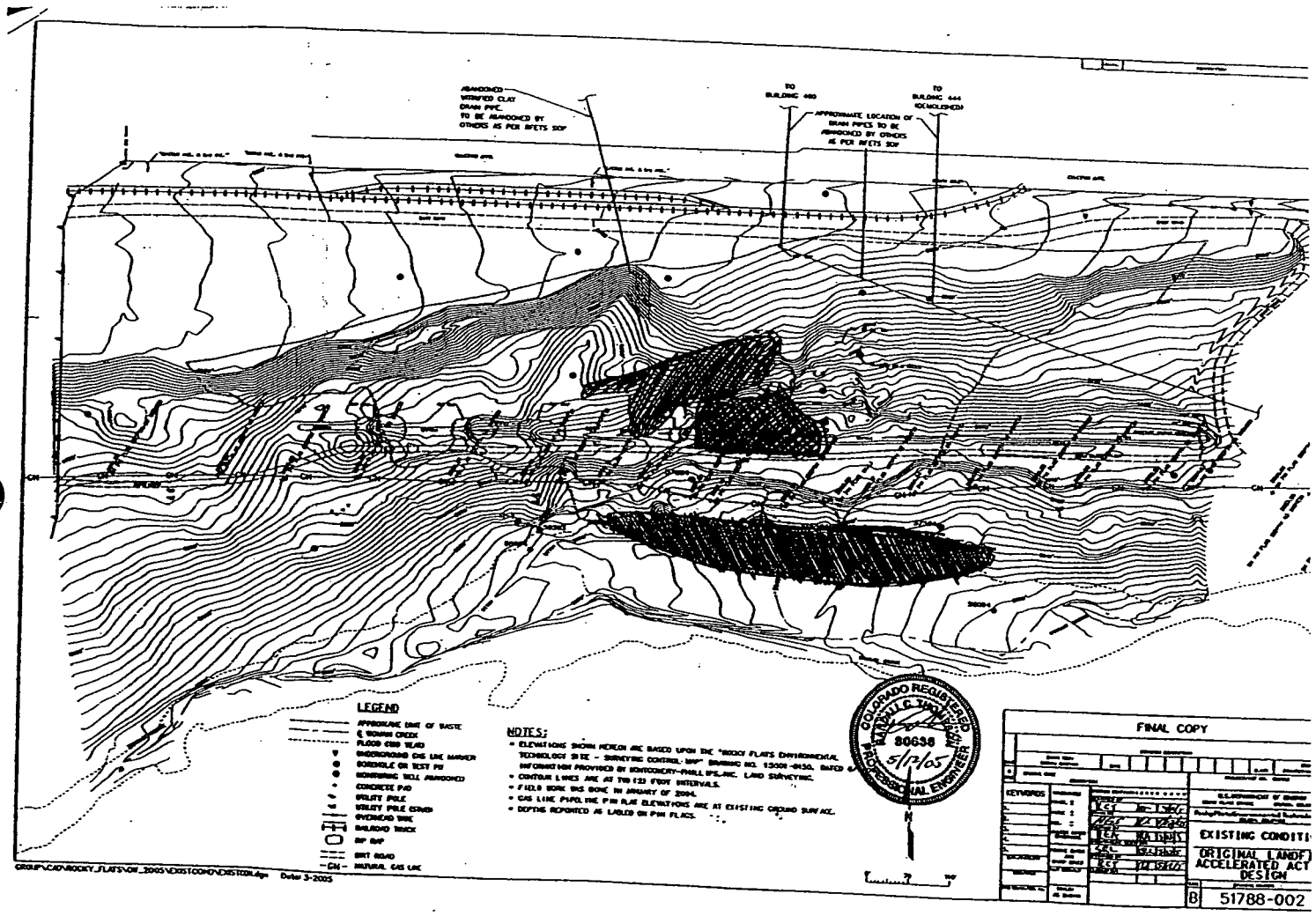
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: _____ **Date:** 6-28-05
Approved by: _____ **Date:** 6-28-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-28-05
Day Shift



- BUTTRESS FILL, HAUL, PLACEMENT, COMPACTION

- COVER FILL, HAULL, PLACEMENT

- REGRADING AND RE-CONTOURING

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/28/05 S M (T) W T F S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: cloudy **WIND:** 5-10mph

GAI PERSONNEL HOURS CHARGED:

James Koffer (1430- 0200, 9.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A CAT D8 dozer and four CAT scrapers worked placing RF alluvium on the upper center of the fill slope.
  Buttress Area: A Cat 825 compactor and a CAT D8 dozer worked to place buttress fill on the west of the buttress fill area at the beginning of night shift. The material being hauled in was checked for moisture content and found to be around 16%. This material was spread thinly over the area. The eastern portion of the buttress area was left untouched for the first half of the shift, except that five truckloads of material were dumped on the toe just before 2000hrs when a lightning warning was issued. After 2200 hours, all fill material was spread thinly over the full buttress footprint area and worked to dry it.

SUMMARY OF QC TESTING:

Golder ran four nuclear density tests in the eastern portion of the buttress. (QC-BF-DT-108, 109, 110, & 111). Only one failed for compaction. The area of this test was being re-worked and will be retested. Three additional tests(QC-BF-DT-112,113, &114) were run on the eastern half of the buttress fill area at varying depths at the request of QA, due to what appeared to be heavy "heavy pumping" and rutting of the surface with truck traffic. All of these tests passed.
Spot water content tests were taken after 2100hrs, and material that had been placed in windrows before the lightning warning was found to be extremely high in moisture. This resulted in all material after this time being spread thinly over the whole buttress footprint and worked to dry it out.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site

this day

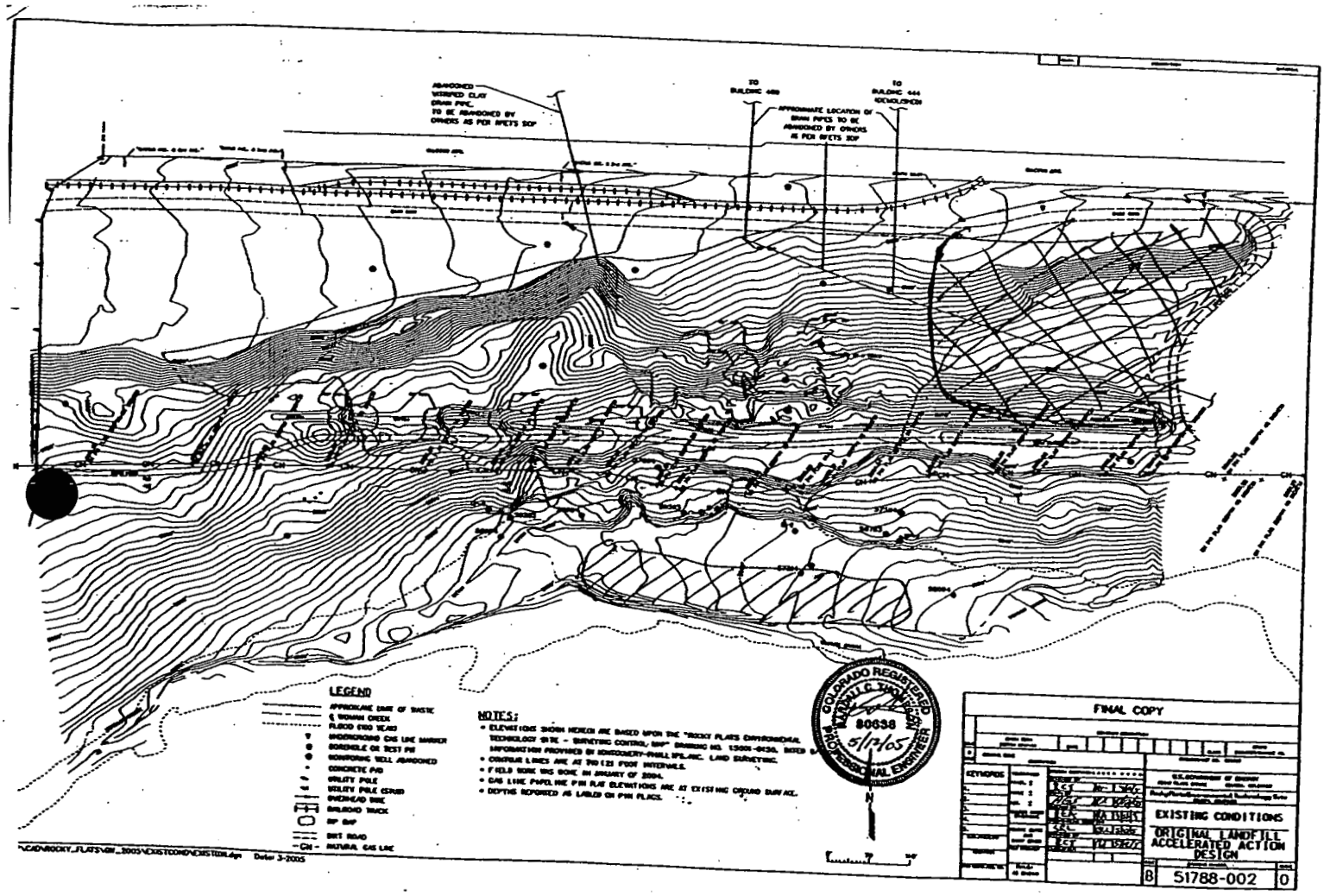
Discussion with foreman: Discussed spot moisture test results with QA authority and the Envirocon foreman. It was agreed between these two that the material was too wet to be placed and compacted. The material was ripped and spread thinly to dry over night.

CQC Monitor: JPK **Date:** 6/28/05
Approved by: **Date:** 6/29/05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

6/28/05

NITE SHIFT



Buttress fill material placement

Rocky Flats Alluvium placement

51

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/29/05 S M T (W) T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** A Cat D9 dozer, a Cat D10 dozer, and a Cat 966 loader, spread and placed cover fill materials from the Centennial Plant by use of Cat 327 scrapers.
- **Buttress Fill:** Envirocon used a Cat D5 dozer, a D9 dozer, a Cat 140 motor grader, a Cat 815 compactor, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat 345 track-hoe and a Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment.

SUMMARY OF QC TESTING:

Golder performed re-testing of in-situ nuclear moisture density tests QC-BF-DT-117, 126, 128, and 130. Golder completed re-testing of the Buttress Fill materials for continued buttress fill placement during the morning and afternoon shifts.

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-115 through QC-BF-DT-136) on Buttress Fill materials. Of the original tests that failed initial moisture, the area was re-worked and re-compacted and was subsequently approved for placement of new buttress fill materials.

Golder obtained sample number BF-08 and transported it to the Golder laboratory for index testing. Golder obtained a sample QC-BF-DT-131 and at QC-BF-DT-136 for oven dry moisture content testing.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

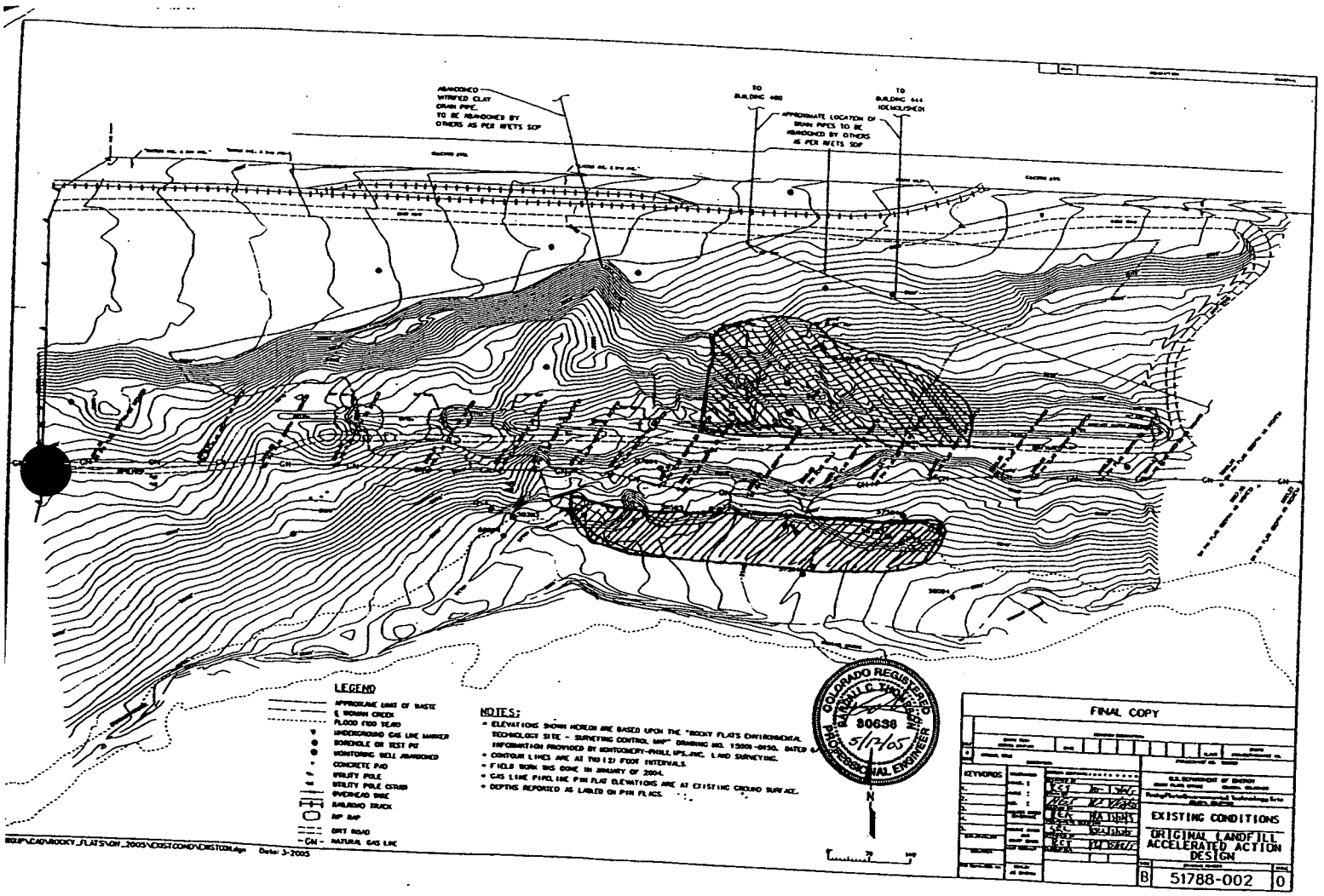
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

Attended a regulator weekly progress meeting. Items discussed included construction, QA/ QC, production, and concerns raised during the previous construction period.

CQC Monitor: _____ **Date:** 6-29-05
Approved by: _____ **Date:** 6-29-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-29-05
Day Shift



- BUTTRESS FILL HAUL, PLACEMENT, & COMPACTION

- COVER FILL HAUL, PLACEMENT

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/29/05 S M T (W) T F S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: CLEAR **WIND:** NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1430- 0200, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A CAT D8 dozer and three CAT scrapers worked placing RF alluvium on the upper northeast to center portion of the fill slope. Trucks began hauling in material along with the scrapers after 2200hrs.
  Buttress Area: A Cat 825 compactor and a CAT D10 dozer worked to place buttress fill over the buttress fill area at the beginning of night shift and continued until approximately 2030hrs. At this point no more buttress fill material was available. From 2200hrs until 2400 hrs a CAT 825 compactor worked the footprint area.

SUMMARY OF QC TESTING:

Golder ran a total of 17 nuclear density tests over the footprint of the buttress. (QC-BF-DT-137-153). Test # 140 failed for compaction, #142 &143 failed for moisture. The areas of these failures were reported to Envirocon and reworked. Retesting of these three tests passed.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

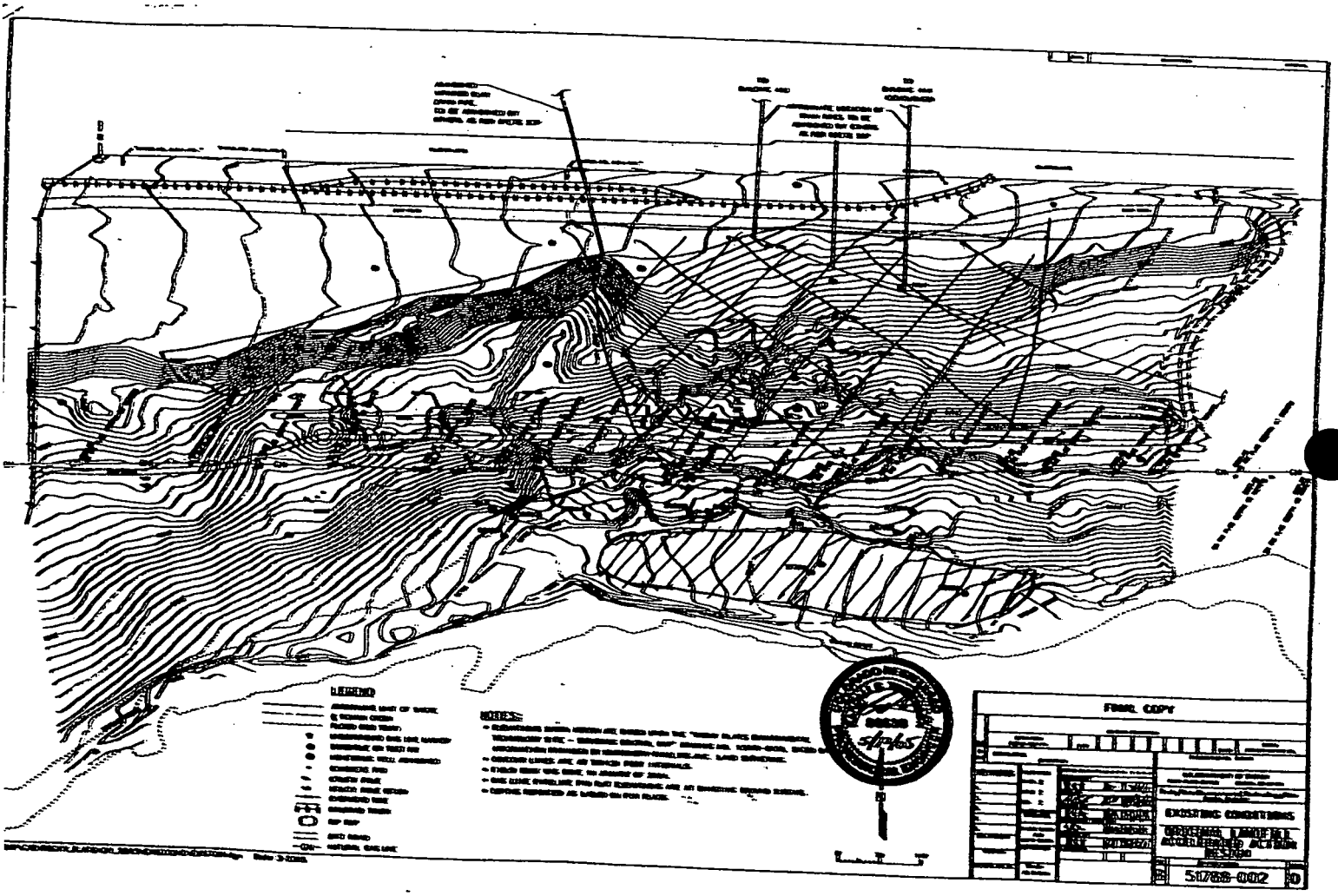
CQC Monitor: JPKoffer **Date:** 6/29/05
Approved by: [signature] **Date:** 6/30/05
File No.

SHEET 1 OF 1

54

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
6/29/05



Buttress fill material placement/compaction

RF ALLUVIUM CAP PLACEMENT

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/30/05 S M T W (T) F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** A Cat D9 dozer, a Cat D10 dozer, and a Cat 966 loader, spread and placed cover fill materials from the Centennial Plant by use of Cat 327 scrapers. Material was hauled in from the Centennial Plant (Rocky Flats Alluvium).

- **Buttress Fill:** Envirocon used a Cat D5 dozer, a D9 dozer, a Cat 140 motor grader, a Cat 815 compactor, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat 345 track-hoe and a Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment. Envirocon opted to stop the haul at 10:30 a.m. to disc the in-situ materials and allow drying. The haul re-continued at 1:30 p.m.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-154 through QC-BF-DT-165) on Buttress Fill materials. Of the original tests that failed initial moisture, the area was re-worked and re-compacted and was subsequently approved for placement of new buttress fill materials.

Golder obtained sample number CF-01 and transported it to the Golder laboratory for index testing. CF-01 is a Cover Fill sample of Centennial Rocky Flats Alluvium. Golder obtained a sample QC-BF-DT-155 and at QC-BF-SC-07 for oven dry moisture content testing.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

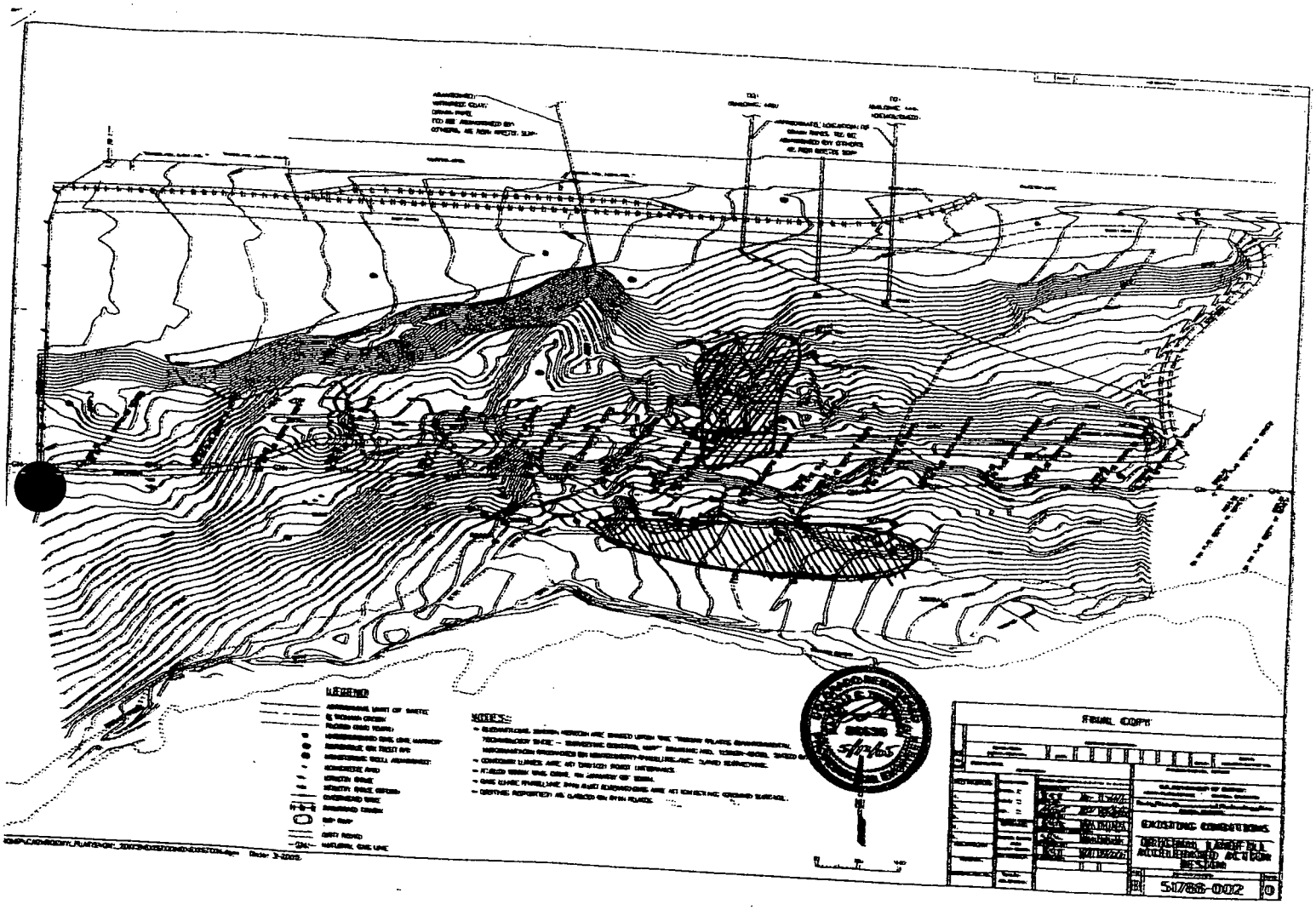
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: _____ **Date:** 6-30-05
Approved by: _____ **Date:** 6-30-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

6-30-05

Day Shift



- COVER FILL HAUL / PLACEMENT / SPREADING

- BUTTRESS FILL HAUL / PLACEMENT / SPREADING / COMPACTION

56

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 6/30/05 S M T W (T) F S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: CLEAR **WIND:** NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1400- 0200, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A CAT D8 dozer and four CAT scrapers worked placing RF alluvium on the upper west to center portion of the fill slope. Trucks began hauling in material along with the scrapers after 2200hrs.
  Buttress Area: A Cat 825 compactor and a CAT D10 dozer worked to place buttress fill over the buttress fill area at the beginning of night shift and continued until approximately 2030hrs. At this point no more buttress fill material was available. From 2200hrs until 2400 hrs a CAT 825 compactor worked the footprint area.

SUMMARY OF QC TESTING:

Golder ran a total of 13 nuclear density tests over the footprint of the buttress. (QC-BF-DT-166-178). Test #s 167,168,169 failed for moisture. The areas of these failures were reported to Envirocon and reworked. Upon retesting these one retest (167A) failed for compression, the remaining passed.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

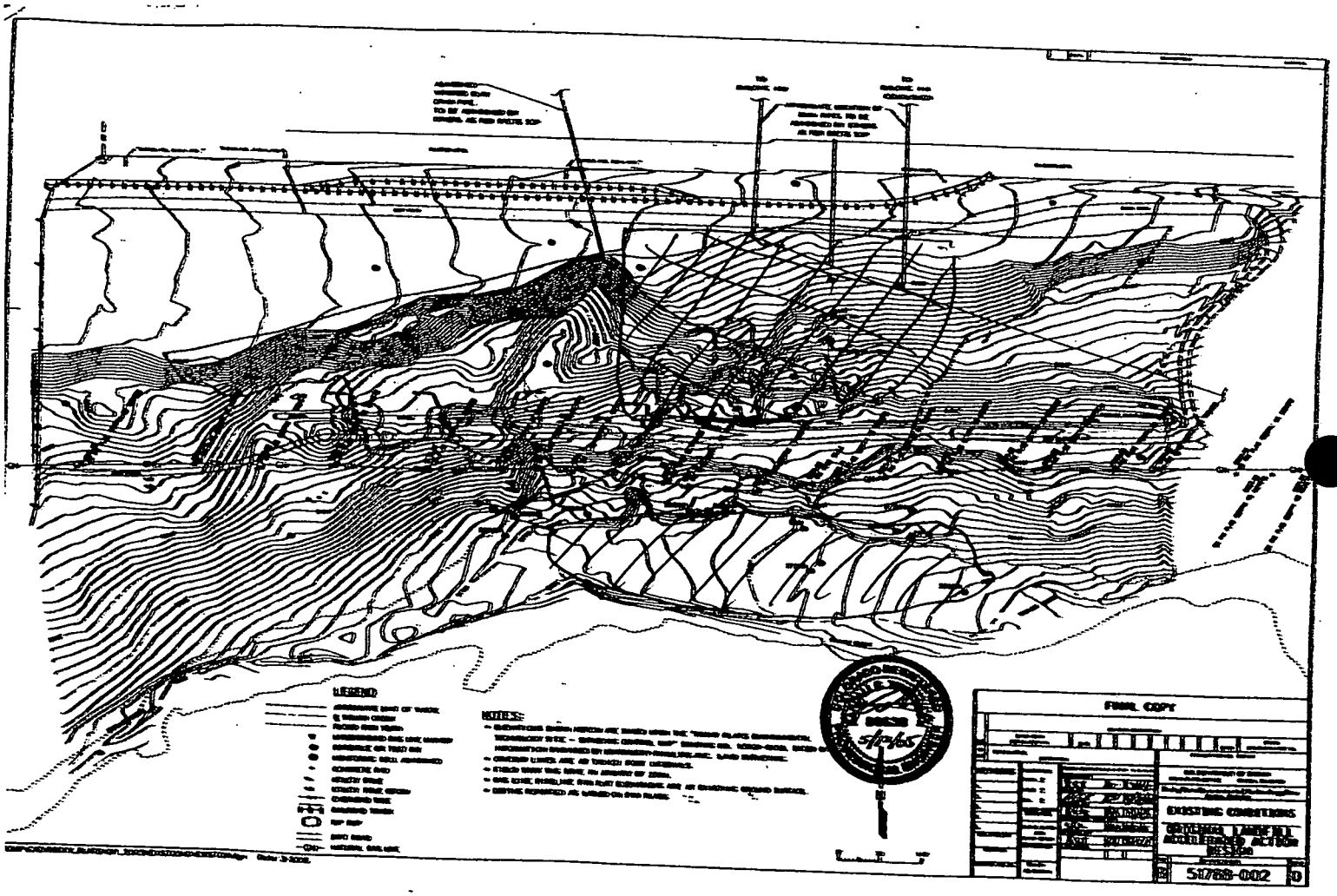
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

CQC Monitor: JPKoffer **Date:** 6/30/05
Approved by: [signature] **Date:** 6/31/05

57

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
8/30/05



Bothress fill placement: compaction

RF ALLUVIUM CAP PLACEMENT

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/01/05 S M T W T (F) S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** A Cat D9 dozer, a Cat D10 dozer, and a Cat 966 loader, spread and placed cover fill materials from the Centennial Plant by use of Cat 327 scrapers. Material was hauled in from the Centennial Plant (Rocky Flats Alluvium).

- **Buttress Fill:** Envirocon used a D9 dozer, a Cat 140 motor grader, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat 345 track-hoe and a Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment. Envirocon stopped haul at 10:45 a.m. to disc the in-situ materials and allow drying during the lunch hour. The haul resumed at 12:30 p.m. A Cat 345 continued the excavation of buttress fill material and drain rock in the north west limits of the buttress fill footprint to correct grade control in the area.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-179 through QC-BF-DT-188) on Buttress Fill materials. Of the original tests that failed initial moisture, the area was re-worked, re-compacted, re-tested and was subsequently approved for placement of new buttress fill materials. Test samples QC-BF-DT-167C, 183A, and 183B are re-tests of failed original tests.

Golder processed and obtained sample number CF-02 and transported it to the Golder laboratory for index testing. CF-02 is a Cover Fill sample of Centennial Rocky Flats Alluvium. Golder obtained samples QC-BF-DT-185 and at QC-BF-SC-08 for oven dry moisture content testing and Sand Cone testing analysis.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

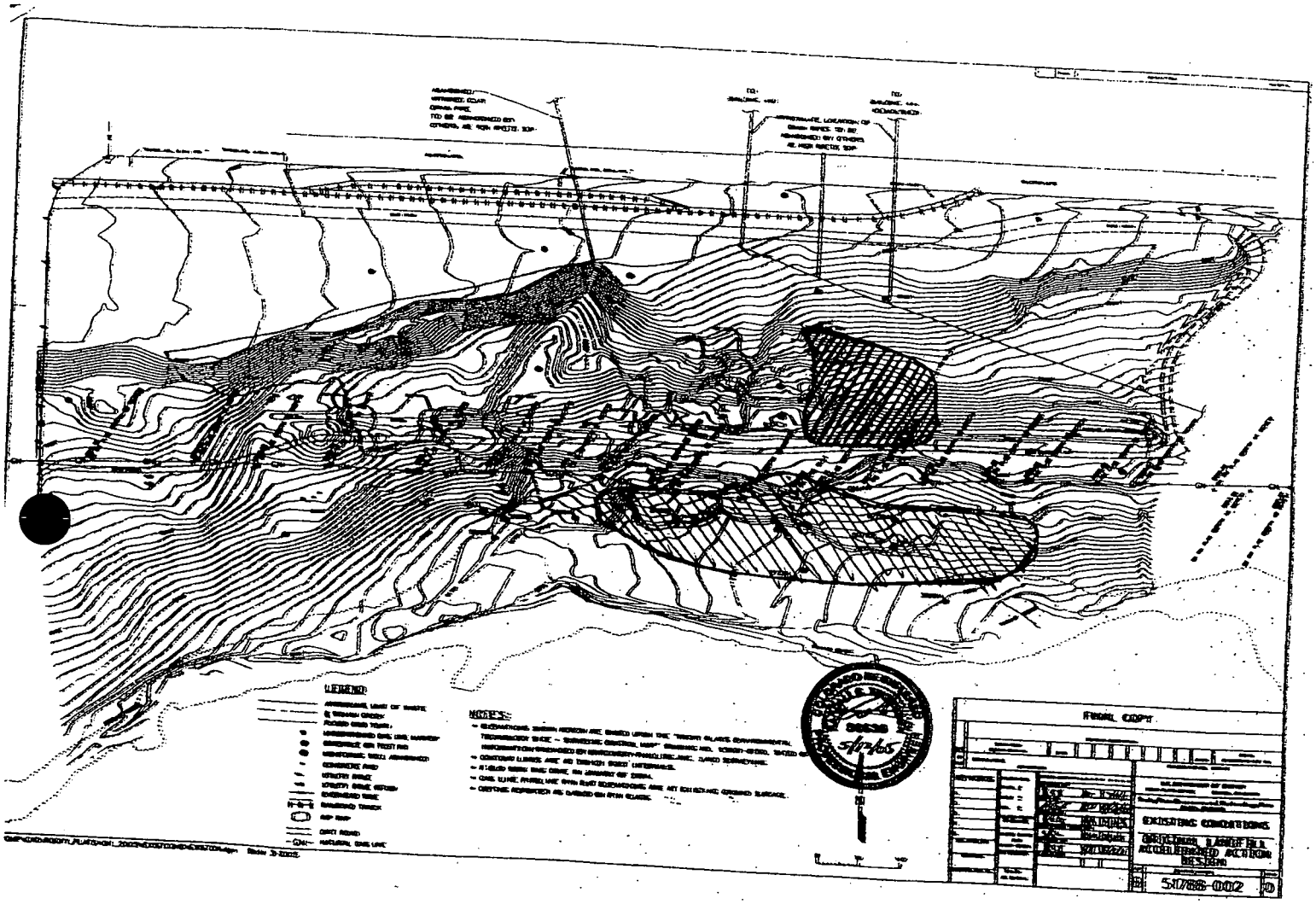
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: _____ **Date:** 7-01-05
Approved by: _____ **Date:** 7-01-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

7-21-05

Day Shift



- COVER FILL HAUL / PLACEMENT / AND SPREADING

- BUTTRESS FILL HAUL / PLACING / SPREADING / CONDITIONING / COMPACTION

59

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/01/05 S M T W T (F) S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: PARTLY CLOUDY **WIND:** GUSTS TO 30MPH

GAI PERSONNEL HOURS CHARGED:

James Koffer (1300- 0130, 12.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A CAT D8R dozer and four CAT scrapers worked placing RF alluvium on the upper west to center portion of the fill slope. Trucks began hauling in material along with the scrapers after 2200hrs.
  Buttress Area: A Cat 825 compactor and a CAT D10 dozer worked to place buttress fill over the buttress, area at the beginning of night shift and continued until approximately 2030hrs. At this point no more buttress fill material was available. From 2200hrs until 2400 hrs a CAT 825 compactor worked the footprint area.

SUMMARY OF QC TESTING:

Golder ran a total of 7nuclear density tests over the footprint of the buttress. (QC-BF-DT-189-195). Test #s 189A & 195 failed for moisture. The areas of these failures were reported to Envirocon and reworked. Upon retesting these areas passed

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

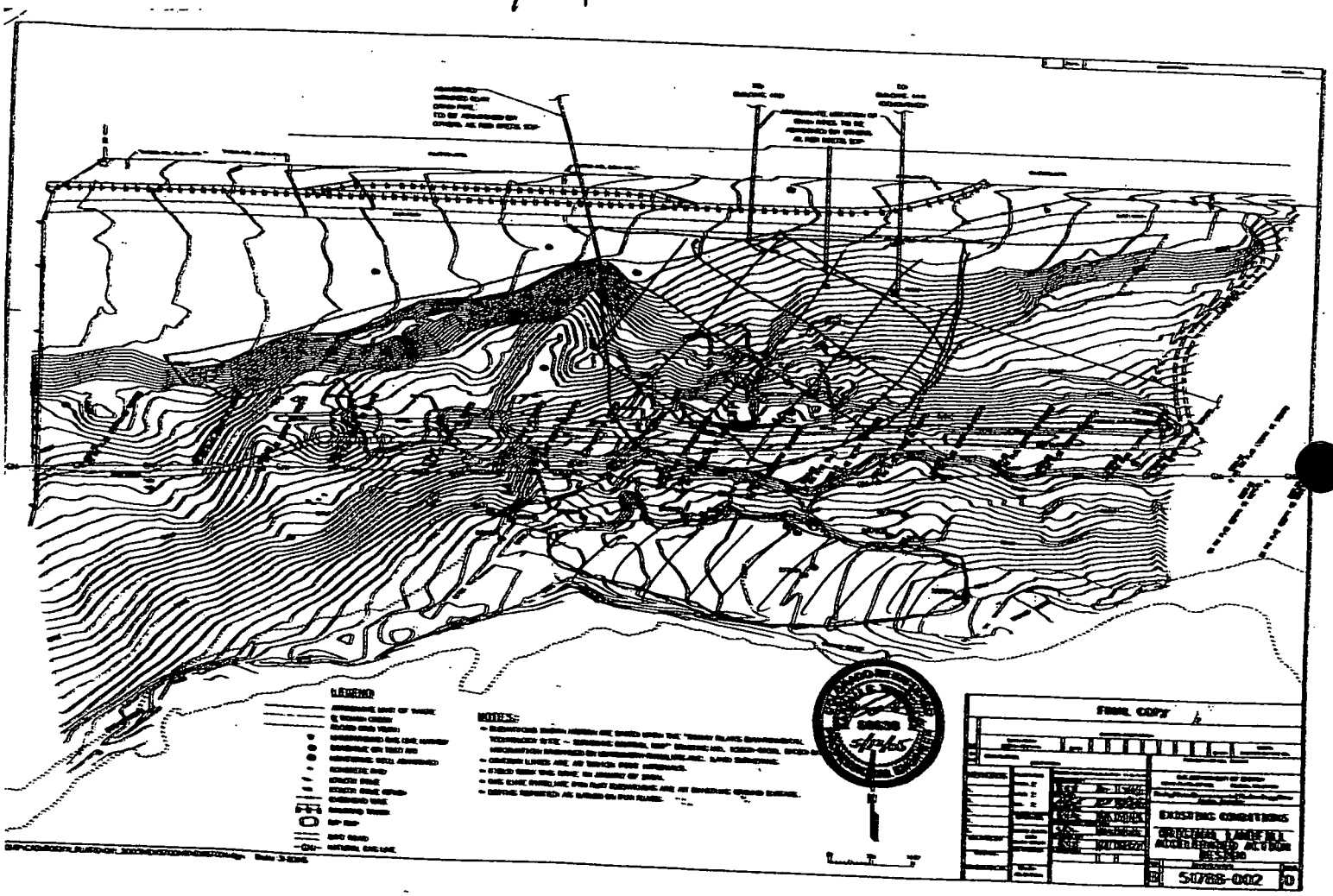
CQC Monitor: JPK **Date:** 7/1/05
Approved by: [signature] **Date:** 7/5/05
File No.

SHEET 1 OF 1

60

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
7/1/05



Buttress fill placement

RF ALLUVIUM CAP PLACEMENT

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/05/05 S M (T) W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** No Cover Fill material was hauled or spread into place during this shift.
- **Buttress Fill:** Envirocon used a D9 dozer, a Cat 140 motor grader, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment. Envirocon stopped haul at 10:45 a.m. to disc the in-situ materials and allow drying during the lunch hour. A Cat 345 continued the excavation of buttress fill material and drain rock in the north west limits of the buttress fill footprint to correct grade control in the area.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-196 through QC-BF-DT-201) on Buttress Fill materials.

Golder performed an in-situ sand cone moisture density test (QC-BF-SC-09) for a direct correlation of nuclear moisture density test QC-BF-DT-196.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

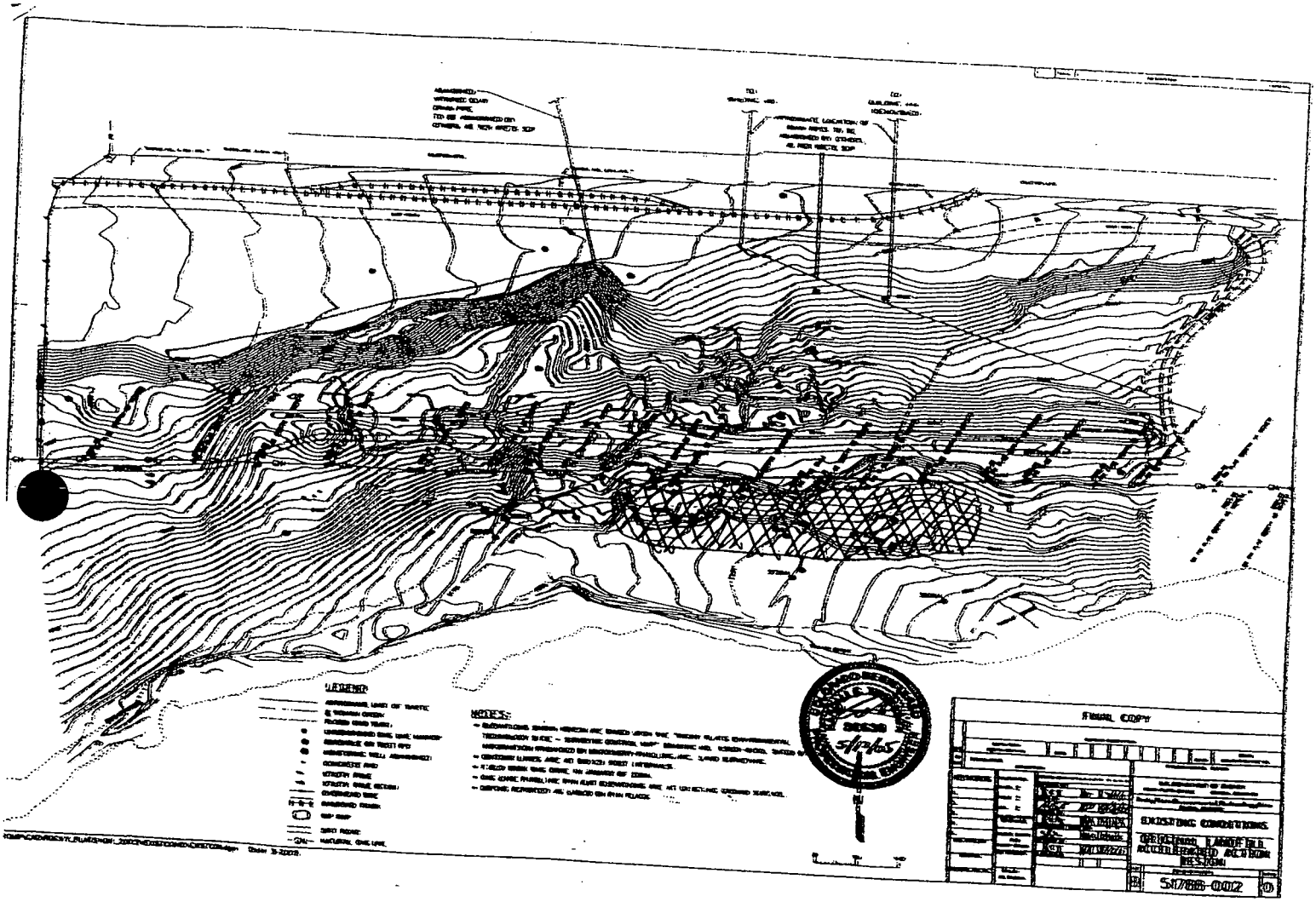
61

Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

Attended a construction meeting, items discussed included schedule, health and safety, and personnel requirements.

CQC Monitor: _____ **Date:** 7-5-5
Approved by: _____ **Date:** 7-5-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS
7-05-05
Don Shiff



— Buttress Fill, Haul, Placement, Compaction.

62

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/05/05 S M (T) W T F S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: PARTLY CLOUDY **WIND:** NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1430- 0130, 11 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  No work done on this area on evening shift.
  Buttress Area: A Cat 825 compactor and a CAT D8 and D5 dozers worked to place buttress fill over the buttress area at the beginning of night shift and continued until approximately 2045hrs. At this point no more buttress fill material was available. From 2200hrs until 2300 hrs a CAT grader worked the footprint area.
  At approximately 2200 hrs a CAT D9 dozer replaced Rocky Flats Alluvium to the northern west end of the buttress slope excavated during day shift.

SUMMARY OF QC TESTING:

Golder ran a total of 8nuclear density tests over the footprint of the buttress. (QC-BF-DT-202-209). Test #s 205,205A,B failed for moisture. The areas of these failures were reported to Envirocon and reworked twice. Upon retesting these areas the final time (QC-BF-DT-205D&E) the area of testing passed.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

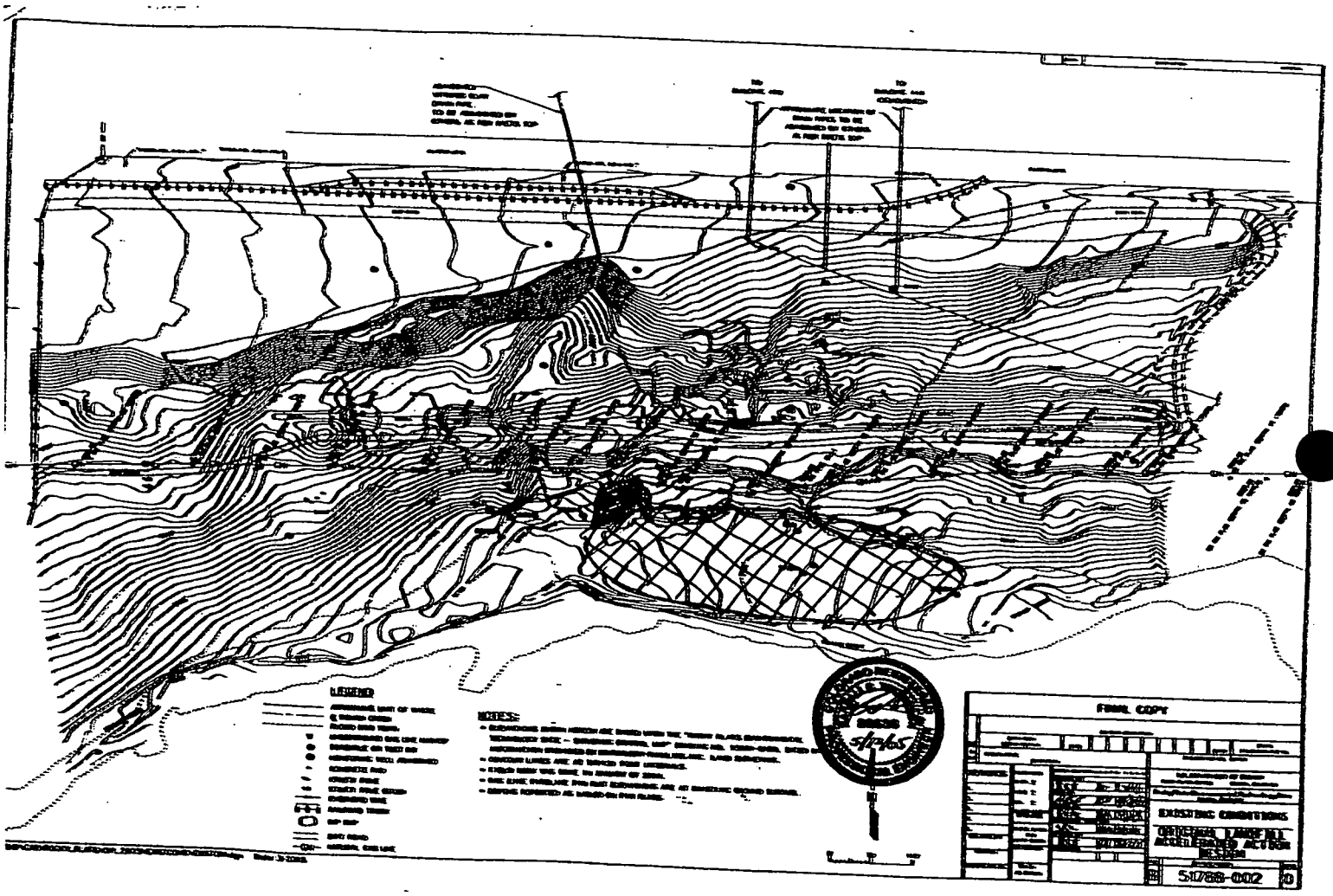
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Discussions with foreman: Discussed failed QC tests with foreman.

CQC Monitor: JPK **Date:** 7/05/05
Approved by: **Date:** 7/08/05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
7/5/05



Buttress fill placement

RF ALLUVIUM Replacement

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/06/05 S M T (W) T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1630, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** No Cover Fill material was hauled or spread into place during this shift.
- **Buttress Fill:** Envirocon used a D9 dozer, a Cat 140 motor grader, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment. Envirocon stopped haul at 10:45 a.m. to disc the in-situ materials and allow drying during the lunch hour. A Cat 345 continued the excavation of buttress fill material and drain rock in the North West limits of the buttress fill footprint to correct grade control in the area.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-210 through QC-BF-DT-~~216~~ 213) on Buttress Fill materials. Several tests fail moisture content and required re-conditioning, re-compaction and re-testing of materials prior to placement of the subsequent lift.

Golder performed an in-situ sand cone moisture density test (QC-BF-SC-10) for a direct correlation of nuclear moisture density test QC-BF-DT-213.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

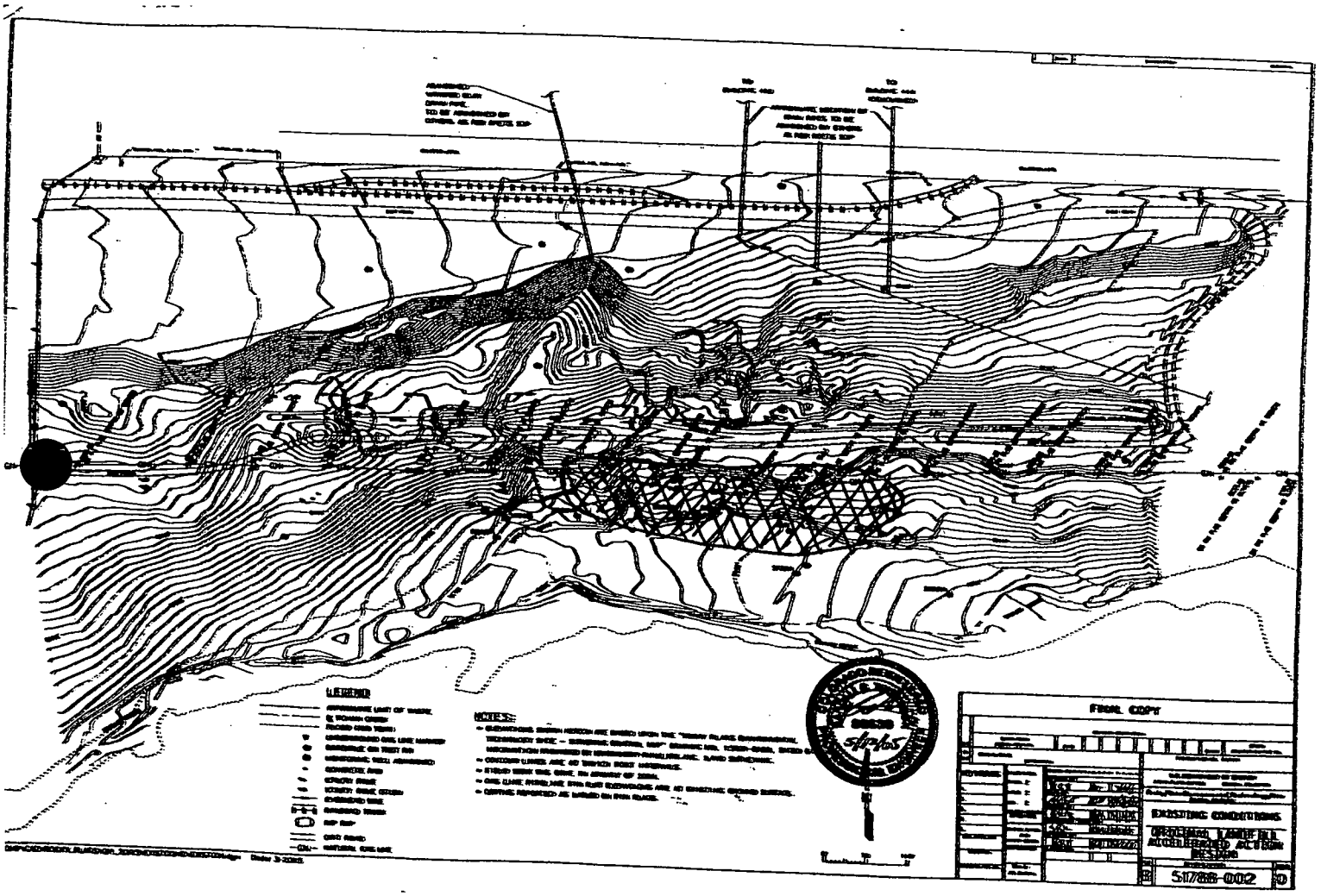
Attended a regulator construction meeting, items discussed included schedule, health and safety, and personnel requirements, ECR's, RFI's, and monthly reports provided by QA.

CQC Monitor: _____ **Date:** 7-6-5
Approved by: _____ **Date:** 7-6-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

7-06-05

Day Shift



- BUTTRESS FILL PLACEMENT, SPREADING, COMPACTION

65

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/06/05 S M T (W) T F S

SHIFT: Night (1500-0130)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: PARTLY CLOUDY **WIND:** NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1400- 0200, 12 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  At 1700hrs two scrapers and a CAT D9 dozer spread RF alluvium cover fill on the west end of the fill area.
  Buttress Area: A Cat 825 compactor and a CAT D8 dozer worked to place buttress fill over the buttress area at the beginning of night shift and continued until approximately 2300hrs. At this point no more buttress fill material was available. From 2300hrs until 00300 hrs a CAT grader and a CAT 825 compactor worked the footprint area.

SUMMARY OF QC TESTING:

Golder ran a total of 8nuclear density tests over the footprint of the buttress. (QC-BF-DT-214-221). Test 219 failed for moisture. This area was reported to Envirocon and reworked. Upon retesting this area the final time (QC-BF-DT-219A&B) the area passed.
A bulk sample (CF-03) was taken in the cover fill area this evening.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Discussions with foreman: Discussed failed QC tests with foreman.

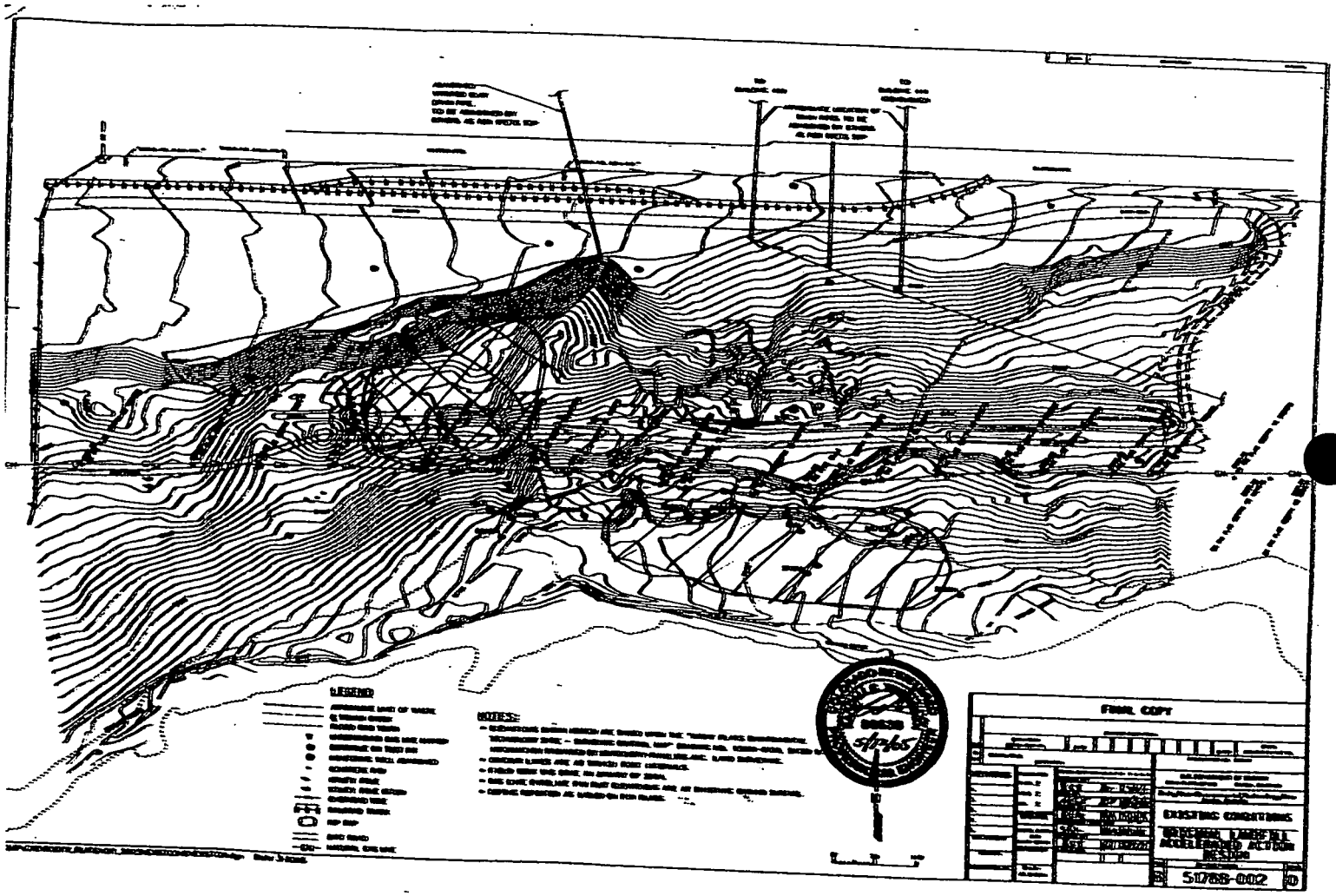
CQC Monitor: JP Koffer **Date:** 7/6/05
Approved by: [signature] **Date:** 7/8/05
File No.

66

ORIGINAL LANDFILL
ROCKY FLATS

7/6/05

NITE SHIFT



Buttress fill mat'l placement, compaction

RF Alluvium Cover fill

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/07/05 S M T W (T) F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1330, 9.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** No Cover Fill material was hauled or spread into place during this shift.
- **Buttress Fill:** Envirocon used a D9 dozer, a Cat 140 motor grader, and two Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-222 through QC-BF-DT-228) on Buttress Fill materials. Several tests fail moisture content and required re-conditioning, re-compaction and re-testing of materials prior to placement of the subsequent lift.

Golder performed an in-situ sand cone moisture density test (QC-BF-SC-11) for a direct correlation of nuclear moisture density test QC-BF-DT-228.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

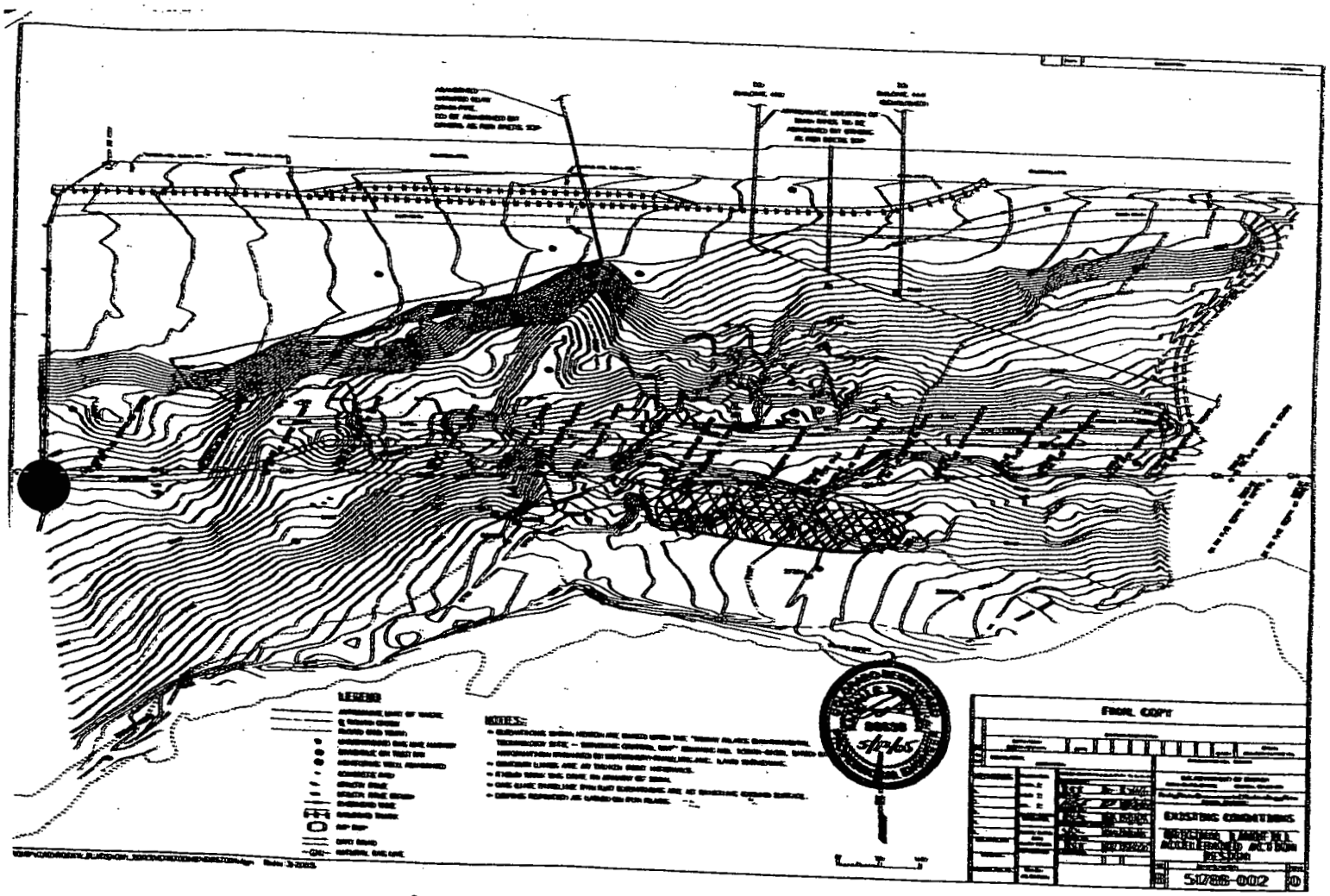
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to

discuss issues pertaining to the work load for the day.

CQC Monitor: _____ **Date:** 07-07-05
Approved by: _____ **Date:** 7/7/05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

7-7-05
Day Shift.



— BUTTRESS. FILL HAUL, PLACE, COMPACT

68

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/07/05 S M T W (T) F S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: PARTLY CLOUDY **WIND:** NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1200- 1200, 12 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  At 1700hrs three scrapers began spreading RF alluvium cover fill on the center of the fill area.This continued until 2100hrs.

  Buttress Area: A Cat 825 compactor and a CAT D8 dozer worked to place buttress fill over the buttress area at the beginning of night shift and continued until approximately 2300hrs. Buttress fill material was available from the beginning of shift until 2200hrs.

SUMMARY OF QC TESTING:

Golder ran a total of 9nuclear density tests over the footprint of the buttress. (QC-BF-DT-229-237). Test 230 failed for moisture. This area was reported to Envirocon.The area was ripped and left open to dry over night. Test #230 will have to be retested.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Discussions with foreman: Discussed failed QC tests with foreman.

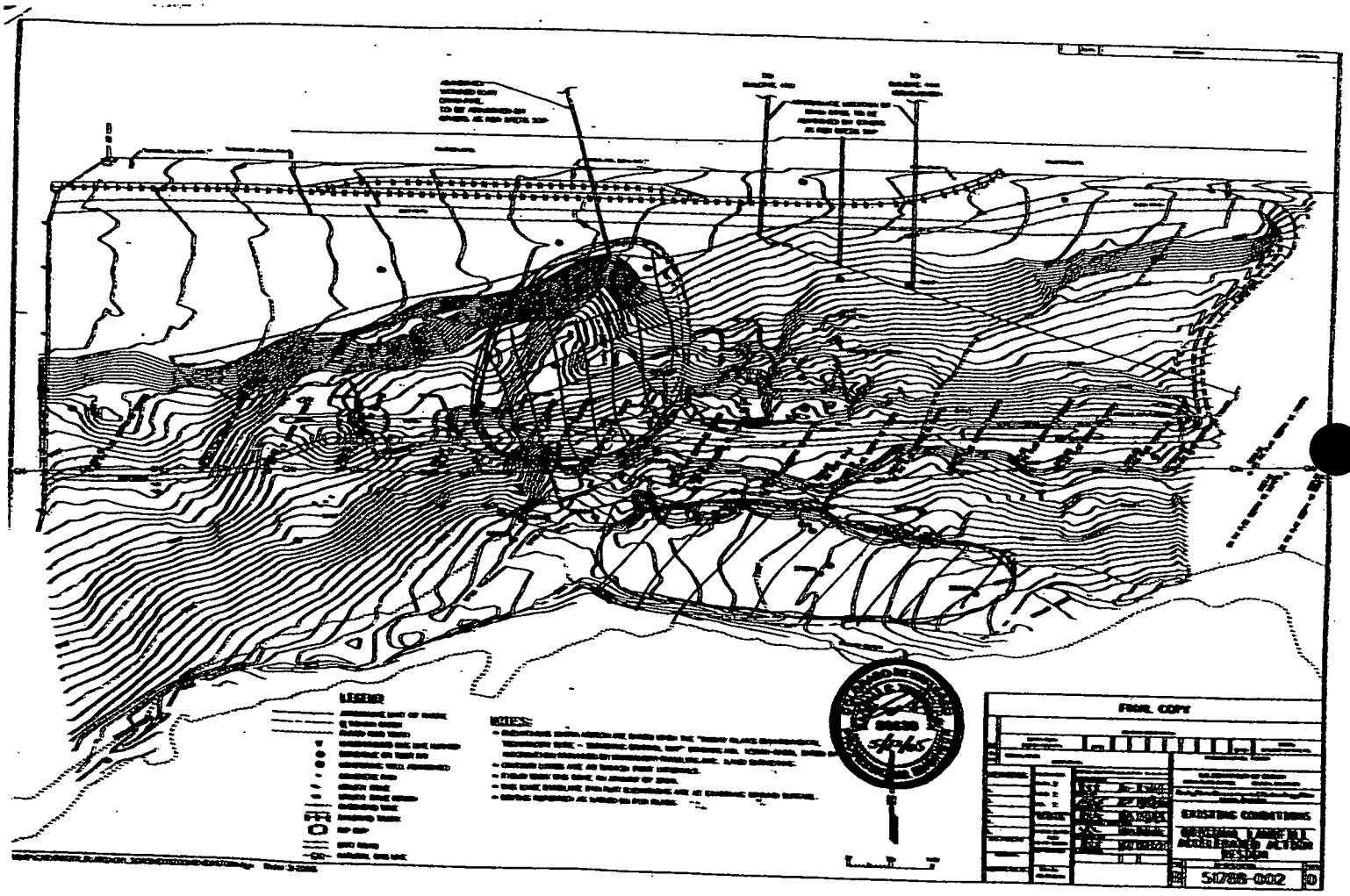
CQC Monitor: JPK **Date:** 7/7/05
Approved by: **Date:** 7/8/05
File No.

69

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT

7/7/05



RF ALLUVIUM COVER FILL PLACEMENT

Buttress FILL PLACEMENT + COMPACTION

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/08/05 S M T W T (F) S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** MINOR

CLOUD COVER: PARTLY CLOUDY **WIND:** NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1200- 1200, 12 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A CAT D5 and four scrapers began spreading RF alluvium cover fill on the "great break' (center area) of the north slope fill area.

  Buttress Area: A Cat 825 compactor, John Deere tractor w/disk, and a CAT D8 dozer worked to place buttress fill over the buttress area at the beginning of night shift and continued until approximately 2300hrs. Buttress fill material was available from the beginning of shift until 2130hrs.

SUMMARY OF QC TESTING:

Golder ran a total of 9nuclear density tests over the footprint of the buttress. (QC-BF-DT-244-252). Test 249 failed for moisture, test 250 failed for compaction. This was reported to Envirocon for correction. Re-tests will have to be completed next operational shift.
Additionally a cover fill bulk sample (CF-04) was taken this evening from the north slope of the fill area.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

CQC Monitor: _____ **Date:** 7/8/05
Approved by: _____ **Date:** 7/11/05
File No. _____

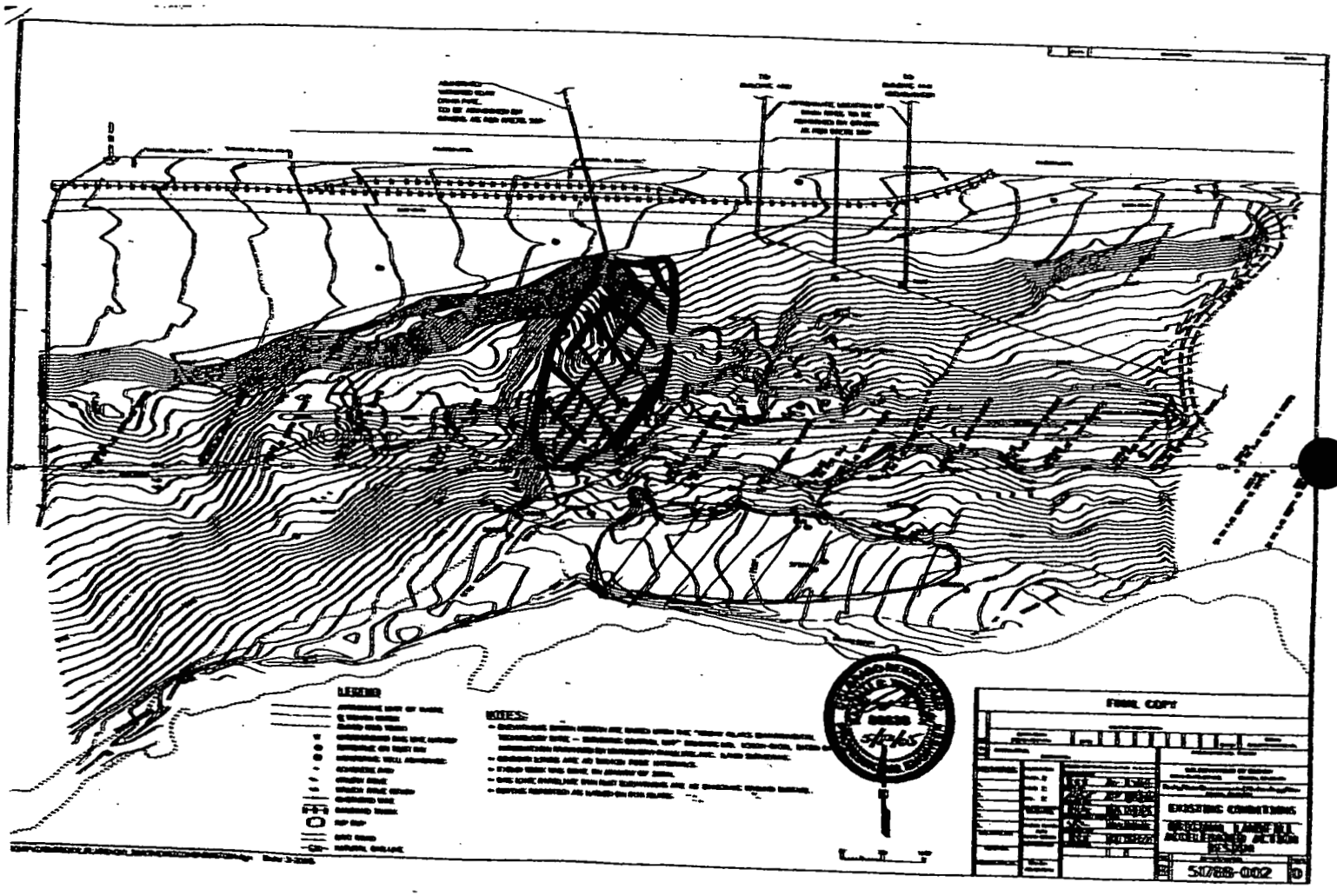
SHEET 1 OF 1

70

GOLDER ASSOCIATES

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
7/8/05



Buttress fill placement, compaction

Rocky FLATS ALL. PLACEMENT

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/11/05 S (M) T W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1330, 9.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** No Cover Fill material was hauled or spread into place during this shift.
- **Buttress Fill:** Envirocon used a D5 dozer, a Cat 140 motor grader, a Cat 815 and a Cat 825 compactors to re-grade, spread and compact hauled in Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-253 through QC-BF-DT-261) on Buttress Fill materials.

Golder performed an in-situ sand cone moisture density test (QC-BF-SC-13) for a direct correlation of nuclear moisture density test QC-BF-DT-261.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

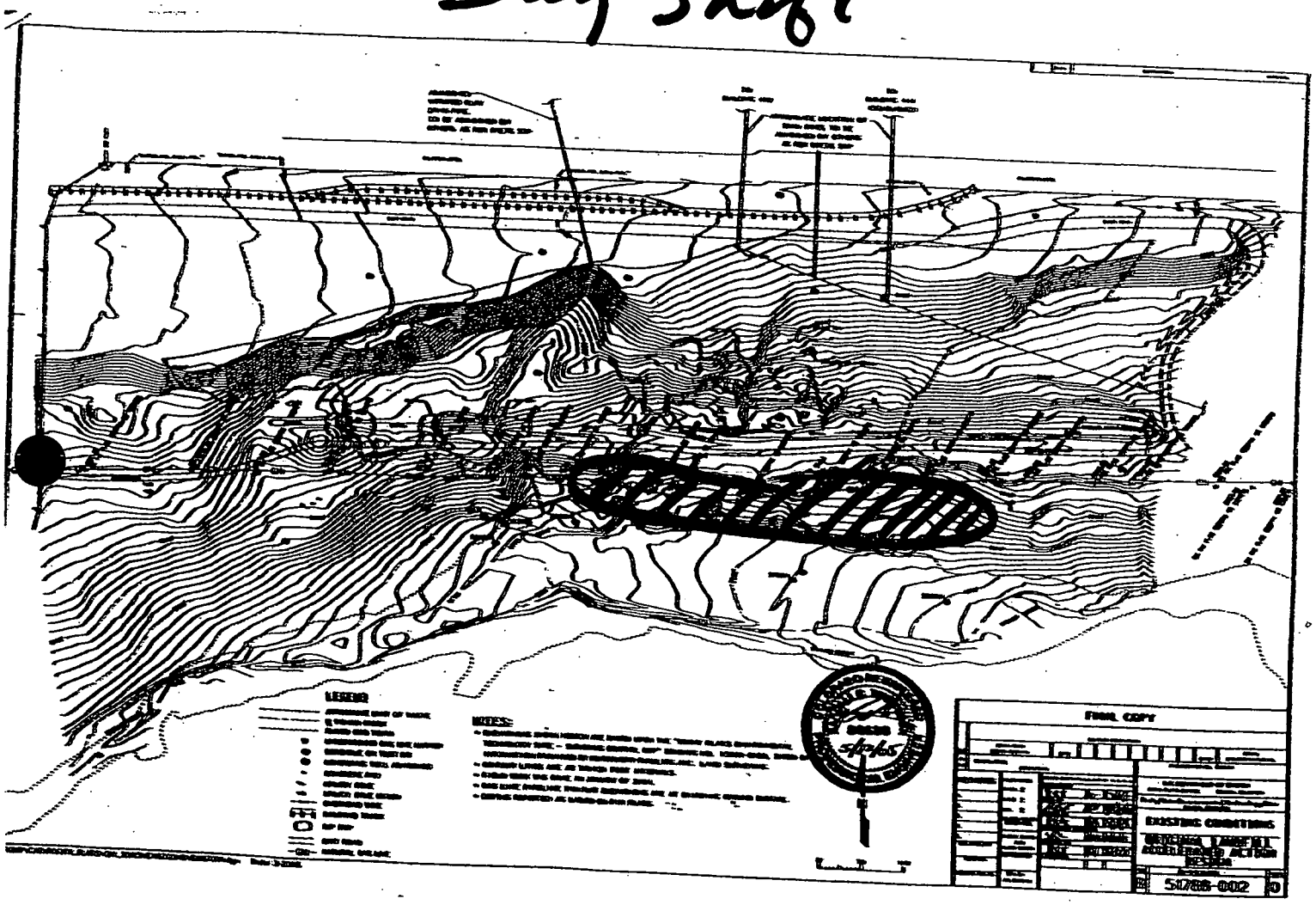
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

71

CQC Monitor: _____ Date: 7-11-05
Approved by: _____ Date: 7-11-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

7-11-05
Day Shift



- BUTTRESS FILL HAUL, PLACEMENT COMPACTION

72

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/11/05 S (M) T W T F S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** NONE

CLOUD COVER: NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1200- 1200, 12 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  A D9 CAT dozer and a Deere backhoe excavated down to subgrade two in two places on the east side of the fill area. At two locations the excavations penetrated into waste material, which was moved to the area northwest of the buttress area for fill.

  Buttress Area: At the beginning of shift two compactors, a grader, and a D-8 Cat dozer worked to place buttress fill material over the buttress footprint. A D-5Cat dozer worked to clean the south slope. After 1700 hrs, a Cat 825 compactor, a CAT D8 dozer, and two graders worked to place buttress fill over the buttress area at the beginning of night shift and continued until approximately 2300hrs. Buttress fill material was available from the beginning of shift until 1730hrs.

SUMMARY OF QC TESTING:

Golder ran a total of 8nuclear density tests over the footprint of the buttress. (QC-BF-DT-262-269). Test 265 failed for moisture, test 269 failed for both compaction and moisture. These were reported to Envirocon for correction. Re-tests will have to be completed next operational shift.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

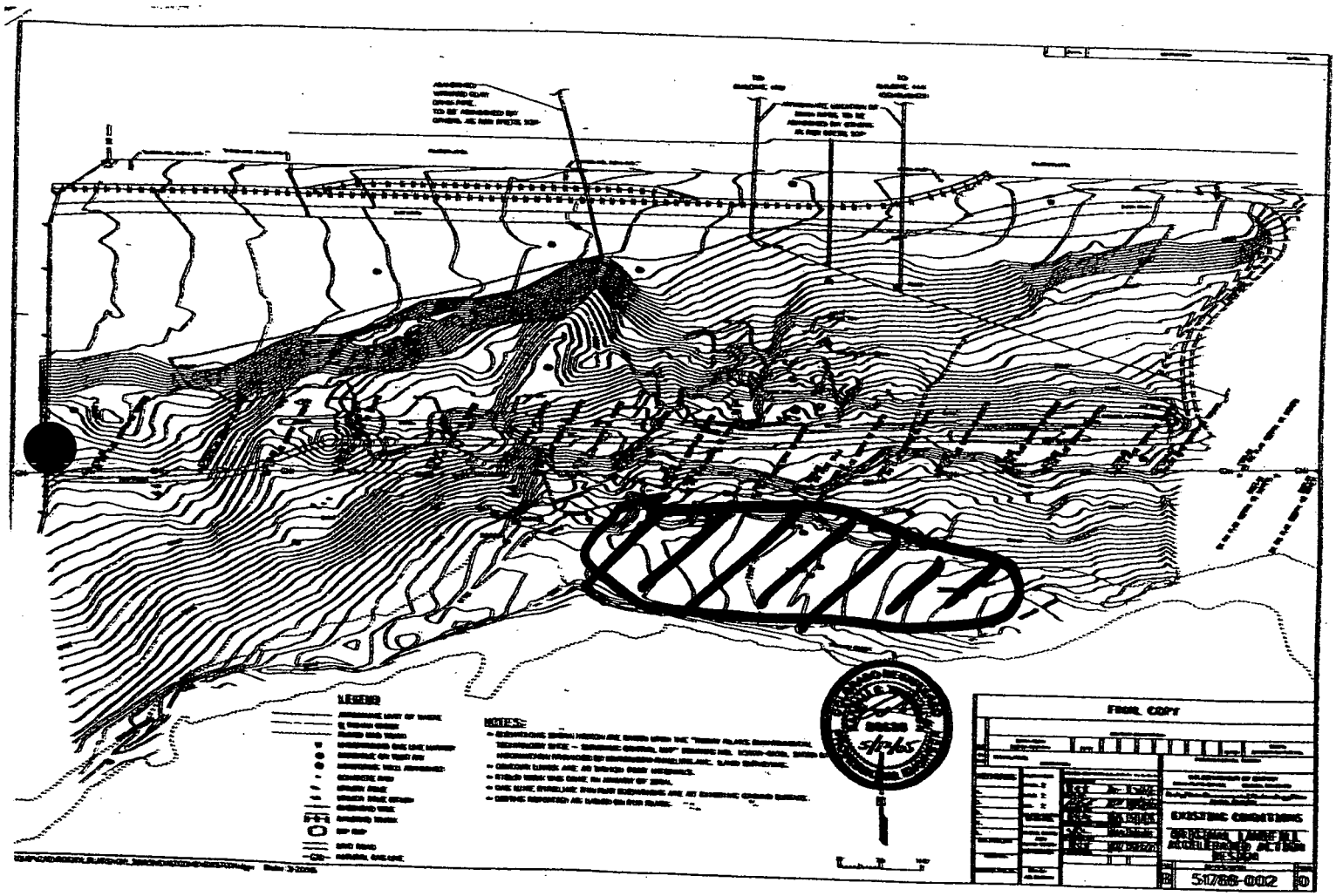
Discussion with Envirocon Safety Rep- Spoke with Envirocon Safety Rep about the excavation and moving of waste materials from the cut and fill area without having an RCT present. He took the mater under consideration and notified the RCTs, and surveys were performed. Additionally, it is being checked to see if an RWP is required to excavate into the waste material.

CQC Monitor: JPKoff Date: 7/11/05
Approved by: Date: 7/12/05
File No.

GOLDER ASSOCIATES

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
7/11/05



☒ Buttress fill placement, compaction

74

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/12/05 S M (T) W T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1330, 9.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** No Cover Fill material was hauled or spread into place during this shift.
- **Buttress Fill:** Envirocon used a D5 dozer, a Cat 140 motor grader, a Cat 815 and a Cat 825 compactors to re-grade, spread and compact Lafarge and Centennial pit fines to be used as Buttress Fill material within the footprint of the Buttress fill area. A Cat D5 dozer performed rough and finish work grading of materials on the outboard slope of the Buttress fill area for survey. Re-work of materials was accomplished by use of a Cat 825 compactor and a John Deere Tractor with a disc attachment, and a water truck.

SUMMARY OF QC TESTING:

Golder performed in-situ nuclear moisture density tests (QC-BF-DT-270 through QC-BF-DT-274) on Buttress Fill materials.

Golder performed an in-situ sand cone moisture density test (QC-BF-SC-14) for a direct correlation of nuclear moisture density test QC-BF-DT-274.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: _____ Date: 7-12-05
Approved by: _____ Date: 7-12-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/12/05 S M (T) W T F S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** NONE

CLOUD COVER: NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1200- 1100, 10.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  At the beginning of shift two D8 and one D6 CAT dozers graded fill on the east end of the north slope. Trucks continued to bring in RF alluvium into this area for the whole shift.

  Buttress Area: At the beginning of shift one compactor, a grader, and a D-5 Cat dozer worked to place buttress fill material. The D-5Cat worked to cut the southeast end of the buttress to grade. A D6 Cat , a grader, and a Deere track hoe worked to cut the west end of the buttress to grade.

SUMMARY OF QC TESTING:

Golder ran a total of 6nuclear density tests over the footprint of the buttress. (QC-BF-DT-275-280). Test 276 failed for compaction, test 277 failed for moisture. These were reported to Envirocon and corrected. Re-tests in these areas passed.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

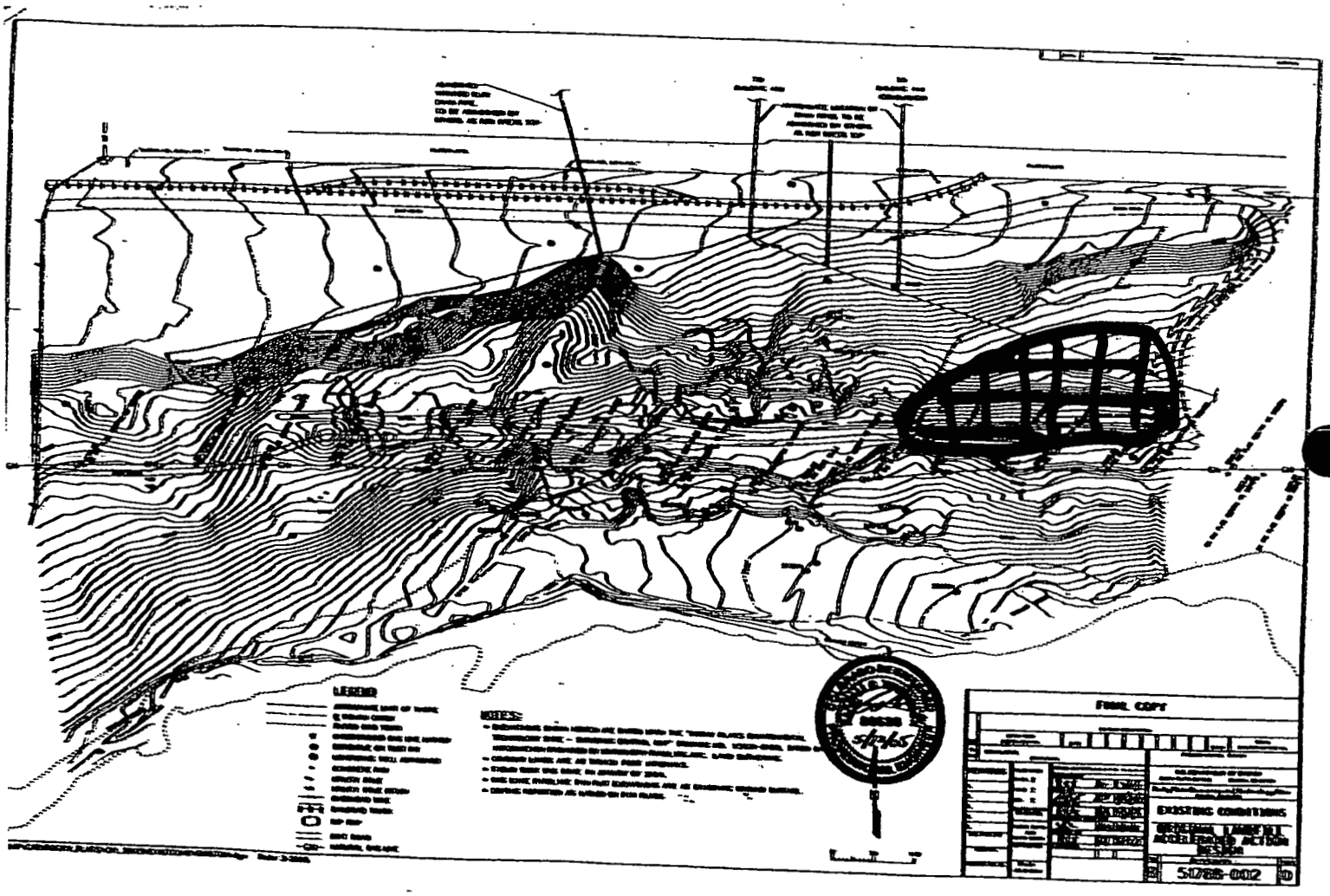
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Approved by: JPK **Date:** 7/12/05
File No. 7/13/05

76

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
7/12/05



cutting buttress fill to grade

RF Alluvium cover fill placement

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/13/05 S M T (W) T F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1330, 9.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was hauled and spread into place on the northeastern quarter of the landfill limits during this shift. Cover Fill Quality control sampling will continue during the placement of new Cover Fill materials.
- **Buttress Fill:** Envirocon used a D5 dozer, and a Cat 140 motor grader to grade the Buttress fill for final topographic survey and control point analysis. Areas deficient in Buttress fill materials was corrected prior to approval of placement of materials above.

SUMMARY OF QC TESTING:

Golder completed all in-situ nuclear moisture density tests of Buttress Fill materials.

Golder completed all in-situ sand cone moisture density tests of Buttress Fill materials.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.

Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

Attended the regulator construction meeting at 10:00 a.m. Issues discussed concerned grading of subgrade 1 to subgrade 2, pot-holing seep location on eastern limits of landfill, RFA placement

on the Buttress fill 3:1 slope, ECR's and RFI's.

CQC Monitor: _____ Date: 7-13-05
Approved by: _____ Date: 7-13-05
File No. _____

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/13/05 S M T (W) T F S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** NONE

CLOUD COVER: NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (1200- 1100, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  At the beginning of shift D8 and D9CAT dozers graded fill on the east end of the north slope, until 1700hrs. A D8 CAT moved RF alluvium on the west end of the fill area at the beginning of shift, until 1700hrs. Trucks and four scrapers continued to bring in RF alluvium into the center and west fill areas for the whole shift.
  A trench was cut in the northeastern fill area to try to relieve seeps. This "east subsurface drain" was dug down one foot below water table, backfilled with drain rock for two feet, then buried. The drain extends approximately 120 feet to the southeast, to an area just above the SID.

  Buttress Area: No earthwork was done in this area during night shift. Surveyors started mapping the buttress fill area at 1800hrs.

SUMMARY OF QC TESTING:

No tests were conducted during this night shift as no new cover fill was placed in the area of the buttress.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

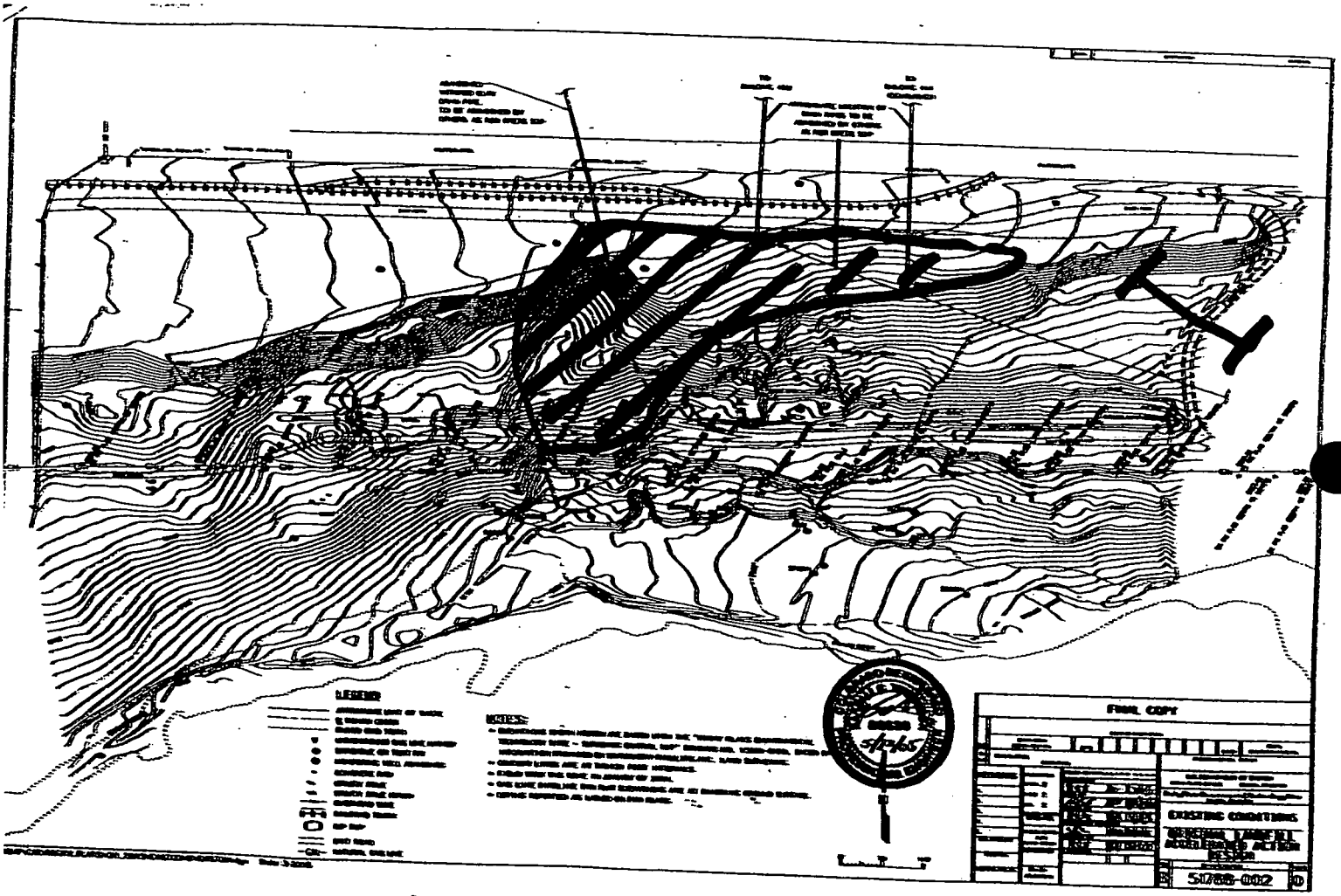
Approved by: JPK **Date:** 7/13/05
File No. 7/14/05

78

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT

7/13/05



RF Alluvium coverfill placement

East subsurface drain inst.

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/14/05 S M T W (T) F S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1330, 7.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was hauled and spread into place on the northeastern quarter of the landfill limits during this shift. Cover Fill Quality control sampling will continue during the placement of new Cover Fill materials. The contractor continued to re-grade material above the buttress final grade in preparation of additional re-grade fill placement.

- **Buttress Fill:** Envirocon used a D5 dozer, and a Cat 140 motor grader to grade the Buttress fill for final topographic survey and control point analysis. Areas deficient in Buttress fill materials was corrected prior to approval of placement of materials above.

SUMMARY OF QC TESTING:

Golder performed no additional QC testing of earthwork materials during this shift.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

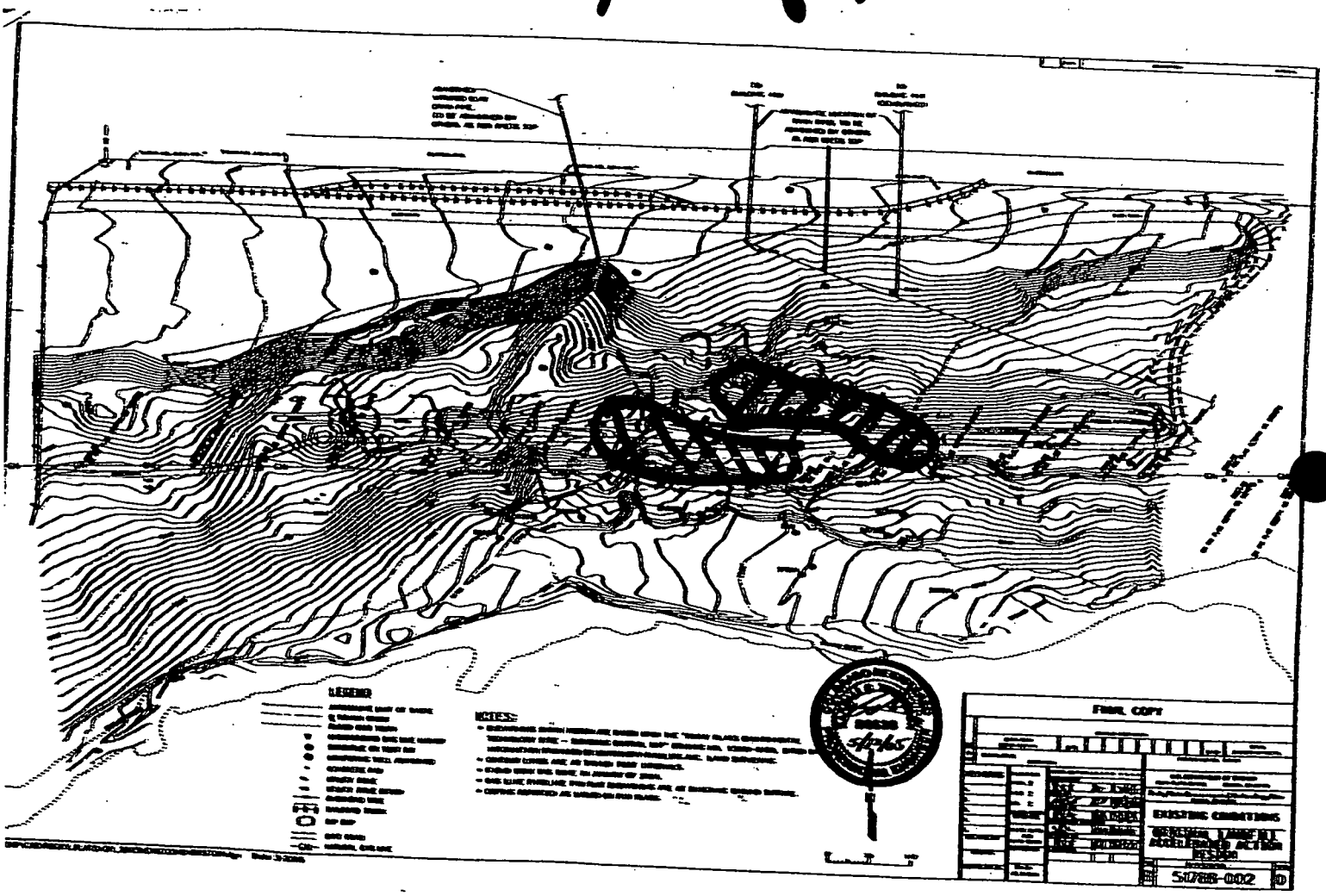
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: _____ **Date:** 7-14-05
Approved by: _____ **Date:** 7-14-05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

7-14-05

Day Shift.



COVER FILL

RE-GRADE FILL

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/14/05 S M T W (T) F S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** NONE

CLOUD COVER: NONE

GAI PERSONNEL HOURS CHARGED:

James Koffer (0900- 0900, 12.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  At the beginning of shift D6 and D5CAT dozers graded fill on the northeast end of the north slope. After 1800hrs four scrapers placed regrade fill on the north side of the buttress area to bring level up to subgrade two. Additionally, RF alluvium was brought into the western half of the fill area for the last half of the shift.

  Buttress Area: No earthwork was done in this area during night shift.

SUMMARY OF QC TESTING:

No tests were conducted during this night shift as no new cover fill was placed in the area of the buttress.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

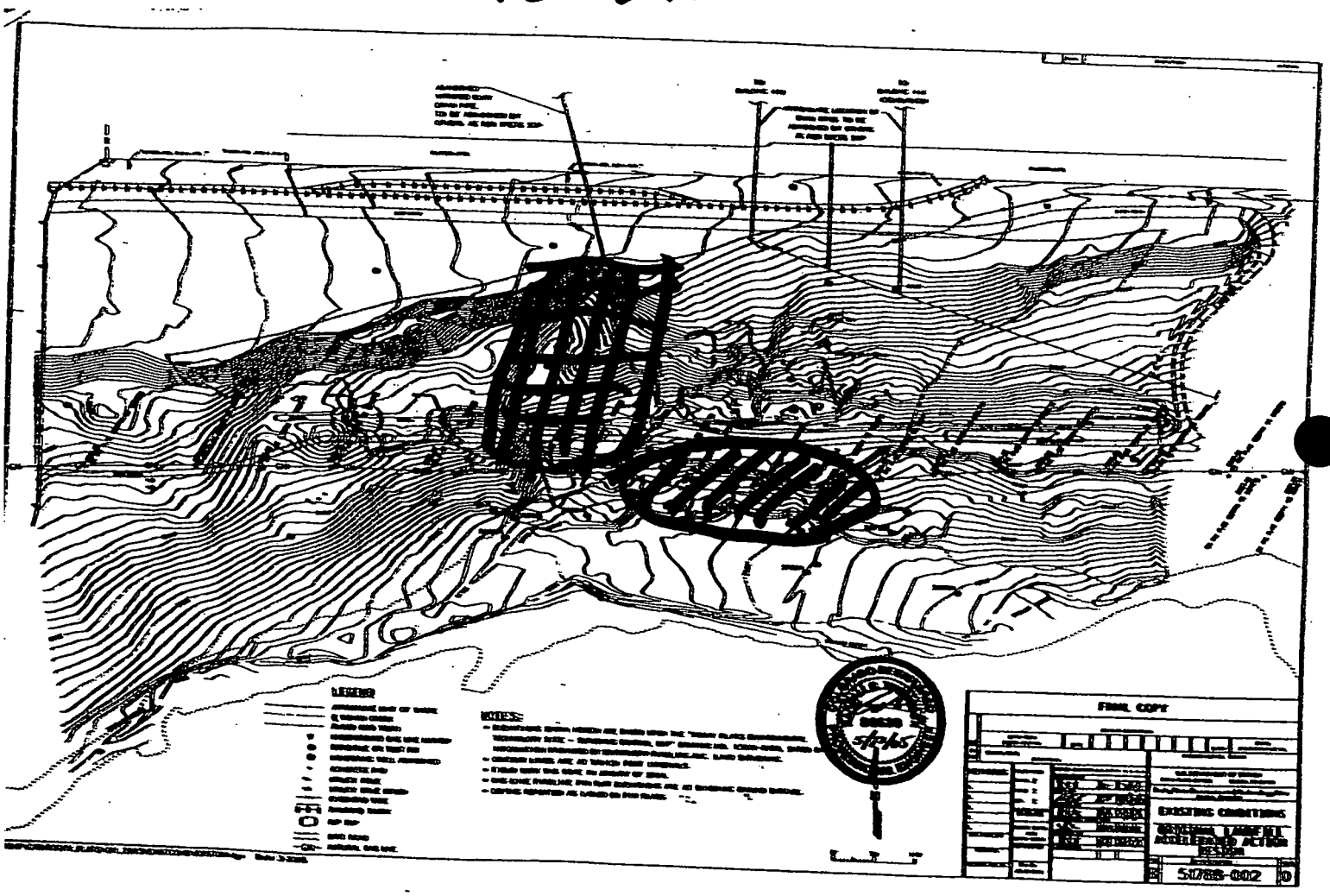
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Approved by: [signature] **Date:** 7/14/05
File No. [signature] 7/15/05

ORIGINAL LANDFILL
ROCKY FLATS

7/14/05

NITE SHIFT



Area of regrade placement

Cover fill placement

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/15/05 S M T W T (F) S

SHIFT: Day (0500-1530)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** lt. to medium

GAI PERSONNEL HOURS CHARGED:

Ron Di Donato (0430-1330, 9.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was hauled and spread into place on the northeastern quarter of the landfill limits during this shift. Cover Fill Quality control sampling will continue during the placement of new Cover Fill materials. Cover fill was hauled in by scrapers in the morning.
- **Regrade Fill:** Envirocon used a D8 dozer, two Cat 825 compactors, and a Cat 140 motor grader to place and grade the regrade fill material above the finished buttress fill grade. Material was hauled from the Centennial pit Rocky Flats Alluvium.

SUMMARY OF QC TESTING:

Golder performed no additional QC testing of earthwork materials during this shift.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

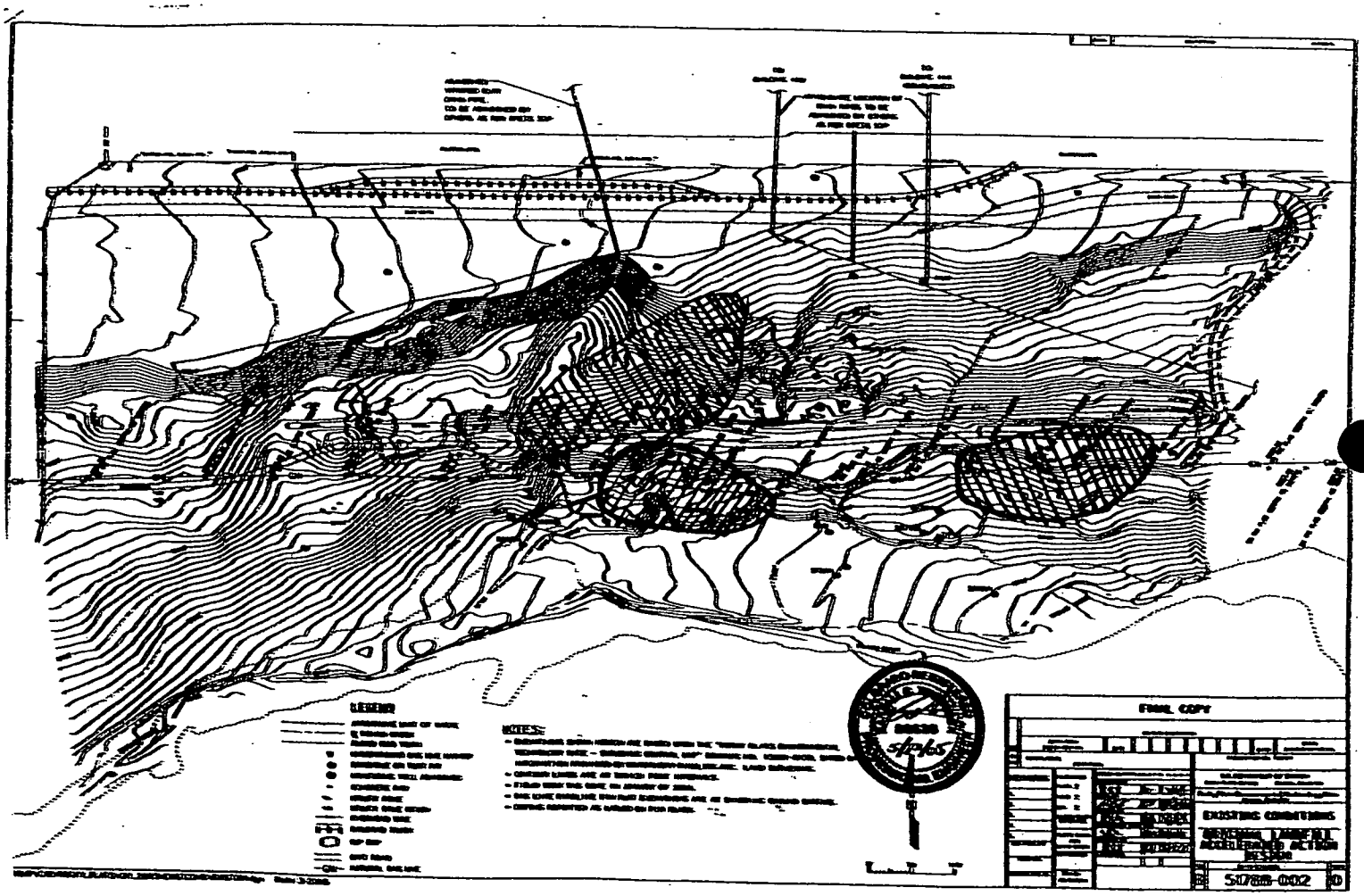
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: [signature] **Date:** 7-15-05
Approved by: [signature] **Date:** 7/18-05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

7-15-05

Day Shift.



- Re-grade Fill placement & compaction

- Cover Fill placement & compaction

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/15/05 S M T W T (F) S

SHIFT: Night (1300-2300)

SHUTDOWNS: none

PRECIPITATION: **AM:** none **PM:** NONE

CLOUD COVER: partly cloudy

GAI PERSONNEL HOURS CHARGED:

James Koffer (1200- 1030, 10.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cut/ Fill:**
  At the beginning of shift D6 and D5CAT dozers graded fill on the western side of the north slope. After 1800hrs, three scrapers placed RF alluvium to create the #1 diversion berm

  Buttress Area: D8 and D9 Cat dozers, along with two Cat 825 compactors placed regrade fill and pit fines along the north edge of the buttress fill area to bring the grade up to subgrade 2.

SUMMARY OF QC TESTING:

No tests were conducted during this night shift.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

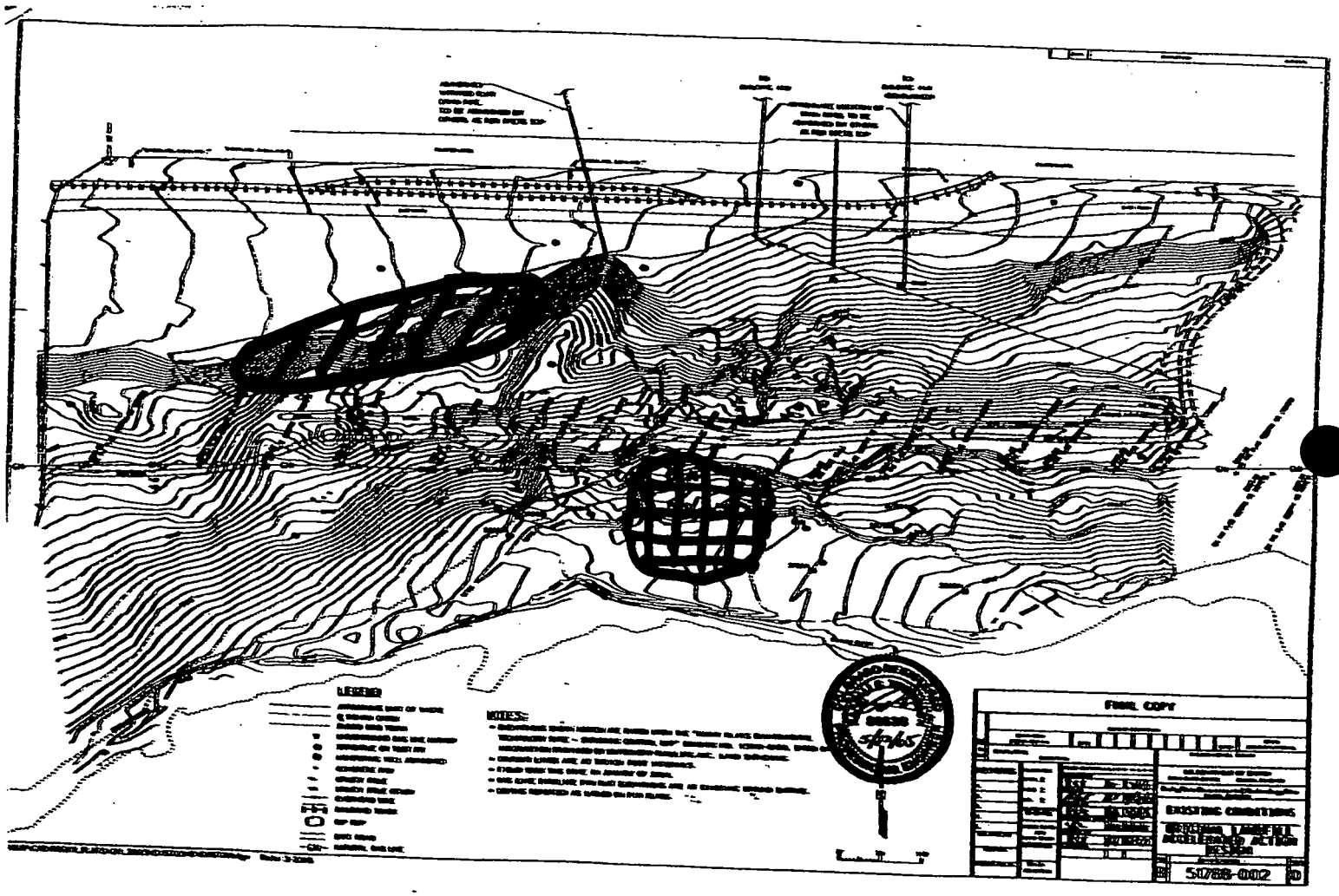
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day

Approved by: [signature] **Date:** 7/15/05
File No. [signature] 7/18/05

82

ORIGINAL LANDFILL
ROCKY FLATS

NITE SHIFT
7/15/05



RF Alluvium placement - #1 DIV. BERM

Regrade / Pit fines placement - Buttress

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/18/05 S (M) T W T F S

SHIFT: Day (0630-2000)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: Partly Cloudy to clear **WIND:** none

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-1930, 12.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was hauled and spread into place west of the grade break during this shift. Cover Fill Quality control sampling will continue during the placement of new Cover Fill materials. In the last portion of the shift, scrapers and a D9 dozer were used to begin installing the diversion channels on the west and east ends.
- **Regrade Fill:** Envirocon used a D8 and D6 dozers, two Cat 825 compactors, and a Cat 140 motor grader to place and grade the regrade fill material above the finished buttress fill grade. Material was hauled from the Centennial pit Rocky Flats Alluvium.
- **Buttress fill:** Geotextile was exposed and found to be damaged on the very southeastern corner of the buttress fill. A Deere excavator was used to expose the material for a repair patch.

SUMMARY OF QC TESTING:

Golder performed no additional QC testing of earthwork materials during this shift.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Met with the Envirocon superintendent and foreman throughout the day to discuss issues pertaining to the work load for the day.

CQC Monitor: JP Koffer Date: 7/18/05

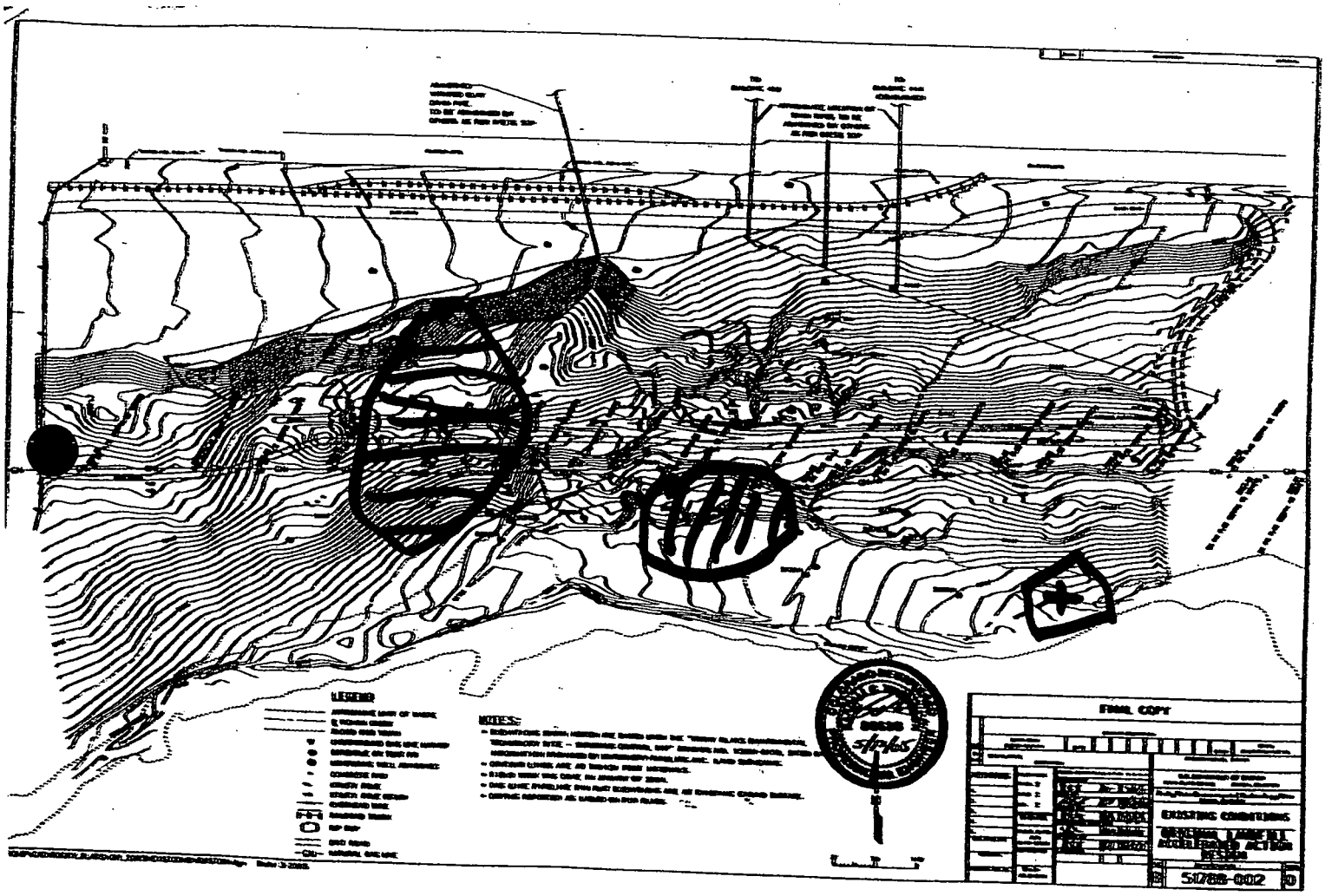
Approved by: _____ Date: 7/18/05

File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT

7/18/05



Regrade Placement

geofabric repair

Coverfill placement

84

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/19/05 S M (T) W T F S

SHIFT: Day (0630-2000)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: clear **WIND:** none

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-2000, 13 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material graded and tied into the west channel
- **Regrade Fill:** A large amount of clay material was found in the morning to have been placed the previous night. Apparently, this material was excavated from the west diversion ditch excavation at the end of the previous along with RF alluvium. The area covered was approximately 100'x100' and varied between 1 and 2' deep. This was reported to Envirocon, and discussions followed, which resulted in the area being excavated down to RF alluvium. Approximately 18 truckloads of clay (weathered claystone) were removed. From 1300 hrs to 1730 hrs, trucks brought in RFA from Centennial pit. After this time, four scrapers worked to bring in RFA while a D9 dozer and an 825 compactor worked to place it.
- **Diversion channels** the east side diversion channel was started today. Additionally, the west side, upper channel was graded.

SUMMARY OF QC TESTING:

Golder performed no additional QC testing of earthwork materials during this shift. A sample of clay material that was removed from the regrade fill was taken for information purposes.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

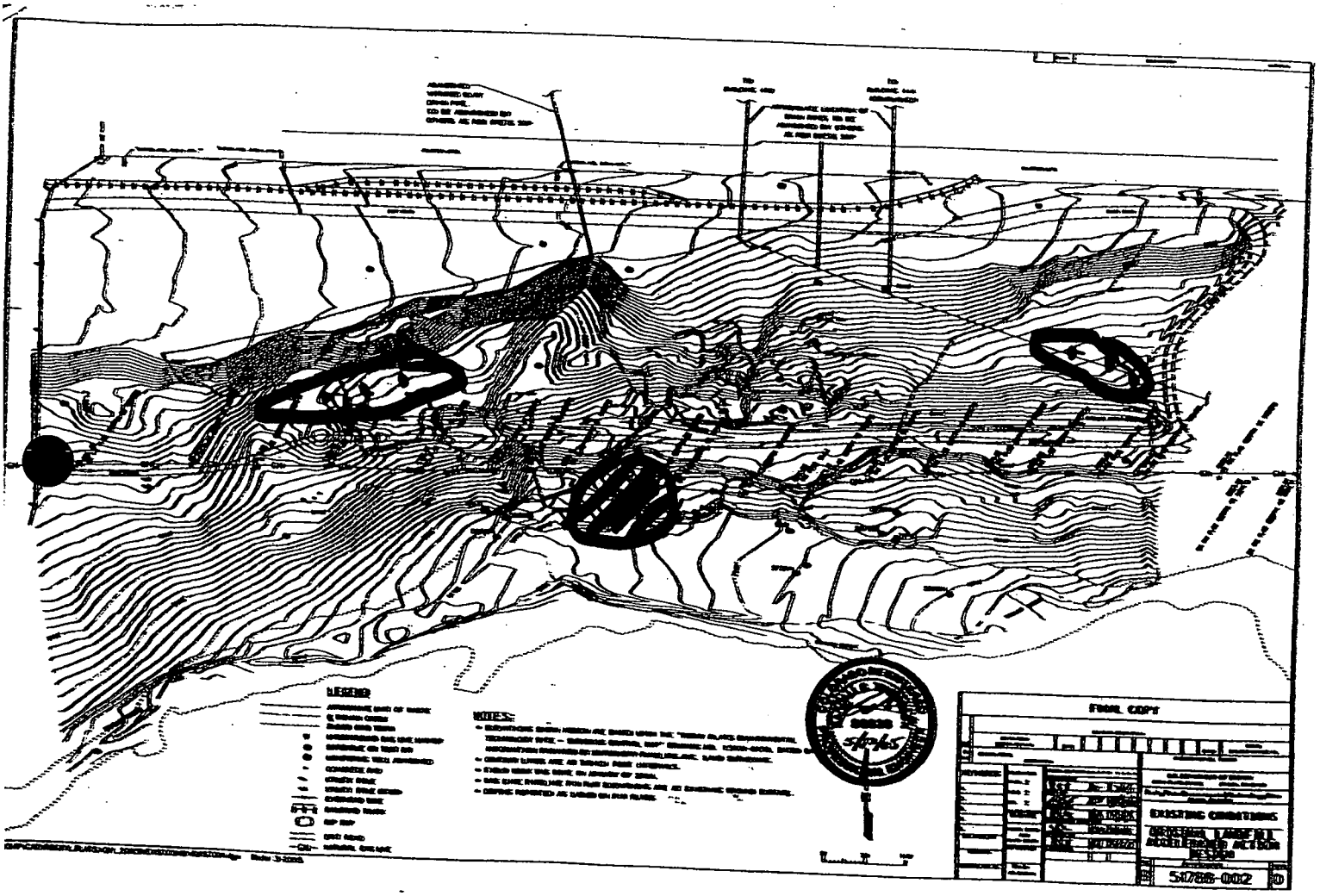
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Met with the Envirocon Project manager, superintendent, and foreman to discuss removing non-approved material from the regrade fill.

CQC Monitor: _____ **Date:** 7/19/05
Approved by: _____ **Date:** 7/19/05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT
7/19/05



Diversion ditch grading

clay material removal
RF Alluv placement

86

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/20/05 S M T (W) T F S

SHIFT: Day (0630-2000)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: clear **WIND:** none

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-2000, 13 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material graded by a D9 and D8 CAT dozers in the upper center portion of the fill area. Additionally, two of the west diversions berms were worked with D6 and D8 dozers and a motor grader. Cover fill was brought in and windrowed along the southern edge of the buttress fill area for future placement.
- **Regrade Fill:** Regrade fill over the buttress area was completed during this shift with a D9 CAT dozer and a CAT 825 compactor.
- **Diversion channels** The southern portions of the east and west lower diversion channels were cut during shift. A Deere track hoe cut the eastern side, and 4 scrapers cut the western side during the last half of the shift.

SUMMARY OF QC TESTING:

Golder performed no additional QC testing of earthwork materials during this shift. A sample of clay material that was removed from the regrade fill was taken for information purposes.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

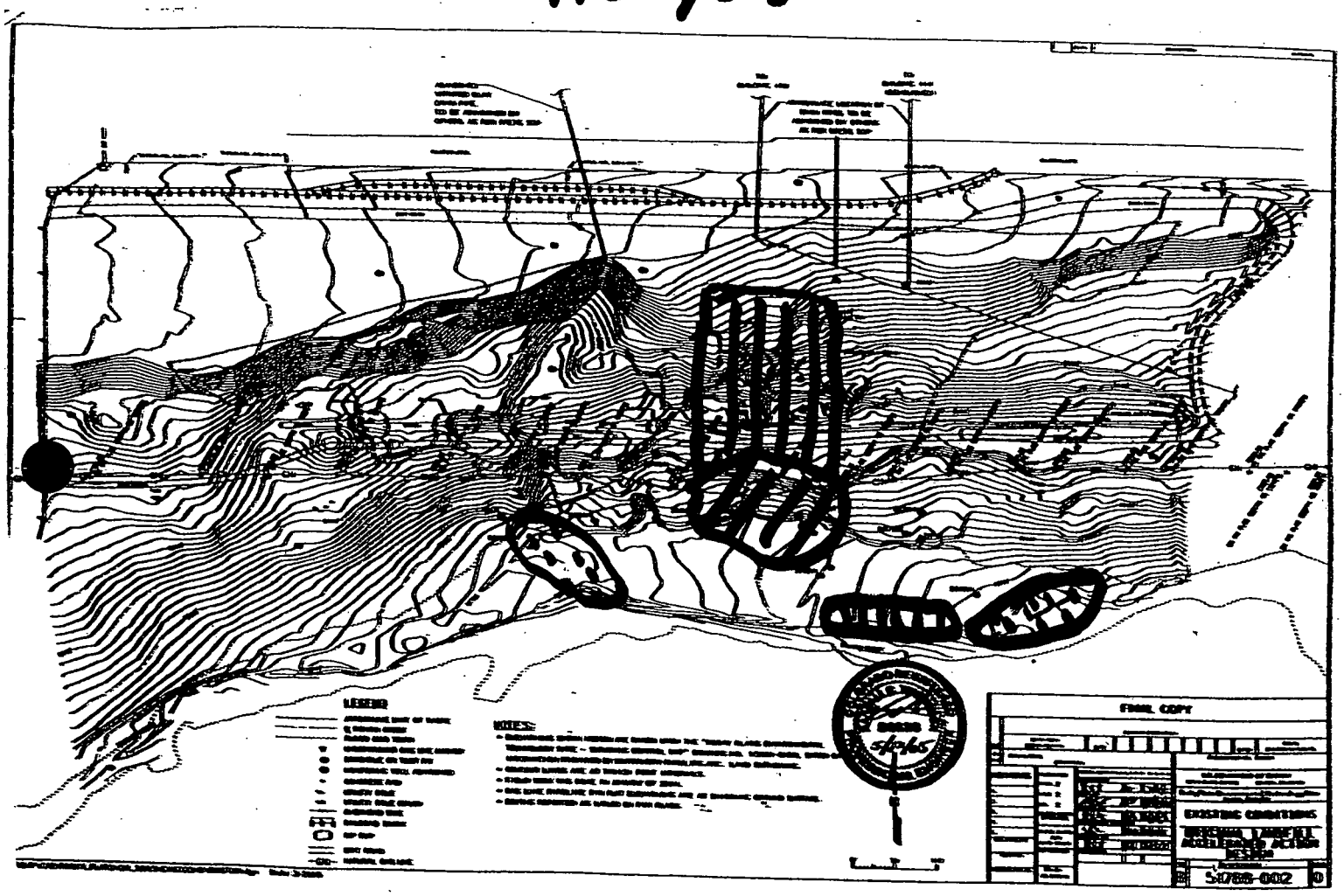
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Met with regulators during the weekly meeting to discuss construction progress and completed site walk down.

CQC Monitor: _____ Date: 7/20/05
Approved by: _____ Date: 7/20/05
File No. _____

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT

7/20/09



Regrade fill placement, compaction

DIVERSION CHANNEL EXCAVATION

COVER FILL PLACEMENT

88

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/21/05 S M T W (T) F S

SHIFT: Day (0630-2000)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: partly cloudy

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-2000, 13 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was graded by a D9 and D8 CAT dozers in the upper center portion of the fill area. Additionally, two of the west diversions berms were worked with D6 and D5 dozers and a motor grader. Cover fill was brought in and windrowed along the southern edge of the buttress fill area for future placement by three scrapers in the last half of the shift. This RF Alluvium cover fill material was being brought in from the 371 west pit. This material was inspected and approved as suitable RF alluvium cover fill material.

- **Diversion channels** The southern portion of the east diversion channel was cut during shift. A Deere track hoe, supported by a D6 CAT dozer cut the eastern side.The material cut was stockpiled for removal from the site as it was deemed unsuitable for RF alluvium cover fill material due to a high amount of weathered claystone in the mix.

SUMMARY OF QC TESTING:

Golder performed one QC bulk sample of the cover fill.(CF-5).

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

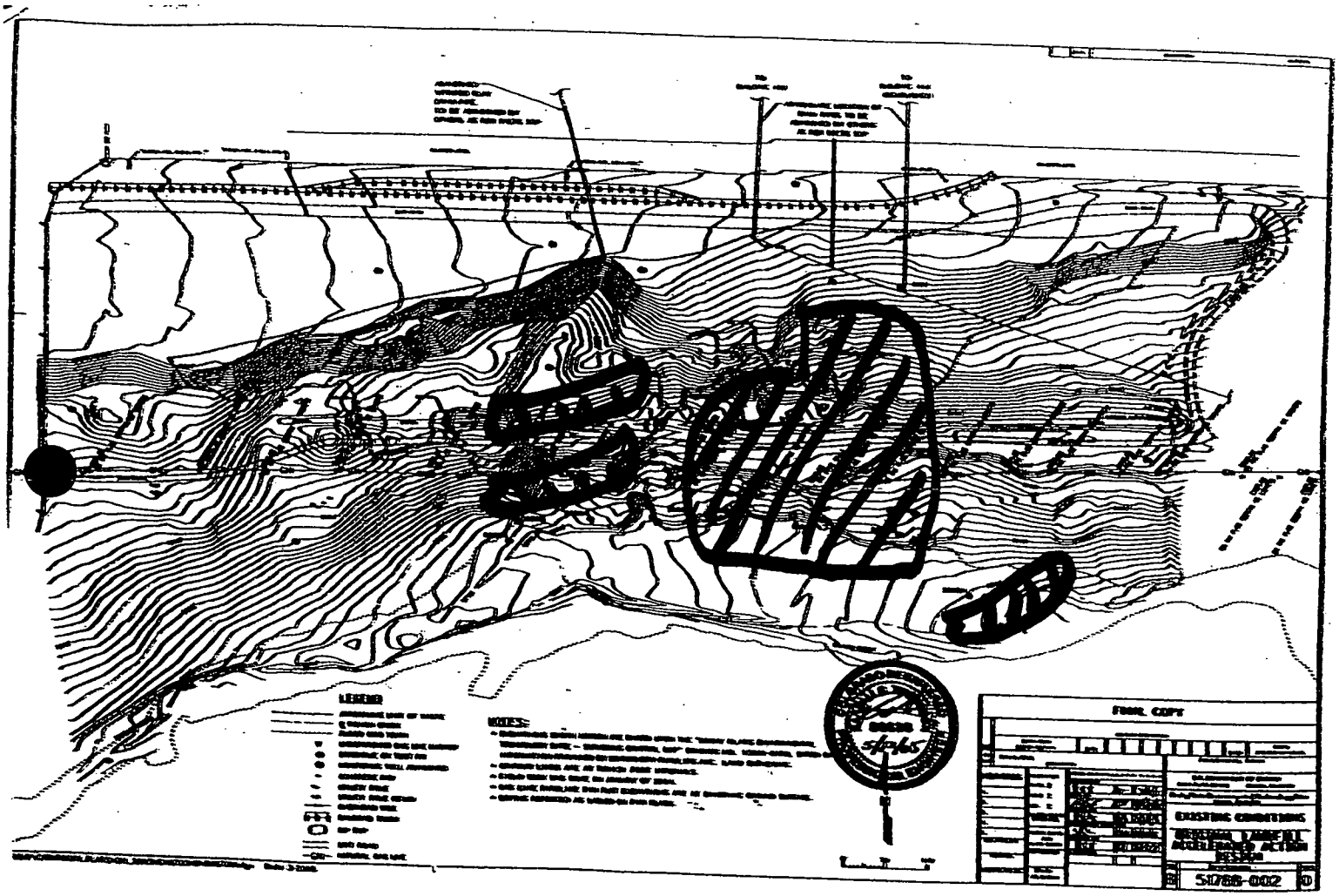
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Met with Envirocon superintendent to review and okay the use of 371 west borrow pit RF alluvium for cover fill material.

CQC Monitor: JPK Date: 7/21/05
Approved by: Date: 7/21/05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT
7/21/05



DIVERSION CHANNEL EXCAVATION

COVERFILL PLACEMENT

DIVERSION BERM WORK

90

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/22/05 S M T W T (F) S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** none

CLOUD COVER: partly cloudy

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-1700, 10 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was graded by a D9 and D8 CAT dozers in the upper center portion of the fill area. Additionally, two of the west diversions berms were worked with a D6 dozer, a CAT 966 loader and a motor grader. Cover fill was brought in and windrowed along the southeastern edge of the buttress fill area for future placement by three scrapers in the first half of the shift. A D9 CAT dozer later pushed this material over the edge of the slope. This RF Alluvium cover fill material was being brought in from the 371 west pit. Scrapers continued to bring this material in and place it on the center of the cover fill area during the last half of the shift.

- **Diversion channels** The southern portion of the west diversion channel was cut during shift. A Deere track hoe, supported by D8 and D5 CAT dozers cut out the aea.The material cut was stockpiled for removal from the site as it was deemed unsuitable for RF alluvium cover fill material due to a high amount of weathered claystone in the mix.

SUMMARY OF QC TESTING:

Golder did not any sampling during this shift.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: none.

91

Job No: 053-2203

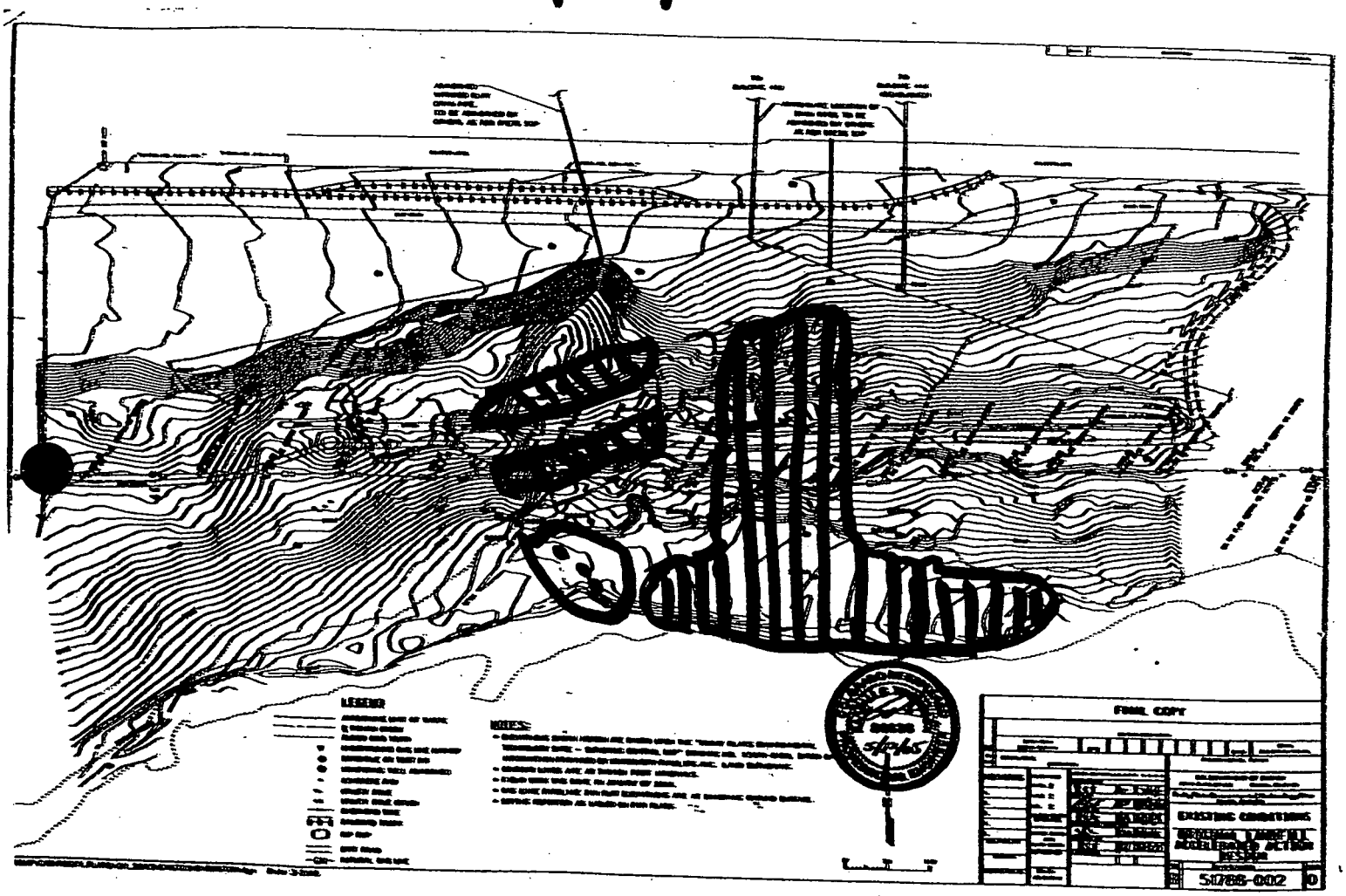
Report No. 072205JPKDaily

CQC Monitor: JPK Date: 7/22/05
Approved by: [illegible] Date: 7/22/05
File No.

GOLDER ASSOCIATES

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT
7/22/05



Div. Berm Construction

RFA Coverfill Placement

Div. Channel Excavation

97

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/25/05 S (M) T W T F S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** none **PM:** rained out

CLOUD COVER: partly cloudy

GAI PERSONNEL HOURS CHARGED:

James Koffer (0730-1800, 10.5 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was graded by a D9 and D8 CAT dozers in the upper center portion of the fill area. Additionally, two of the west diversions berms were worked with a D6 dozer. Cover fill was brought in and worked along the center buttress area. CAT D9 and D8 dozers pushed this material up the slope.
- **Diversion channels** The northern portion of the west diversion channel was cut during shift. A Deere track hoe cut out the aea.The material cut was stockpiled for removal from the site as it was deemed unsuitable for RF alluvium cover fill material due to a high amount of weathered claystone in the mix.

SUMMARY OF QC TESTING:

Golder did one bulk sample of cover fill material (CF-06) during this shift.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: none.

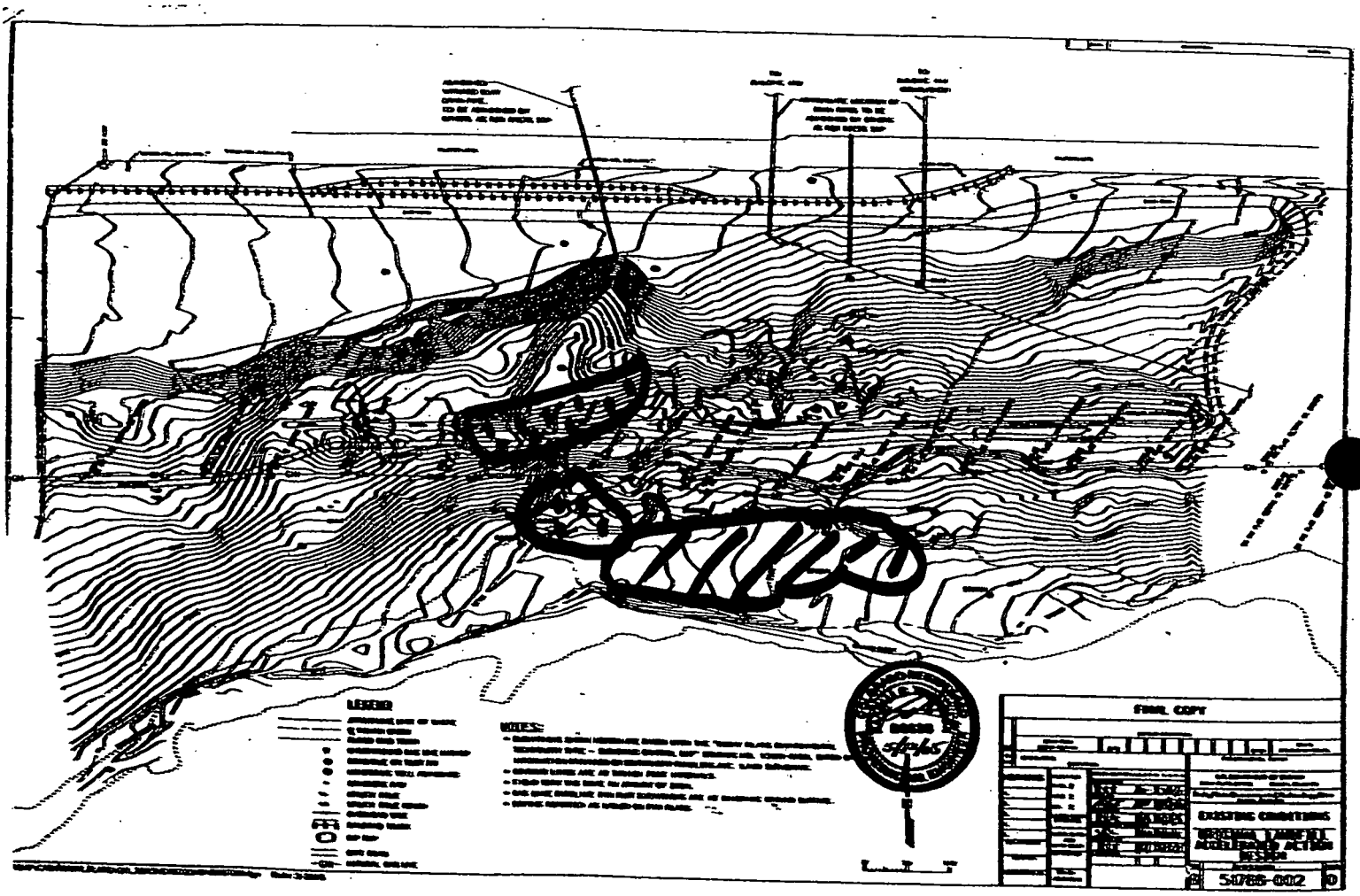
CQC Monitor: JPK **Date:** 7/25/05
Approved by: [signature] **Date:** 7/25/05
File No.

93

GOLDER ASSOCIATES

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT
7/25/05



Cover fill placement

Diversion channel, berm Const.

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/26/05 S M (T) W T F S

SHIFT: Day (0630-1700)

PRECIPITATION: **AM:** rain **PM:** rain

CLOUD COVER: cloudy

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-1800, 11.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was brought in and spread along the upper road and graded by a D10 and D8 CAT dozers. Additionally, the top west diversion berm was worked with a D6 dozer. No cover fill material was spread on the buttress area due to high mud and slippery conditions due to rain.
- **Diversion channels** The southern portion of the east diversion channel was cut during the last half of the shift. A Deere track hoe cut out the area.The material cut was stockpiled for removal from the site as it was deemed unsuitable for RF alluvium cover fill material due to a high amount of weathered claystone in the mix.

SUMMARY OF QC TESTING:

Golder did not do any QC sampling during this shift.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

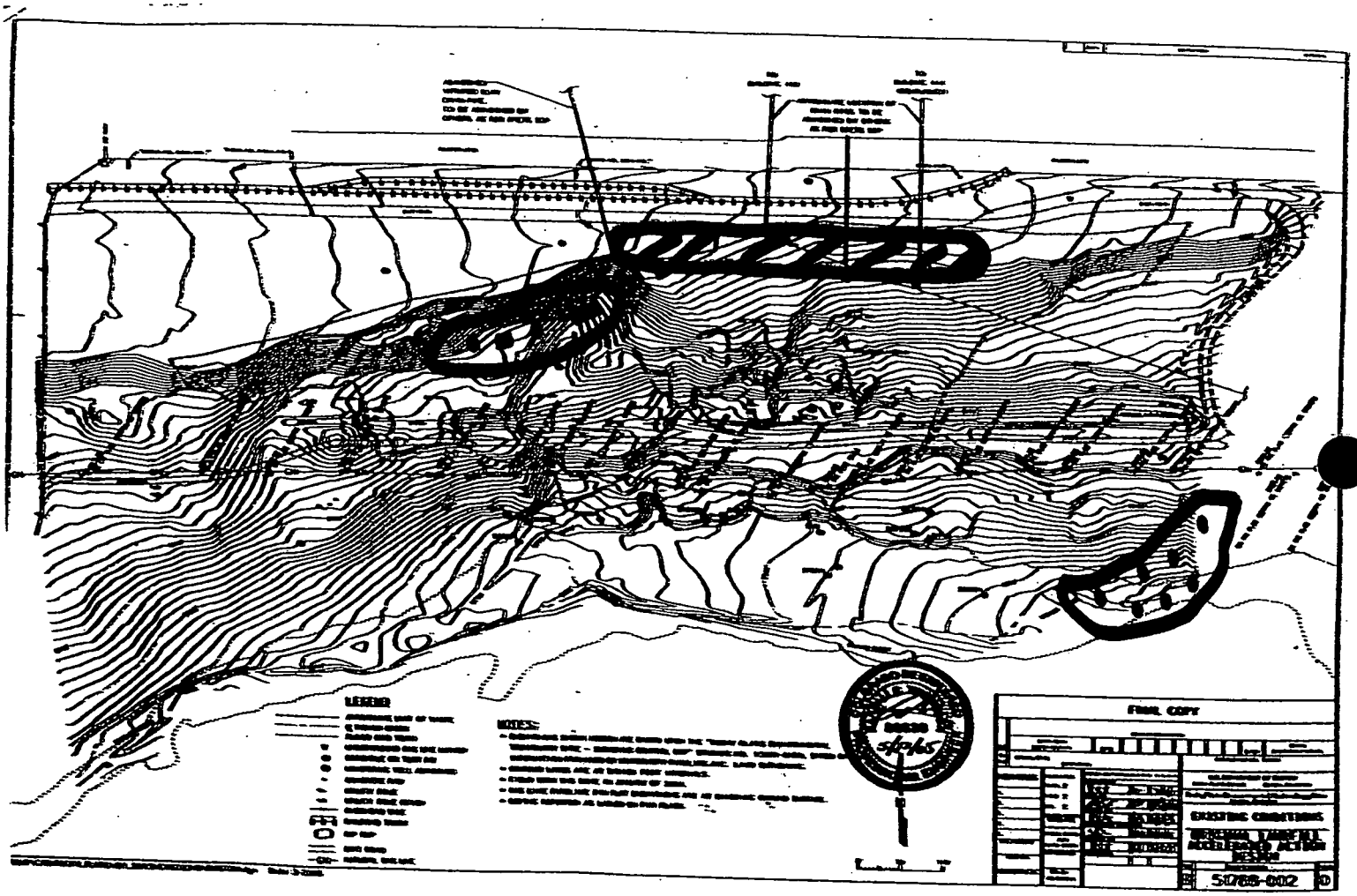
SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings: Discussed installation of erosion control with Envirocon management in anticipation of starting this work later in the week.

CQC Monitor: JPK **Date:** 7/26/05
Approved by: [signature] **Date:** 7/26/05
File No.

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT
7/26/05



RF Alluvium Coverfill placement

Diversion channel, berm const

GOLDER ASSOCIATES
FIELD MONITORING SUMMARY

PROJECT TITLE: Original Landfill Accelerated Action **GOLDER PROJECT NO:** 053-2203

ENVIROCON CLIENT: Kaiser Hill **PROJECT DESIGNER:** Earth Tech

GOLDER CLIENT: Envirocon **GENERAL CONTRACTOR:** Envirocon

LOCATION: Golden, CO

PROJECT: Original Landfill (Rocky Flats)

DATE 7/27/05 S M T (W) T F S

SHIFT: Day (0630-2000)

PRECIPITATION: **AM:** rain **PM:** rain

CLOUD COVER: cloudy

GAI PERSONNEL HOURS CHARGED:

James Koffer (0700-2100, 14.0 hrs)

GUESTS ON SITE: none

SUMMARY OF CONSTRUCTION:

- **Cover Fill:** Cover Fill material was brought in with trucks and spread along the upper road and graded by a D10 and D8 CAT dozers in the first half of the shift. During the last half of the shift articulated trucks brought in cover fill material spread on the buttress above the 3:1 slope and on the west end of the buttress fill area to be used for diversion berm #3. After 1700 hrs, scrapers brought in RF alluvium and spread it on the main fill area just east of the grade break.

- **Diversion channels** Waste piles from the southern portions of the east and west diversion channels were loaded and removed from the area during the shift by a Deere track hoe.

SUMMARY OF QC TESTING:

Golder completed two QC samples (BF-07, 8) during this shift. This completes the bulk sampling of the cover fill for this project.

Quality Control for the Original Landfill is confident that the above items are being conducted in accordance with the proper specifications. All requirements of the QC Tables have been observed and met.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

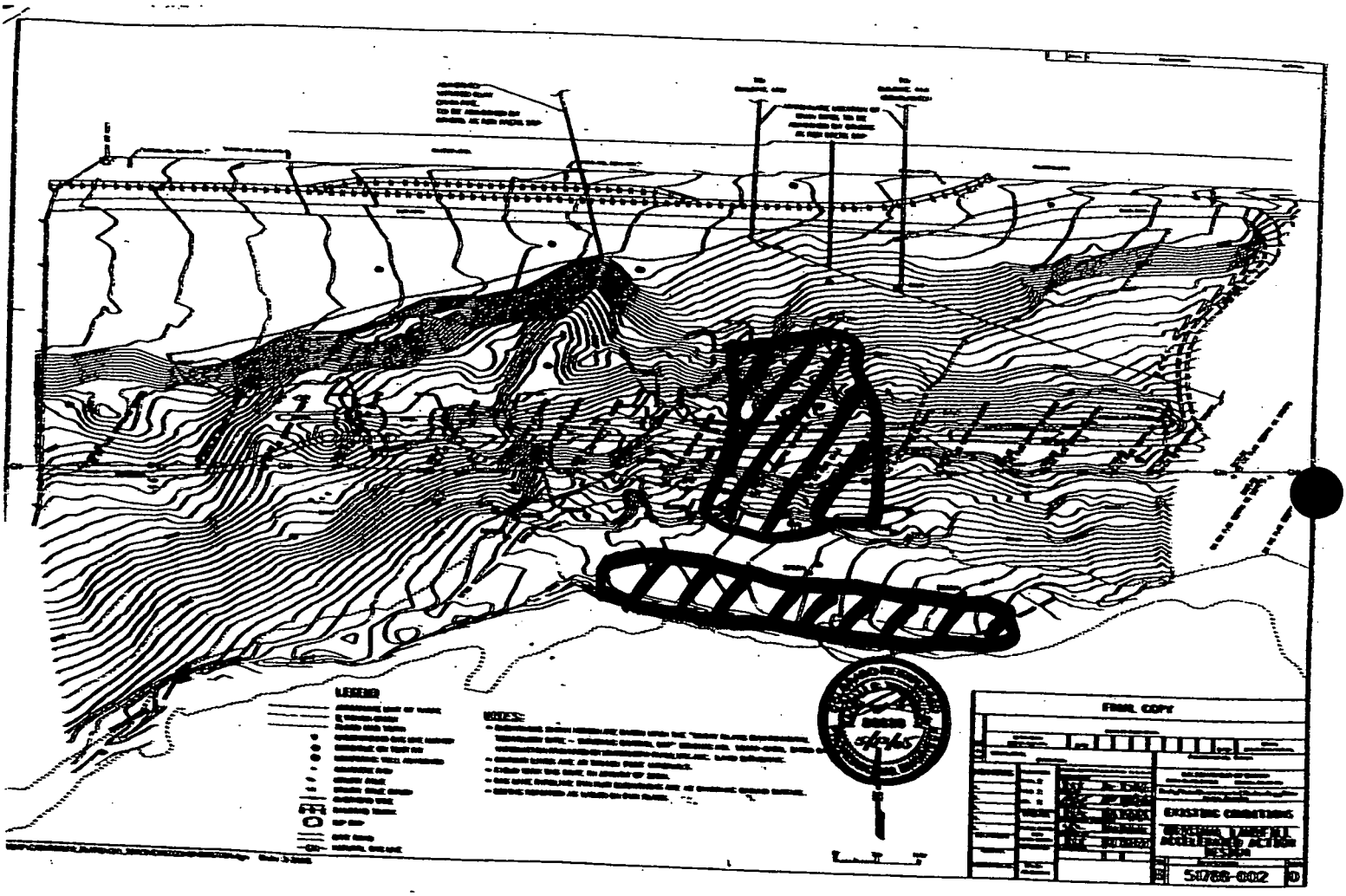
Pre-EV Meeting: Discussed potential hazards associated with activities to be conducted on site this day.
Other Meetings The weekly regulator meeting was held with Envirocon managers and representatives from the regulatory agencies.

CQC Monitor: _____ **Date:** 7/27/05
Approved by: _____ **Date:** 7/27/05
File No. _____

95

ORIGINAL LANDFILL
ROCKY FLATS

DAY SHIFT
7/27/05



COVERFILL PLACEMENT

CH2MHill / K-H
August 20, 2005

10 Aug 2005 J Woo

11:05 Arrived onsite

Joined a site walk already in progress
Mike + EPA, CDPHE, Tetra, Earth Tech.

- looked at seeps on east & west channel slopes on landfill side
  - Norm wants them to be addressed
  - evidence of cracking on west one
  - slope on east seep had been flattened

- working on building diversion berms 5, 6, & 7

- excavated west perimeter channel

- placed topsoil on downslope side of buttress fill
  - area was seeded & erosion mat placed.

15:30 Lightning shut down work. Rain

17:00 Too wet to work. Sent most of crew home.

Some stayed to work on equip

17:00 Left site.

Reviewed by: [signature] 8-15-05

96

CH2MHill – K-H

August 11, 2005

11 Aug 2005 — J. Woo — 12 Au[illegible] 7:30

10:30 Arrived onsite

Heavy rains last night left site wet & muddy.
Decided not to put heavy equipment on cap.

Discing above div. berm #1 & #4.
Dozer smoothed area above berm #4.
Laying C125 erosion mat on berm #4.

Grader trying to build berm #7.

Disced between berms #1 & #2
Hand seeded area.

Dozer shaped sections of berms #4 & #6

Ditch Witch trenched along west permieter trench

Placed erosion mat on south side of buttress slope

12:30 Left site.

Reviewed by: [signature] 8/15/05

August 12, 2005 J. Wos
1 of 2

12[illegible]9
7:30 Arrived onsite

Hauling in R.F. Alluvium to build berm #7

Continue laying erosion mat (125) on berm #4
- Also laying 350 on buttress slope

Dozer shaping up berms and making tie-ins into channels

Placed topsoil in west & east perimeter channels

Pushed up soil for outer slope on west perimeter channel

Excavator began removing top 1 ft of slump area on east perimeter channel. Exposed a lens (30' x 30' x 2' deep) of soft fat clay. Decided to remove it. Finished @ ≈ 14:30. Spread out piles of material so equip. could get through. Cut a notch in so water could drain out of hole into the channel.

Began repair of seep above div. berm #3 per sketch from Earth Tech. Established limits of seep. Cut trench perpendicular to berm first. Water running into trench. Cut trench 2' wide and 3' deep at top (T-intersection) and ≈ 6' deep at tie-in to drain rock. Will

97

CH2M Hill / K-H

August 12, 2005

excavate trench, put in geotextile, & rock and cover over with geotextile. Will backfill the rest tomorrow.

17:15 Left site

Envirocon worked until 1930

Review By: 8-15-05

Saturday
3 Aug 2005

J. Elliott

0700 - Rain and overcast this day. Temperatures in the high 50's. Forecast for remainder of day was similar.

Discussed and inspected the installation of the burito wrap drain rock on Beam #3 Area was not back filled last night and the installation was visible Geotext liner was covering the drain rock and installation was in accordance with sketch provided by Earth tech. Survey coordinates were obtained by Surveyor Nick and will be added to design prints.

0900 Left site.

Jon R. Elliott

Reviewed By:

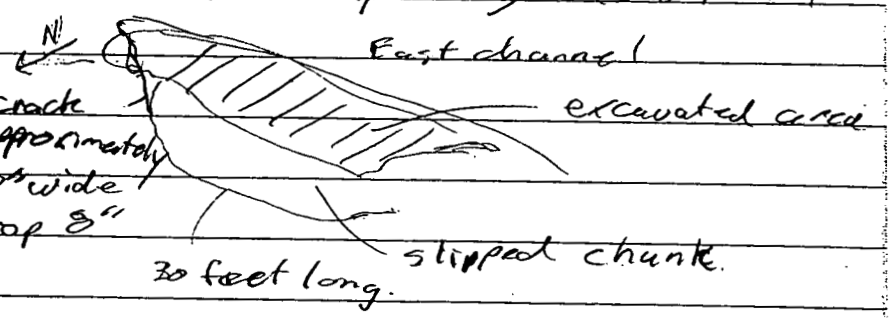
98

6
Monday -
15 Aug 2005 J. Elliot

0700 Arrive on site, Sunny warm, expect 85 today.

- Some seed being overlaid with the Flextera between the berm 1 - berm 2

- Walkdown excated area on east channel No fill had taken place between last Friday and this Monday. Area above excavation had cracked fairly extensively "Iceberg area", pointed oval in shape, Approx 10' in middle and tapering down on ends to



Engineer Scott Powel on site to assess. Gave direction to fill channel with RFA and pack on toe area. This to build a buttress area. Cause deemed to be lack of below support during excavation. "Iceburg" will be trenched to observe soil condition

8/15/05

- West trench also partially excavated to observe wet spot soil and origin location between berm 2 & 3 east wall of West Channel Ground water observed and did fill up excavated area. Area Observed by Keating, Ryan Woodruff, Chris Pierson and Engineer Scott Powell. Soil was investigated. Preliminary decision may be just to leave as is. Will make final decision after further investigation.

- Separate crew installing C350 matting on the lower 30' of the main buttress area.

- With Jack Wao & Scott Powell present excavated further on the west channel. No significant soft spots on the west. Two spots dug up South section was smaller, No significant soil problem noted. Decision made to refill with RFA. Area where water was discovered it was decided to insert a Riprap drainage berito. That is in process.

- Crew completed installation on RipRap-Geotext liner drain on west channel. Empties to bottom of channel.

International Engineering
8/15/05

8

8/15/05

- East channel excavation fill removal late in day. Area completely restored to final grade.

Jim Elliott Jim R. Elliott
Reviewed By [illegible]

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action

Golder Project No: 053-2203

Envirocon Client: Kaiser-Hill

Project Designer: Earth Tech

Golder client: Envirocon

General Contractor: Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Project Dates: 7/28/05 thru 8/15/05

Report On Absence of QC Monitor:

On the above dates, the QC monitor was not on the project site to observe project construction, at the request of the Kaiser-Hill project manager Mike Keating.

Upon returning at his request on 8/16/05, the following work was observed to have been done during the QC monitoring absence:

- Coverfill had been completed over the majority of the site.
- Berms 3,4,5,6,&7 were completed.
- East and West channel earthwork had been completed.
- P550 had been placed in the West Channel.
- C125 had been placed over berms 1 & 2.
- C350 had been placed across buttress toe.

Due to the absence of the QC Monitor during this reporting period, verification of the construction methods cannot be confirmed. Installed materials that can be readily seen, appear to have been installed correctly.

CQC Monitor: _____ **Date:** 9/01/05

9/01/05

100

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/16/05 5pm **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** minor

Cloud Cover:minor

GAI Personnel hours charged: 6.5hrs

Guests on site: none

Summary of Construction:
Crews installed C350 erosion matting on the south face of the buttress fill area. A tractor was used to till the cover fill area in preparation for seeding over the former waste fill area. Additionally, a grader was still working to create proper grade on the top (north) end of the coverfill area. A track hoe placed 2' rock at the intersection of berm #1 and the west channel.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: JPKoff **Date:** 8-16-05
Approved by: [signature] **Date:** 8-18-05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/17/05 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** minor

Cloud Cover: temp high 80s

GAI Personnel hours charged: 6.5hrs

Guests on site: none

Summary of Construction:
Crews installed C125 erosion matting on the south face of the buttress fill area. Energy retention rocks placed in west channel outflow berms 2 and 3, and at final west channel outfall. Rock is being placed with 2' edge spacing on slits in P550 matting.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
Weekly project progress meeting at 10:00am with KH, Envirocon, and Regulators.

CQC Monitor: JP Kiff **Date:** 8-17-05

Approved by: [signature] **Date:** 8-18-05

101

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/18/05 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** minor

Cloud Cover: temp high 80s

GAI Personnel hours charged: 6.5hrs

Guests on site: none

Summary of Construction:

Crews installed C125 erosion matting on the south face of the buttress fill area. Energy retention rocks placed in east channel outflow berms 4,5,6,and 7. Rock is being placed with 2' edge spacing on slits in P550 matting.

Seeding, straw placement with crimping, and Flexterra spraying have begun in the areas in between berms 2,3,4,5, and 6.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: JPK **Date:** 8-18-05

Approved by: [signature] **Date:** 8/18/05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/19/05 S M T W T F S

Shift Day

Precipitation: AM none PM minor

Cloud Cover:partly cloudy, temp high 80s

GAI Personnel hours charged: 7.5hrs

Guests on site: none

Summary of Construction:

Crews finished installing C125 erosion matting on the south face of the buttress fill area. Energy retention rocks placed in east channel outflow berms 4,5,6,and 7. Rock is being placed with 2' edge spacing on slits in P550 matting. Installation nailing of P550 matting in the West Channel was completed.

Seeding, straw placement with crimping, and Flexterra spraying have begun in the areas in between berms 2,3,4,5, and 6.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: [signature] **Date:** 8-19-05

Approved by: [signature] **Date:** 8/22/05

102

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/22/05 S M T W T F S

Shift Day

Precipitation: **AM** none **PM** minor

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 6.5hrs

Guests on site: none

Summary of Construction:
Hay is being spread and crimped in between berms 5 and 6, and 6 and 7.Flexterra is being sprayed in the areas in between berms 2 and 3, and 5 and 6.
Erosion matting is being installed in the east channel, starting at the bottom and working up.
C125BN matting was delivered for berms 3,5,6,&7.
Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: _____ **Date:** 8/22/05
Approved by: _____ **Date:** 8/22/05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action

Golder Project No: 053-2203

Envirocon Client: Kaiser-Hill

Project Designer: Earth Tech

Golder client: Envirocon

General Contractor: Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/23/06 Sqpv S M T W T F S

Shift **Day**

Precipitation: **AM** none **PM** rain after 3pm

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 6.5hrs

Guests on site: none

Summary of Construction:
Flexterra is being sprayed in the areas in between berms 6 and 7.
C125 BN Erosion matting is being installed on berms 3 and 5 west, additionally the west sections of berms 6 and 7.
West Channel area is basically complete. West access area is being graded for transition to west boundary.
The East channel is being matted with P550 by a small crew, who have worked up to the area of diversion berm 7.
Summary of concerns:
C125BN matting that has been installed inside the berms does not have the proper anchoring where mats meet on the short ends. Supplier's spec calls for two rows of pins, on 4" centers, 4" apart. This does not appear to have been done.

Grade break at the east end of Berm 4, where it intersects the East Channel is matted with C125, this slope is over 5% and should be matted with P550.
Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

103

CQC Monitor: J.P. Koffler **Date** 8-23-05

Approved by: [illegible] **Date:** 8-24-05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date **8/24/06** **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 9.0hrs

Guests on site: Regulators, DOE personnel

Summary of Construction:
Flexterra is being sprayed in the areas in between berms 6 and 7and 5 and 6.
C125 BN Erosion matting was installed on berms 3 and 5 west, additionally the west sections of berms 6 and 7.
West Channel area is basically complete. West access area is being graded for transition to west boundary.
The East channel was not worked on at all today
Summary of concerns:
C125BN matting that has been installed inside the berms does not have the proper anchoring where mats meet on the short ends. Supplier's spec calls for two rows of pins, on 4" centers, 4" apart. This will be done from this point onwards.
Grade break at the east end of Berm 4, where it intersects the East Channel is matted with C125, this slope is over 5% and should be matted with P550.
Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
Weekly meeting with Regulators, DOE, and project personnel was held. A preliminary walk down of the west side of the project site was conducted, and a punch list compiled.

104

CQC Monitor: JPKoff **Date:** 8-24-05

Approved by: GWaff **Date:** 8-25-05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/25/05 S M T W T F S

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 8.0hrs

Guests on site: none

Summary of Construction:
The buttress area was tilled, seeded, hay mulched, and crimped in.
Flexterra is being sprayed in the areas in between berms 6 and 7and the buttress area.
C125 BN Erosion matting was completed on berm 7 and started on berm 6
The East channel was not worked on at all today
Summary of concerns:
none
Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
none

CQC Monitor: _____ **Date:** 8/25/05

Approved by: _____ **Date:** 9/1/05

105

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action

Golder Project No: 053-2203

Envirocon Client: Kaiser-Hill

Project Designer: Earth Tech

Golder client: Envirocon

General Contractor: Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/26/0~~6~~5 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 5.5hrs

Guests on site: none

Summary of Construction:
The buttress area continued to be sprayed with Flexterra.
Crews worked to anchor C125BN matting to berms 5 and 6.
Seed was applied to upper tier east side after the area was tilled, hay mulched, and crimped.
C125 matting was removed from the very east end of berm 4 where it meets the East Channel. This area will be matted with P550 due to its slope which is over 5%.
Berm 7 was restored in the area of the grade break road.
Laborers worked to address the West channel trench tuck punch list item. This required additional dirt which was delivered by truck driving on already hydromulched area between berms 1 &2 and 3 &4.

Summary of concerns:
A fire broke out shortly after 12:30 on berm 6 east of the grade break road. Crews returning from lunch spotted the blaze and attempted to put it out. However, the wind came up, resulting in a large fire which eventually consumed all the C125 matting laid down on berm 6, one pallet of C125 laying nearby, and most of the hay and Flexterra between berms 5&6, and 6&7. Additionally, the fire area has been ripped up by equipment brought in to fight the fire. Grades will have to be rebuilt and surveyed before remediation.
Cause of the fire is under investigation.

Summary of QC testing:

None

Summary of QC Testing:

None

Summary of Meetings and Discussions Held:

none

CQC Monitor: JPKoff **Date:** 8-26-05

Approved by: [signature] **Date:** 9-1-05

106

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/27/05 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 7.0hrs

Guests on site: none

Summary of Construction:
Crews worked to place P550 in the East Channel.
Restoration of the fire damaged area commenced this morning. Areas between berms 5&6, and 6&7 where regraded and tilled. The area between berms 6&7 was mulched with hay, and crimped, but no seed was sewn. The area between berms5&6 were seeded. Berm 7 was closed at the grade break road.

Summary of concerns:
Berm 6 has a sharp drop about 300 feet west of the East Channel. Additionally, the uphill side of the berm was damaged by water trucks and loaders during the fire. Although this area was remediated during this shift, the area should be surveyed to assure correct grades.
The area burned on Friday was re-worked during today's shift, but no seed was seen being placed between berms 6&7 before hay mulch was applied. .
Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
none

CQC Monitor: _____ **Date:** 8/27/06

Approved by: _____ **Date:** 9/1/05

107

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date **8/29/05** **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 8.5hrs

Guests on site: none

Summary of Construction:
Crews worked to place P550 in the East Channel.
The road was closed at the grade break on the west side of berms 5, 6 and 7.
The soil cover area on the western edge between berms 6 and 7 was sprayed with flexterra. The area north of berm 4 was mulched with hay, and crimped, but no seed was sewn.

Summary of concerns:
A small fire started in the soil cover area between berms 4 and 5. The fire was quickly contained resulting in minimal damage. Fire may have been caused by build up of flexterra material around the exhaust system. The hydromulch truck was hosed down to prevent future problems.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
A fact finding meeting was held at 15:00 to discuss probable causes of fire and to establish corrective action.

CQC Monitor: Ernette Mole Date: 08-30-05

Approved by: [illegible] Date: 8-30-05

108

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/30/05 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 90s

GAI Personnel hours charged: 8.5hrs

Guests on site: DOE

Summary of Construction:
Crews worked to place P550 in the East Channel.
Flexterra was sprayed between berms 4, 5 and 6, north of berm 4 and east of the east channel.
C125 cocoa matting was placed and anchored on berms 4 and 5.
The anchor trench was dug for berm 5 and area was hand seeded.

Summary of concerns:
Anchor trenches along east channel need to be backfilled. Some holes were found in the P550 matting on the top of the east channel. Subcontractor plans to cover this area with additional matting. P550 matting was covered by the C125 matting on berm 4. Subcontractor recovered and anchored area with P550 matting.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: _____ **Date:** 08-30-05
9-1-05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 8/31/05 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 70s

GAI Personnel hours charged: 8.5hrs

Guests on site: DOE

Summary of Construction:
Backfilled anchor trench along the East Channel.
Flexterra was sprayed north of berm 4.
C125 cocoa matting was placed and anchored on berms 4 and 5.
Berm 6 was graded in accordance with technical specifications and Berm 5 was graded to remove ruts from vehicle traffic accessing berm 6.

Summary of concerns:
Holes found yesterday in the P550 matting on the top of the east channel have not been repaired. Found some thinning of the C125 matting and some holes along the edge of Berm 5. Found some open seams where soil is exposed on Berm 4. Notified Patrick of observations.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: [signature] **Date:** 08-31-05
[signature] 9-1-05

109

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action

Golder Project No: 053-2203

Envirocon Client: Kaiser-Hill

Project Designer: Earth Tech

Golder client: Envirocon

General Contractor: Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date 9/1/05 **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover:minor temp high 80s

GAI Personnel hours charged: 7.5hrs

Guests on site: none

Summary of Construction:
Berm 5 completed today.
The grade break road at berm 4 was closed at the last part of the shift. The area below this was tilled, seeded, hay mulched, crimped in, and sprayed with flexterra. The west end of berm four was also covered with C125BN. Berm 5 repairs were also completed today. East channel, berm 6, and berm 4 anchor trenches were partially filled this shift.
Summary of concerns:
Found some thinning of the C125 matting and some holes along the edge of Berm 4. These were pointed out to the foreman, who said they would be fixed when the grade break road through berm 4 is closed and repaired.

Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: _____ **Date:** 9-1-05
Approved by: _____ **Date:** 9-1-05

Golder Associates, Inc.
Field Monitoring Summary

Project Title: Original Landfill Accelerated Action **Golder Project No:** 053-2203

Envirocon Client: Kaiser-Hill **Project Designer:** Earth Tech

Golder client: Envirocon **General Contractor:** Envirocon

Location: Golden, Colorado

Project: Original Landfill (Rocky Flats)

Date **9/2/05** **S M T W T F S**

Shift **Day**

Precipitation: **AM** none **PM** none

Cloud Cover: minor temp high 80s

GAI Personnel hours charged: 7.5hrs

Guests on site: none

Summary of Construction:
The grade break road at berm 4 was closed and matted with C125BN. The area above this berm was tilled, seeded, hay mulched, crimped in, and sprayed with flexterra. The East channel trench tuck was completed.
Terra tubes were being placed 65' apart down slope along contours and anchored in accordance with manufacturer's recommendations.
Summary of concerns:
West end (56') of berm four was found to be sloping to the east at 0.44%, requirement is for 2-5%.
Summary of QC testing:
None
Summary of QC Testing:
None
Summary of Meetings and Discussions Held:
None

CQC Monitor: **Date:** 9/2/05
Approved by: **Date:** 9/2/05

110

Punchlist
Final Regulator Walkdown
Original Landfill

No.	Issue	Area	Date Noted	Comment	Date Approved
1	Repair trackhoe ruts in flexterra on berm 1	West landfill	8/24/05	Additional soil and flexterra needed 8/29/05	9/06/05
2	Complete backfill of west side anchor trench in west channel	West landfill	8/24/05	OK	8/29/05
3	Clean flexterra from georidge	West landfill	8/24/05	OK	8/29/05
4	Anchor georidge in flowline of div.berm	West landfill	8/24/05	West georidge on berm #2 needs adjusting 8/29/05	9/06/05
5	Improve transition grade across anchor trenches	West landfill	8/24/05	OK	8/29/05
6	Repair C125 on 3:1 slope	Buttress	8/24/05	OK	8/29/05
7	Repair west anchor trench of C350	Buttress	8/24/05	OK	8/29/05
8	Add metal staples to P550 to reinforce plastic staples	West landfill	8/24/05	OK	8/29/05
9	Show location of seep below berm 3 on map	West landfill	8/24/05, 8/29/05 and 9/06/05	CDPHE requires KH to address seep similar to ECR #12 seep. ECR #13 implemented a drain from the seep to the buttress drain rock similar to ECR#12. Drain to buttress drain in place on Thursday 9/8/05	9/12/05
10	Berm 1 &2 need small piece of C125BN for transition into P550 from berm	West landfill	8/29/05	Areas repaired	9/06/05
11	Upper buttress area	Buttress	8/29/05	No issues	8/29/05
12	Re-evaluste flowline slopes on west end of Berm 4.	East landfill	9/06/05	See attached survey	9/12/05
13	Re-evaluste flowline slopes on west end of Berm 5.	East landfill	9/06/05	See attached survey	9/12/05
14					

NOTE: FINAL walkdown on 9/12 resolved issues # 9, 12, and 13

APPENDIX F-2: QC FIELD AND LABORATORY TESTS AND LOGS

ROCKY FLATS ORIGINAL LANDFILL COVER
EARTHWORKS QUALITY CONTROL TESTING
FINAL FIELD AND LABORATORY TESTING

Submitted to:

Envirocon
651 Corporate Circle, Suite 114
Golden, Colorado 80401

Submitted by:

Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228

Distribution:

5 Copies Envirocon
3 Copies Golder Associates Inc.

August 8, 2005 053-2203

112

ROCKY FLATS MATERIALS SUMMARY FOR THE ACCELERATED ACTION DESIGN FOR THE ORIGINAL LANDFILL

Summary of Soils Data Sheet, and Abbreviations.

Site Characterization of Soils:

Materials and abbreviated sample designations are from three independent local pit sites. Samples were collected at the direction of Envirocon to determine utilization of local engineered materials as specified.

1. Lafarge: Rocky Flats Alluvium screened Pit Fines (LPF)
2. Pioneer: Rocky Flats Alluvium screened Pit Fines (PSE, PSW)
3. Centennial: Rocky Flats Alluvium screened Drain Rock (DG), and Rocky Flats Alluvium Screened Pit Fines (CPF, CERB)

Site In-Situ Sampling of Soils:

Engineered Materials placed within the footprint of the Original Landfill were sampled according to specification and frequency. Abbreviations and Acronyms of the materials are as follows.

- DR – Drain Rock. Rocky Flats Alluvium screened Drain Rock from Centennial, sampled from in-situ locations for grain-size analysis to determine suitability of materials as specified.
- RF – Re-grade Fills. Rocky Flats Alluvium screened Pit Fines from Pioneer, and Rocky Flats Alluvium from Centennial, sampled from in-situ locations for Atterberg Limits, moisture content, and grain-size analysis.
- BF – Buttress Fills. Rocky Flats Alluvium screened Pit Fines from Centennial, Lafarge, and Pioneer, sampled from in-situ locations for Atterberg Limits, moisture content, grain-size analysis, and compaction to determine suitability of materials as specified.
- CF – Cover Fills. Rocky Flats Alluvium from Centennial, sampled from in-situ locations for Atterberg Limits, moisture content, and grain-size analysis.

- QC-BF-SC – Quality Control Buttress Fill Sand Cone. Rocky Flats Alluvium screened Pit Fines from Centennial, Lafarge, and Pioneer, sampled from in-situ locations for moisture content to determine dry density of sand cone correlations.

- QC-BF-DT – Quality Control Buttress Fill Density Test (oven moisture content sample). Rocky Flats Alluvium screened Pit Fines from Centennial, Lafarge, and Pioneer, sampled from in-situ locations for moisture content for moisture correction of nuclear moisture-density tests at specified frequencies.

Summary of Earthwork Materials:

Golder Associates Inc. was retained by Envirocon at Rocky Flats to perform Quality Control sampling and testing over a period from May 2005 to July 2005. Earthwork materials sampled and tested for the Rocky Flats accelerated action design for the original landfill are summarized in Table 1.

Nuclear Moisture-Density testing Summary:

Quality Control (QC) nuclear moisture-density testing was performed on Buttress Fill materials placed above the Drain Rock and geotextile during the construction period of June through July, 2005. A summary of the testing performed is provided in Table 2.

Individual Testing Results:

Characterization and in-situ samples collected for the Rocky Flats original landfill are presented in the following sections:

- Section 1: Characterization Testing Results
- Section 2: Drain Rock Testing Results
- Section 3: Re-grade Fill Testing Results
- Section 4: Buttress Fill Testing Results
- Section 5: Buttress Fill Sand Cone Testing Results
- Section 6: Cover Fill Testing Results

TABLE 1

SOIL SUMMARY

115

TABLE 1
KAISER HILL/ROCKY FLATS FIELD and LAB
SUMMARY OF SOIL DATA

Sample Type	Sample/ Boring Number	Sample Date	U.S.C.S. Soil Classi-fication	Delivered Moisture (%)	Atterberg Limits			Grain Size Distribution			Perm Value	Moist/Den Relationship Standard Proctor		Additional Tests Comments (See Notes)
					LL	PL	PI	% Finer 3/4"	% Finer #4	% Finer #200		PCF (Dry)	Moist (%)	
Pail	DG-1	--	GP	--	--	--	--	15.0	8.0	3.0	--	--	--	soil characterization sample
Pail	DG-2	--	GP	--	--	--	--	9.8	8.0	3.0	--	--	--	soil characterization sample
Pail	CPF-1	--	SC	--	37	17	20	100.0	86.4	29.8	--	119.3*	12.1*	T, soil characterization sample
Pail	CPF-2	--	SC	--	50	18	32	99.9	68.9	21.3	--	116.0*	13.3*	soil characterization sample
Pail	PSE-1	--	SC	--	33	17	16	100.0	95.1	28.2	--	119.0	13.2	soil characterization sample
Pail	PSE-2	--	SC	--	28	15	13	100.0	92.9	26.0	--	122.0*	12.2*	soil characterization sample
Pail	PSE-3	--	SC	--	28	17	11	99.9	93.8	19.9	--	121.3*	12.3*	T, soil characterization sample
Pail	PSE-4	--	SC	--	32	16	16	100.0	94.3	31.0	--	121.1*	11.8*	soil characterization sample
Pail	PSW-1	--	SC	--	31	17	14	99.9	92.5	27.8	--	123.2*	11.5*	soil characterization sample
Pail	PSW-2	--	SC	--	36	16	20	100.0	94.7	24.8	--	120.4*	12.7*	soil characterization sample
Pail	PSW-3	--	SC	--	35	18	17	100.0	97.1	28.9	--	118.1	13.4	soil characterization sample
Pail	PSW-4	--	SC	--	--	--	--	100.0	96.1	25.2	--	118.9	12.9	soil characterization sample
Pail	CERB-1	--	SC	--	38	17	21	90.5	64.5	28.1	--	121.6*	12.8*	soil characterization sample
Pail	LPF-1	--	SC	--	41	17	24	100.0	85.0	22.5	--	122.7*	10.9*	soil characterization sample
Pail	LPF-2	--	SP-SC	--	39	18	21	100.0	80.2	11.5	--	125.9*	10.0*	soil characterization sample
Pail	LPF-3	--	SC	--	40	14	26	100.0	85.5	22.7	--	122.9*	11.1*	soil characterization sample
Pail	LPF-4	--	SC	--	45	15	30	99.9	82.4	20.9	--	122.9*	11.1*	soil characterization sample
Pail	LPF-5	--	SC	--	44	14	30	99.9	77.5	20.1	--	122.6*	11.2*	soil characterization sample
Pail	LPF-6	--	SC	--	43	18	25	100.0	72.0	22.2	--	124.5*	10.5*	soil characterization sample
Pail	LPF-7	--	SC	--	46	16	30	100.0	81.2	22.6	--	124.6*	10.7*	T, soil characterization sample

TABLE 1
KAISER HILL/ROCKY FLATS FIELD and LAB
SUMMARY OF SOIL DATA

Sample Type	Sample/ Boring Number	Sample Date	U.S.C.S. Soil Classi-fication	Delivered Moisture (%)	Atterberg Limits			Grain Size Distribution			Perm Value	Moist/Den Relationship Standard Proctor		Additional Tests Comments (See Notes)
					LL	PL	PI	% Finer 3/4"	% Finer #4	% Finer #200		PCF (Dry)	Moist (%)	
Pail	DR-1	--	GP	--	--	--	--	17.0	6.5	2.8	--	--	--	Centenial Drain Rock
Pail	DR-2	--	GP	--	--	--	--	25.0	11.1	4.7	--	--	--	Centenial Drain Rock
Pail	DR-3	06/09/05	GP	--	--	--	--	28.4	14.0	5.9	8.3×10^0	--	--	Centenial Drain Rock, PERM
Pail	DR-4	06/09/05	GP	--	--	--	--	27.3	11.4	4.5	8.3×10^0	--	--	Centenial Drain Rock, PERM
Pail	RF-01	--	SC	--	30	18	12	99.9	93.8	29.2	--	--	--	Pioneer pit fines
Pail	RF-02	--	GC	10.5	38	18	20	70.8	52.7	20.4	--	--	--	Centenial Rocky Mountain Alluvium
Pail	RF-03	06/13/05	--	12.0	--	--	--	50.6	33.6	13.2	--	--	--	Centenial Rocky Mountain Alluvium
Pail	RF-04	06/14/05	SC	12.0	36	19	17	100.0	83.3	24.5	--	--	--	Pioneer pit fines
Pail	RF-05	06/16/05	GC	5.7	45	18	27	56.6	37.8	14.2	--	--	--	Centenial Rocky Mountain Alluvium
Pail	RF-06	06/17/05	SC	11.3	36	17	19	98.9	94.2	28.4	--	120.4*	13.4*	Pioneer pit fines
Pail	RF-07	06/21/05	SC	9.8	32	17	15	100.0	94.2	38.5	--	--	--	Pioneer pit fines
Pail	RF-08	06/22/05	GP-GC	16.1	45	18	27	49.4	33.6	10.9	--	--	--	Centenial Rocky Mountain Alluvium
Pail	BF-01	06/13/05	SC	13.3	38	18	20	100.0	85.3	29.4	--	121.9*	11.8*	Centennial pit fines
Pail	BF-02	06/17/05	SC	11.8	49	17	32	100.0	86.5	28.4	--	121.5*	11.9*	Centennial pit fines
Pail	BF-03	06/17/05	SC	11.3	50	17	33	100.0	82.7	27.5	--	123.4*	11.2*	Centennial pit fines
Pail	BF-04	06/21/05	SC	10.3	41	16	25	100.0	81.2	28.1	--	126.9*	10.5*	LaFarge pit fines/mix
Pail	BF-05	06/22/05	SC	11.9	43	18	25	100.0	80.8	22.9	--	125.5*	10.2*	LaFarge pit fines
Pail	BF-06	06/27/05	SC	--	42	15	27	100.0	83.7	24.1	--	121.3*	11.6*	LaFarge pit fines/mix
Pail	BF-07	06/28/05	SC	9.2	48	19	29	100.0	85.7	30.2	--	121.9*	11.6*	LaFarge pit fines/mix
Pail	BF-08	06/29/05	SC	10.3	41	15	26	100.0	82.5	27.1	--	123.5*	11.0*	LaFarge pit fines/mix
Pail	BF-09	07/11/05	SC	7.8	40	18	22	100.0	81.9	25.7	--	125.9*	10.3*	Pioneer/LaFarge pit fines/mix
Bag	QC-BF-SC-01	06/13/05	--	13.3	--	--	--	--	--	--	--	115.2**	13.3**	Sand Cone testing
Bag	QC-BF-SC-02	06/17/05	--	12.2	--	--	--	--	--	--	--	123.9**	12.2**	Sand Cone testing
Bag	QC-BF-SC-03	06/17/05	--	11.6	--	--	--	--	--	--	--	128.5**	11.6**	Sand Cone testing
Bag	QC-BF-SC-04	06/21/05	--	10.1	--	--	--	--	--	--	--	128.4**	10.1**	Sand Cone testing
Bag	QC-BF-SC-05	06/24/05	--	10.2	--	--	--	--	--	--	--	124.1**	10.2**	Sand Cone testing
Bag	QC-BF-SC-06	06/28/05	--	10.9	--	--	--	--	--	--	--	125.2**	10.9**	Sand Cone testing
Bag	QC-BF-SC-07	06/30/05	--	10.4	--	--	--	--	--	--	--	128.2**	10.4**	Sand Cone testing
Bag	QC-BF-SC-08	07/01/05	--	11.5	--	--	--	--	--	--	--	122.4**	11.5**	Sand Cone testing
Bag	QC-BF-SC-09	07/05/05	--	8.8	--	--	--	--	--	--	--	128.5**	8.8**	Sand Cone testing
Bag	QC-BF-SC-10	07/06/05	--	11.0	--	--	--	--	--	--	--	126.7**	11.0**	Sand Cone testing
Bag	QC-BF-SC-11	07/07/05	--	10.7	--	--	--	--	--	--	--	127.8**	10.7**	Sand Cone testing
Bag	QC-BF-SC-12	07/08/05	--	10.9	--	--	--	--	--	--	--	133.2**	10.9**	Sand Cone testing
Bag	QC-BF-SC-13	07/11/05	--	12.8	--	--	--	--	--	--	--	125.0**	12.8**	Sand Cone testing
Bag	QC-BF-SC-14	07/12/05	--	9.6	--	--	--	--	--	--	--	132.3**	9.6**	Sand Cone testing

116

TABLE 1
KAISER HILL/ROCKY FLATS FIELD and LAB
SUMMARY OF SOIL DATA

Sample Type	Sample/ Boring Number	Sample Date	U.S.C.S. Soil Classi-fication	Delivered Moisture (%)	Atterberg Limits			Grain Size Distribution			Perm Value	Moist/Den Relationship Standard Proctor		Additional Tests Comments (See Notes)
					LL	PL	PI	% Finer 3/4"	% Finer #4	% Finer #200		PCF (Dry)	Moist (%)	
Bag	QC-BF-DT-01	06/13/05	--	13.3	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-17	06/17/05	--	12.2	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-20	06/17/05	--	10.8	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-27	06/17/05	--	11.6	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-40	06/21/05	--	12.0	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-52	06/22/05	--	11.9	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-60	06/24/05	--	10.2	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-70	06/27/05	--	10.8	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-94	06/28/05	--	10.9	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-131	06/29/05	--	10.3	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-136	06/29/05	--	10.4	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-155	06/30/05	--	10.4	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-165	06/30/05	--	10.4	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-179	07/01/05	--	11.5	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-185	07/01/05	--	12.3	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-196	07/05/05	--	8.8	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-213	07/06/05	--	11.0	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-228	07/07/05	--	10.7	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-240	07/08/05	--	10.9	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-258	07/11/05	--	10.3	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-261	07/11/05	--	12.8	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Bag	QC-BF-DT-274	07/12/05	--	9.6	--	--	--	--	--	--	--	--	--	Density test moisture requirement
Pail	CF-01	06/30/05	GC	--	49	20	29	62.2	43.2	19.9	--	--	--	Centenial Rocky Mountain Alluvium
Pail	CF-02	07/01/05	GW-GC	8.0	41	18	23	52.8	36.1	11.3	--	--	--	Centenial Rocky Mountain Alluvium
Pail	CF-03	07/06/05	GC	5.1	41	20	21	58.6	37.6	13.8	--	--	--	Centenial Rocky Mountain Alluvium
Pail	CF-04	07/08/05	GC	4.1	39	20	19	62.1	49.3	20.1	--	--	--	Centenial Rocky Mountain Alluvium
Pail	CF-05	07/22/05	GW-GC	7.6	36	16	20	51.2	37.6	10.0	--	--	--	Centenial Rocky Mountain Alluvium
Pail	CF-06	07/25/05	GC	3.9	43	15	28	48.2	33.7	12.9	--	--	--	Centenial Rocky Mountain Alluvium
Pail	CF-07	07/27/05	GP-GC	8.0	51	17	34	50	32	11		--	--	Centenial Rocky Mountain Alluvium
Pail	CF-08	07/27/05	GP-GC	7.6	45	16	29	50	33	11		--	--	Centenial Rocky Mountain Alluvium

NOTES:

LL = LIQUID LIMIT
PL = PLASTIC LIMIT
PI = PLASTIC INDEX
SL = SHRINKAGE LIMIT

T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
PERM = PERMEABILITY

* PER ASTM D4718, Rock corrected values
** Dry Density/moisture relationship

TABLE 2

BUTTRESS FILL MOISTURE-DENSITY SUMMARY

118

TABLE 2
BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
6/13/2005	7	BF-01	QC-BF-DT-01	747526.6	2081369.1	5960.0	130.7	14.7	13.3	115.4	11.8	121.9	13.3	115.2	1.5	95%	PASS	Sand Cone QC-BF-SC-01 taken, index test sample BF-01 taken
6/14/2005	2	CPF-2	QC-BF-DT-02	747500.3	2081527.1	5949.8	128.1	14.6	-	111.8	13.3	116.0			1.3	96%	PASS	
6/15/2005	7	BF-01	QC-BF-DT-03	747552.2	2081362.3	5965.3	137.6	12.5	-	122.3	11.8	121.9			0.7	100%	PASS	
6/15/2005	7	BF-01	QC-BF-DT-04	747511.5	2081524.1	5952.7	136.2	13.2	-	120.3	11.8	121.9			1.4	99%	PASS	
6/15/2005	7	BF-01	QC-BF-DT-05	747498.3	2081701.6	5947.5	132.8	12.6	-	117.9	11.8	121.9			0.8	97%	PASS	
6/15/2005	7	BF-01	QC-BF-DT-06	747489.9	2081692.4	5948.4	136.7	12.3	-	121.7	11.8	121.9			0.5	100%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-07	747545.0	2081388.9	5962.3	134.4	12.7	-	119.3	11.8	121.9			0.9	98%	PASS	
6/16/2005	1	CPF-1	QC-BF-DT-08	747544.2	2081539.0	5952.9	133.4	13.3	-	117.7	12.1	119.3			1.2	99%	PASS	
6/16/2005	2	CPF-2	QC-BF-DT-09	747535.9	2081699.2	5949.6	131.2	14.4	-	114.7	13.3	116.0			1.1	99%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-10	747529.3	2081847.1	5943.2	127.9	10.6	-	115.6	11.8	121.9			-1.2	95%	PASS	
6/16/2005	1	CPF-1	QC-BF-DT-11	747979.5	2082082.7	5935.3	123.4	15.9	-	106.5	12.1	119.3			3.8	89%	FAIL	note 2
6/16/2005	1	CPF-1	QC-BF-DT-11A	747979.5	2082082.7	5935.3	130.2	12.3	-	115.9	12.1	119.3			0.2	97%	PASS	
6/16/2005	1	CPF-1	QC-BF-DT-11B	747979.5	2082082.7	5935.3	129.7	13.5	-	114.3	12.1	119.3			1.4	96%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-12	747494.2	2081743.5	5947.1	129.7	10.1	-	117.8	11.8	121.9			-1.7	97%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-13	747490.3	2081846.5	5943.6	132.8	11.8	-	118.8	11.8	121.9			0.0	97%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-14	747490.5	2081944.5	5940.7	132.5	13.2	-	117.0	11.8	121.9			1.4	96%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-15	747493.1	2082043.2	5938.0	122.4	13.5	-	107.8	11.8	121.9			1.7	88%	FAIL	note 2
6/16/2005	7	BF-02	QC-BF-DT-15A	747493.1	2082043.2	5938.0	131.4	13.4	-	115.6	11.8	121.9			1.3	95%	PASS	
6/16/2005	7	BF-03	QC-BF-DT-15B	747494.1	2082043.2	5938.0	131.1	12.0	-	117.0	11.8	121.9			-0.1	96%	PASS	
6/16/2005	7	BF-01	QC-BF-DT-16	747505.7	2082143.9	5936.2	133.1	13.4	-	117.4	11.8	121.9			1.6	96%	PASS	
6/17/2005	8	BF-02	QC-BF-DT-17	747543.6	2081471.8	5957.4	135.7	15.1	12.2	120.9	11.9	121.5	12.2	123.9	0.3	100%	PASS	Sand Cone QC-BF-SC-02 taken, index test sample BF-02 taken
6/17/2005	8	BF-02	QC-BF-DT-18	747553.3	2081540.6	5955.7	132.5	12.7	-	117.6	11.9	121.5			0.8	97%	PASS	
6/17/2005	7	BF-01	QC-BF-DT-19	747530.8	2081607.1	5952.5	137.4	13.5	-	121.1	11.8	121.9			1.7	99%	PASS	
6/17/2005	7	BF-01	QC-BF-DT-20	747511.3	2081715.2	5947.9	136.2	11.9	10.8	122.9	11.8	121.9			-1.0	101%	PASS	Oven M.C. sample taken
6/17/2005	7	BF-01	QC-BF-DT-21	747525.7	2081799.7	5945.1	136.4	12.6	-	121.1	11.8	121.9			0.8	99%	PASS	
6/17/2005	7	BF-01	QC-BF-DT-22	747507.4	2081936.1	5941.1	137.1	11.9	-	122.5	11.8	121.9			0.1	101%	PASS	
6/17/2005	7	BF-01	QC-BF-DT-23	747587.2	2081531.8	5960.4	134.5	13.0	-	119.0	11.8	121.9			1.2	98%	PASS	
6/17/2005	2	CPF-2	QC-BF-DT-24	747537.7	2081755.7	5947.3	132.6	14.9	-	115.4	13.3	116.0			1.6	99%	PASS	
6/17/2005	7	BF-01	QC-BF-DT-25	747540.0	2082075.6	5940.9	133.4	10.8	-	120.4	11.8	121.9			-1.0	99%	PASS	
6/17/2005	7	BF-01	QC-BF-DT-26	747551.0	2082300.4	5937.8	137.3	12.5	-	122.0	11.8	121.9			0.7	100%	PASS	
6/17/2005	9	BF-03	QC-BF-DT-27	747493.4	2082110.1	5936.4	136.1	13.0	11.6	122.0	11.2	123.4	11.6	128.5	0.4	99%	PASS	Sand Cone QC-BF-SC-03 taken, index test sample BF-03 taken
6/20/2005	7	BF-01	QC-BF-DT-28	747498.6	2081711.9	5948.0	138.0	12.1	-	123.1	11.8	121.9			0.3	101%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-29	747487.5	2081810.5	5944.4	137.5	10.8	-	124.1	11.8	121.9			-1.0	102%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-30	747483.3	2081919.3	5941.3	134.6	9.4	-	123.0	11.8	121.9			-2.4	101%	FAIL	note 1
6/20/2005	7	BF-01	QC-BF-DT-30A	747483.3	2081919.3	5941.3	136.9	11.3	-	123.0	11.8	121.9			-0.5	101%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-30B	747483.3	2081919.3	5941.3	137.7	13.3	-	121.5	11.8	121.9			1.5	100%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-31	747480.4	2082036.2	5937.6	134.8	10.8	-	121.7	11.8	121.9			-1.0	100%	PASS	
6/20/2005	1	CPF-1	QC-BF-DT-32	747626.6	2081579.1	5968.7	121.8	13.0	-	107.8	12.1	119.3			0.9	90%	FAIL	note 2
6/20/2005	1	CPF-1	QC-BF-DT-32A	747626.6	2081579.1	5968.7	126.9	12.5	-	112.8	12.1	119.3			0.4	95%	PASS	
6/20/2005	1	CPF-1	QC-BF-DT-32B	747626.6	2081579.1	5968.7	135.6	12.3	-	120.7	12.1	119.3			0.2	101%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-33	747623.8	2081492.7	5971.2	136.9	12.3	-	121.9	11.8	121.9			0.5	100%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-34	747529.8	2081593.4	5952.6	136.1	14.2	-	119.2	11.8	121.9			2.4	98%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-35	747522.0	2081883.2	5944.2	139.5	12.7	-	123.8	11.8	121.9			0.9	102%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-36	747539.2	2081706.1	5950.3	133.6	11.0	-	120.4	11.8	121.9			-0.8	99%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-37	747539.0	2081803.1	5946.8	126.0	9.4	-	115.2	11.8	121.9			-2.4	94%	FAIL	note 1 and 2
6/20/2005	7	BF-01	QC-BF-DT-37A	747539.0	2081803.1	5946.8	125.1	8.6	-	115.2	11.8	121.9			-3.2	94%	FAIL	note 1 and 2
6/21/2005	7	BF-01	QC-BF-DT-37AA	747539.0	2081803.1	5946.8	129.2	11.4	-	116.0	11.8	121.9			-0.4	95%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-37B	747539.0	2081797.7	5946.9	127.2	10.4	-	115.2	11.8	121.9			-1.4	95%	PASS	
6/20/2005	7	BF-01	QC-BF-DT-38	747532.1	2081843.8	5943.2	135.2	13.2	-	119.4	11.8	121.9			1.4	98%	PASS	
6/21/2005	2	CPF-2	QC-BF-DT-39	747536.6	2081553.7	5955.2	134.4	14.3	-	117.6	13.3	116.0			1.0	101%	PASS	
6/21/2005	10	BF-04	QC-BF-DT-40	747503.3	2081640.3	5951.1	136.0	12.2	12.0	121.4	10.5	126.9	10.1	128.4	1.5	96%	PASS	Sand Cone QC-BF-SC-04 taken, index test sample BF-04 taken
6/21/2005	25	LPF-05	QC-BF-DT-41	747509.1	2081710.4	5949.5	134.9	12.3	-	120.1	11.2	122.6			1.1	98%	PASS	
6/21/2005	25	LPF-05	QC-BF-DT-42	747504.4	2081843.7	5945.1	139.5	10.1	-	126.7	11.2	122.6			-1.1	103%	PASS	
6/21/2005	2	CPF-2	QC-BF-DT-43	747505.6	2081983.9	5940.6	134.3	14.1	-	117.7	13.3	116.0			0.8	101%	PASS	
6/21/2005	25	LPF-05	QC-BF-DT-44	747540.9	2082095.0	5940.6	135.2	9.2	-	123.8	11.2	122.6			-2.0	101%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-45	747511.3	2082133.3	5937.2	138.6	10.8	-	125.1	11.2	122.6			-0.4	102%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-46	747522.6	2082257.1	5936.6	141.0	10.6	-	127.5	11.2	122.6			-0.6	104%	PASS	

TABLE 2
BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
6/22/2005	2	CPF-2	QC-BF-DT-47	747521.0	2081994.0	5942.3	135.8	14.1	-	119.0	13.3	116.0			0.8	103%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-48	747609.8	2081629.3	5963.2	135.8	10.2	-	123.2	11.2	122.6			-1.0	101%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-49	747614.9	2081568.2	5966.0	137.0	10.2	-	124.3	11.2	122.6			-1.0	101%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-50	747534.7	2081770.6	5949.6	134.6	14.6	-	117.5	11.2	122.6			3.4	96%	FAIL	note 1
6/22/2005	25	LPF-05	QC-BF-DT-50A	747534.7	2081770.6	5949.6	132.3	9.1	-	121.2	11.2	122.6			-2.1	99%	FAIL	note 1
6/22/2005	25	LPF-05	QC-BF-DT-50B	747537.7	2081770.3	5948.8	127.3	9.8	-	116.0	11.2	122.6			-1.4	95%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-51	747538.5	2081859.4	5947.2	132.7	13.7	-	116.7	11.2	122.6			2.5	95%	FAIL	note 1
6/22/2005	25	LPF-05	QC-BF-DT-51A	747538.5	2081859.4	5947.2	132.6	9.3	-	121.3	11.2	122.6			-1.9	99%	PASS	
6/22/2005	25	LPF-05	QC-BF-DT-51B	747542.4	2081855.9	5946.0	134.0	11.9	-	119.7	11.2	122.6			0.7	98%	PASS	
6/22/2005	11	BF-05	QC-BF-DT-52	747595.2	2081801.1	5954.2	133.4	14.7	11.9	119.2	10.2	125.5			1.7	95%	PASS	note 1, Index test sample BF-05 taken
6/23/2005	25	LPF-05	QC-BF-DT-53	747518.3	2081592.3	5954.7	134.8	12.4	-	119.9	11.2	122.6			1.2	98%	PASS	
6/23/2005	25	LPF-05	QC-BF-DT-54	747508.6	2081712.2	5951.2	136.5	12.2	-	121.7	11.2	122.6			1.0	99%	PASS	
6/23/2005	25	LPF-05	QC-BF-DT-55	747554.7	2081833.6	5948.1	131.8	11.1	-	118.6	11.2	122.6			-0.1	97%	PASS	
6/24/2005	7	BF-01	QC-BF-DT-56	747552.4	2081658.6	5954.3	134.6	13.6	-	118.5	11.8	121.9			1.8	97%	PASS	
6/24/2005	7	BF-01	QC-BF-DT-57	747542.9	2081828.0	5948.1	135.5	12.4	-	120.6	11.8	121.9			0.6	99%	PASS	
6/24/2005	7	BF-01	QC-BF-DT-58	747545.7	2082011.0	5943.2	135.4	13.5	-	119.3	11.8	121.9			1.7	98%	PASS	
6/24/2005	7	BF-01	QC-BF-DT-59	747555.5	2081523.4	5959.0	134.1	13.6	-	118.0	11.8	121.9			1.8	97%	PASS	
6/24/2005	11	BF-05	QC-BF-DT-60	747544.6	2081460.1	5960.3	136.2	11.1	10.2	123.6	10.2	125.5	10.2	124.1	0.0	98%	PASS	Sand Cone QC-BF-SC-05 taken
6/27/2005	25	LPF-05	QC-BF-DT-61	747506.5	2082025.6	5942.1	130.7	12.4	-	116.3	11.2	122.6			1.2	95%	PASS	
6/27/2005	22	LPF-02	QC-BF-DT-62	747499.8	2082251.7	5934.3	135.1	8.9	-	124.1	10.0	125.9			-1.1	99%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-63	747568.8	2082158.5	5944.7	134.5	10.1	-	122.2	11.2	122.6			-1.1	100%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-64	747610.9	2082138.8	5951.2	134.7	13.2	-	119.0	11.2	122.6			2.0	97%	PASS	
6/27/2005	2	CPF-2	QC-BF-DT-65	747513.3	2082105.1	5939.5	135.9	13.6	-	119.6	13.3	116.0			0.3	103%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-66	747545.4	2082024.9	5943.3	135.8	11.4	-	121.9	11.8	121.9			-0.4	100%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-67	747596.0	2081957.5	5951.4	135.1	9.7	-	123.2	11.2	122.6			-1.5	100%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-68	747529.6	2081909.9	5945.2	131.2	10.6	-	118.6	11.2	122.6			-0.6	97%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-69	747563.7	2081880.5	5947.4	134.5	12.1	-	120.0	11.2	122.6			0.9	98%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-70	747528.2	2081856.2	5947.3	135.6	12.0	10.8	122.4	11.2	122.6			-0.4	100%	PASS	Oven M.C. sample taken
6/27/2005	7	BF-01	QC-BF-DT-71	747591.5	2081846.5	5952.3	128.1	11.1	-	115.3	11.8	121.9			-0.7	95%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-72	747604.2	2081785.1	5957.0	121.8	6.9	-	111.9	11.2	122.6			-2.4	91%	FAIL	note 1 and 2
6/27/2005	25	LPF-05	QC-BF-DT-72A	747604.2	2081785.1	5957.0	133.7	8.8	-	121.0	11.2	122.6			-0.7	99%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-72B	747604.2	2081785.1	5957.0	134.2	10.5	-	120.8	11.2	122.6			-0.1	99%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-73	747503.2	2081750.7	5950.9	134.5	11.1	-	121.1	11.8	121.9			-0.7	99%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-74	747568.0	2081712.9	5953.9	136.3	11.5	-	122.2	11.8	121.9			-0.3	100%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-75	747538.5	2081618.9	5956.3	131.5	12.9	-	116.5	11.8	121.9			1.1	96%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-76	747562.5	2081540.6	5959.1	136.1	10.7	-	122.9	11.8	121.9			-1.1	101%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-77	747561.0	2081419.3	5964.7	137.4	10.7	-	124.1	11.8	121.9			-1.1	102%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-78	747527.3	2081489.9	5959.4	135.4	11.1	-	121.9	11.8	121.9			-0.7	100%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-79	747520.7	2081592.0	5957.1	126.0	11.5	-	113.0	11.2	122.6			0.3	92%	PASS	Index test sample BF-06 taken
6/27/2005	7	BF-01	QC-BF-DT-80	747538.8	2081826.9	5949.3	134.0	12.4	-	119.2	11.8	121.9			0.6	98%	PASS	
6/27/2005	7	BF-01	QC-BF-DT-81	747523.2	2081938.0	5945.0	136.1	12.3	-	121.2	11.8	121.9			0.5	99%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-82	747603.5	2081757.8	5957.7	130.6	7.2	-	121.9	11.2	122.6			-4.0	99%	FAIL	note 1
6/27/2005	25	LPF-05	QC-BF-DT-82A	747600.5	2081759.1	5957.0	128.2	10.7	-	115.8	11.2	122.6			-0.5	94%	FAIL	note 2
6/27/2005	25	LPF-05	QC-BF-DT-82B	747597.9	2081762.8	5956.4	130.5	9.7	-	119.0	11.2	122.6			-1.5	97%	PASS	
6/28/2005	25	LPF-05	QC-BF-DT-82AA	747603.5	2081757.8	5957.7	135.3	12.6	-	120.2	11.2	122.6			1.4	98%	PASS	
6/28/2005	25	LPF-05	QC-BF-DT-82BB	747603.5	2081757.8	5957.7	131.8	12.2	-	117.5	11.2	122.6			1.0	96%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-83	747634.7	2081823.1	5960.8	133.4	8.2	-	123.3	11.2	122.6			-3.0	101%	FAIL	note 1
6/28/2005	25	LPF-05	QC-BF-DT-83A	747634.7	2081823.1	5960.8	133.3	10.2	-	121.0	11.2	122.6			-1.0	99%	PASS	
6/28/2005	25	LPF-05	QC-BF-DT-83B	747634.7	2081823.1	5960.8	130.1	9.9	-	118.4	11.2	122.6			-1.3	97%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-84	747557.7	2082011.7	5944.8	131.2	12.7	-	116.4	11.2	122.6			1.5	95%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-85	747609.6	2081892.8	5954.6	135.5	11.4	-	121.6	11.2	122.6			0.2	99%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-86	747506.7	2082014.5	5942.6	135.1	8.3	-	124.7	11.2	122.6			-2.9	102%	FAIL	note 1
6/28/2005	25	LPF-05	QC-BF-DT-86A	747506.7	2082014.5	5942.6	133.2	10.1	-	121.0	11.2	122.6			-1.1	99%	PASS	
6/28/2005	25	LPF-05	QC-BF-DT-86B	747506.7	2082014.5	5942.6	138.2	10.1	-	125.5	11.2	122.6			-1.1	102%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-87	747502.3	2082102.8	5940.8	130.2	12.9	-	115.3	11.2	122.6			1.7	94%	FAIL	note 2
6/28/2005	25	LPF-05	QC-BF-DT-87A	747502.3	2082102.8	5940.8	137.7	10.9	-	124.2	11.2	122.6			-0.3	101%	PASS	
6/28/2005	25	LPF-05	QC-BF-DT-87B	747502.3	2082102.8	5940.8	135.1	12.8	-	119.8	11.2	122.6			1.6	98%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-88	747502.3	2082196.1	5938.0	130.3	12.2	-	116.1	11.2	122.6			1.0	95%	PASS	
6/27/2005	25	LPF-05	QC-BF-DT-89	747507.9	2082280.2	5936.3	128.9	11.4	-	115.7	11.2	122.6			0.2	94%	FAIL	note 2
6/28/2005	25	LPF-05	QC-BF-DT-89A	747507.9	2082280.2	5936.3	136.8	13.1	-	121.0	11.2	122.6			1.9	99%	PASS	
6/28/2005	25	LPF-05	QC-BF-DT-89B	747507.9	2082280.2	5936.3	136.5	13.0	-	120.8	11.2	122.6			1.8	99%	PASS	

119

TABLE 2
BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
6/28/2005	7	BF-01	QC-BF-DT-90	747559.3	2081744.7	5953.0	136.7	12.2	-	121.8	11.8	121.9			0.4	100%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-91	747553.6	2081832.8	5950.2	133.6	11.8	-	119.5	11.8	121.9			0.0	98%	PASS	
6/28/2005	1	CPF-1	QC-BF-DT-92	747556.0	2081921.6	5946.9	130.5	13.7	-	114.8	12.1	119.3			1.6	96%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-93	747543.6	2082024.7	5944.3	136.6	11.3	-	122.7	11.8	121.9			-0.5	101%	PASS	
6/28/2005	13	BF-07	QC-BF-DT-94	747519.3	2082216.0	5938.7	137.1	13.4	10.9	123.6	11.6	121.9	10.9	125.2	-0.7	101%	PASS	Sand Cone QC-BF-SC-06 taken, index test sample BF-07 taken
6/28/2005	7	BF-01	QC-BF-DT-95	747531.2	2082152.0	5941.1	137.2	13.6	-	120.8	11.8	121.9			1.8	99%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-96	747511.1	2082097.7	5941.7	137.1	13.2	-	121.1	11.8	121.9			1.4	99%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-97	747532.5	2082057.6	5943.3	134.8	13.8	-	118.5	11.8	121.9			2.0	97%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-98	747560.6	2081993.1	5946.3	134.9	11.9	-	120.6	11.8	121.9			0.1	99%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-99	747536.2	2081939.5	5946.4	135.8	11.0	-	122.3	11.8	121.9			-0.8	100%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-100	747519.1	2081861.4	5949.7	132.1	11.0	-	119.0	11.8	121.9			-0.8	98%	PASS	
6/28/2005	1	CPF-1	QC-BF-DT-101	747565.2	2081796.2	5952.3	134.0	13.9	-	117.6	12.1	119.3			1.8	99%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-102	747548.0	2081712.3	5955.0	137.9	12.2	-	122.9	11.8	121.9			0.4	101%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-103	747528.0	2081623.6	5956.9	137.5	10.3	-	124.7	11.8	121.9			-1.5	102%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-104	747564.5	2081550.9	5960.0	134.2	10.9	-	121.0	11.8	121.9			-0.9	99%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-105	747553.1	2081461.7	5961.8	136.0	12.1	-	121.3	11.8	121.9			0.3	100%	PASS	
6/28/2005	1	CPF-1	QC-BF-DT-106	747540.3	2082059.1	5943.8	135.8	14.0	-	119.2	12.1	119.3			1.9	100%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-107	747534.0	2082161.1	5941.2	135.9	12.0	-	121.4	11.8	121.9			0.2	100%	PASS	
6/28/2005	1	CPF-1	QC-BF-DT-108	747558.1	2081557.9	5960.8	126.3	11.8	-	113.1	12.1	119.3			-0.3	95%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-109	747550.8	2081508.4	5961.3	131.3	12.7	-	116.5	11.8	121.9			0.9	96%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-110	747551.9	2081634.5	5958.8	134.2	12.6	-	119.2	11.8	121.9			0.8	98%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-111	747547.2	2081730.0	5956.2	133.7	12.0	-	119.4	11.8	121.9			0.2	98%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-112	747527.6	2082071.7	5942.0	131.8	12.6	-	117.1	11.8	121.9			0.8	96%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-113	747528.2	2082043.7	5943.7	136.9	10.9	-	123.4	11.8	121.9			-0.9	101%	PASS	
6/28/2005	7	BF-01	QC-BF-DT-114	747527.8	2082014.5	5944.4	132.8	12.1	-	118.5	11.8	121.9			0.3	97%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-115	747511.8	2082271.1	5937.1	137.0	12.4	-	121.9	11.8	121.9			0.6	100%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-116	747512.3	2082202.4	5938.9	136.4	11.2	-	122.7	11.8	121.9			-0.6	101%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-117	747525.1	2082075.3	5943.6	135.0	15.7	-	116.7	11.8	121.9			3.9	96%	FAIL	note 1
6/29/2005	7	BF-01	QC-BF-DT-117A	747525.1	2082075.3	5943.6	137.9	11.6	-	123.6	11.8	121.9			-0.2	101%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-117B	747525.1	2082075.3	5943.6	136.7	12.8	-	121.2	11.8	121.9			1.0	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-118	747554.2	2081840.8	5952.3	136.4	13.1	-	120.6	11.8	121.9			1.3	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-119	747530.3	2081791.3	5953.4	133.3	13.3	-	117.7	11.8	121.9			1.5	97%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-120	747572.9	2081746.4	5955.7	135.2	13.7	-	118.9	11.8	121.9			1.9	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-121	747562.1	2081693.3	5957.1	136.6	13.5	-	120.4	11.8	121.9			1.7	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-122	747526.0	2081656.6	5957.0	132.2	12.6	-	117.4	11.8	121.9			0.8	96%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-123	747554.6	2081598.5	5959.4	138.1	12.6	-	122.6	11.8	121.9			0.8	101%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-124	747557.6	2081517.0	5961.4	135.8	12.5	-	120.7	11.8	121.9			0.7	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-125	747555.3	2082096.7	5944.2	134.8	12.9	-	119.4	11.8	121.9			1.1	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-126	747565.2	2082023.4	5947.0	135.2	14.0	-	118.6	11.8	121.9			2.2	97%	FAIL	note 1
6/29/2005	7	BF-01	QC-BF-DT-126A	747565.2	2082023.4	5947.0	136.3	12.4	-	121.3	11.8	121.9			0.6	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-126B	747565.2	2082023.4	5947.0	135.8	12.8	-	120.4	11.8	121.9			1.0	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-127	747581.6	2081935.6	5950.3	132.9	12.4	-	118.2	11.8	121.9			0.6	97%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-128	747581.7	2081843.2	5952.8	130.2	15.1	-	113.1	11.8	121.9			3.3	93%	FAIL	note 1 and 2
6/29/2005	7	BF-01	QC-BF-DT-128A	747581.7	2081843.2	5952.8	134.6	13.1	-	119.0	11.8	121.9			1.3	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-128B	747581.7	2081843.2	5952.8	134.2	12.7	-	119.1	11.8	121.9			0.9	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-129	747583.2	2081669.9	5959.0	134.0	13.0	-	118.6	11.8	121.9			1.2	97%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-130	747585.8	2081782.0	5955.4	134.3	14.3	-	117.5	11.8	121.9			2.5	96%	FAIL	note 1 and 2
6/29/2005	7	BF-01	QC-BF-DT-130A	747585.8	2081782.0	5955.4	135.6	13.3	-	119.7	11.8	121.9			1.5	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-130B	747585.8	2081782.0	5955.4	135.7	11.5	-	121.7	11.8	121.9			-0.3	100%	PASS	
6/29/2005	14	BF-08	QC-BF-DT-131	747556.3	2081858.3	5952.0	134.2	13.7	10.3	121.7	11.0	123.5			-0.7	99%	PASS	Index test sample BF-08 taken
6/29/2005	7	BF-01	QC-BF-DT-132	747551.1	2081941.4	5948.6	132.7	12.3	-	118.2	11.8	121.9			0.5	97%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-133	747551.8	2082043.8	5945.6	136.9	12.2	-	122.0	11.8	121.9			0.4	100%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-134	747524.0	2082003.6	5945.7	136.6	12.3	-	121.6	11.8	121.9			0.5	100%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-135	747523.9	2081893.5	5949.5	135.0	13.4	-	119.0	11.8	121.9			1.6	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-136	747531.4	2081751.7	5954.3	135.9	12.5	10.4	123.1	11.8	121.9			-1.4	101%	PASS	Oven M.C. sample taken
6/29/2005	7	BF-01	QC-BF-DT-137	747513.3	2082174.7	5944.3	134.3	12.1	-	119.7	11.8	121.9			0.3	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-138	747520.3	2082074.9	5944.3	131.1	13.2	-	115.8	11.8	121.9			1.4	95%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-139	747526.6	2081987.5	5946.6	128.9	11.6	-	115.6	11.8	121.9			-0.2	95%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-140	747521.7	2081895.7	5950.1	127.1	12.0	-	113.5	11.8	121.9			0.2	93%	FAIL	note 2
6/29/2005	7	BF-01	QC-BF-DT-140A	747521.7	2081895.7	5950.1	131.0	14.1	-	114.8	11.8	121.9			2.3	94%	FAIL	note 1 and 2

TABLE 2
BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
6/29/2005	7	BF-01	QC-BF-DT-140B	747526.8	2081897.1	5950.9	134.6	12.0	-	120.1	11.8	121.9			0.2	99%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-140C	747526.8	2081897.1	5950.9	133.7	11.6	-	119.8	11.8	121.9			-0.2	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-141	747525.9	2081807.6	5953.2	133.1	11.2	-	119.7	11.8	121.9			-0.6	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-142	747529.7	2081714.9	5956.1	129.9	8.8	-	119.4	11.8	121.9			-3.0	98%	FAIL	note 1
6/29/2005	7	BF-01	QC-BF-DT-142A	747530.4	2081714.5	5956.4	129.7	11.4	-	116.4	11.8	121.9			-0.4	96%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-142B	747535.5	2081712.8	5956.7	130.9	12.6	-	116.3	11.8	121.9			0.8	95%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-143	747534.1	2081627.2	5958.2	131.2	9.7	-	119.6	11.8	121.9			-2.1	98%	FAIL	note 1
6/29/2005	7	BF-01	QC-BF-DT-143A	747534.1	2081627.2	5958.2	139.9	14.2	-	114.6	11.8	121.9			2.4	94%	FAIL	note 1 and 2
6/29/2005	7	BF-01	QC-BF-DT-143B	747531.4	2081631.0	5958.4	131.9	11.4	-	118.5	11.8	121.9			-0.4	97%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-143C	747527.8	2081626.2	5958.3	132.3	13.2	-	116.9	11.8	121.9			1.4	96%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-144	747543.0	2081537.0	5958.1	133.1	11.1	-	119.8	11.8	121.9			-0.7	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-145	747551.8	2081446.7	5964.5	129.9	11.1	-	116.9	11.8	121.9			-0.7	96%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-146	747563.9	2081553.0	5961.4	134.3	12.8	-	119.1	11.8	121.9			1.0	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-147	747571.4	2081653.6	5959.2	134.0	11.9	-	119.7	11.8	121.9			0.1	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-148	747566.6	2081749.5	5956.5	134.1	12.5	-	119.2	11.8	121.9			0.7	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-149	747558.8	2081836.8	5953.8	133.5	11.8	-	119.5	11.8	121.9			0.0	98%	PASS	
6/29/2005	8	BF-02	QC-BF-DT-150	747554.8	2081922.1	5950.5	134.8	12.9	-	119.4	11.9	121.5			1.0	98%	PASS	
6/29/2005	7	BF-01	QC-BF-DT-151	747550.2	2082010.4	5947.8	133.6	12.5	-	118.7	11.8	121.9			0.7	97%	PASS	
6/29/2005	8	BF-02	QC-BF-DT-152	747540.5	2082095.4	5944.7	133.7	12.7	-	118.7	11.9	121.5			0.8	98%	PASS	
6/29/2005	8	BF-02	QC-BF-DT-153	747539.6	2082183.9	5941.6	137.0	12.2	-	122.0	11.9	121.5			0.3	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-154	747520.2	2082131.9	5943.4	135.3	12.7	-	120.1	11.9	121.5			0.8	99%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-155	747520.8	2082018.6	5946.7	134.6	12.8	10.4	121.9	11.9	121.5			-1.5	100%	PASS	Oven M.C. sample taken
6/30/2005	8	BF-02	QC-BF-DT-156	747514.4	2081927.4	5949.8	136.2	11.7	-	121.9	11.9	121.5			-0.2	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-157	747534.3	2081826.4	5953.6	134.7	12.8	-	119.4	11.9	121.5			0.9	98%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-158	747538.6	2081695.9	5957.8	135.7	11.0	-	122.3	11.9	121.5			-0.9	101%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-159	747534.8	2081551.7	5961.0	135.2	13.8	-	118.8	11.9	121.5			1.9	98%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-160	747567.4	2081510.5	5963.8	133.5	13.5	-	117.6	11.9	121.5			1.6	97%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-161	747583.0	2081616.6	5962.0	135.3	13.0	-	119.7	11.9	121.5			1.1	99%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-162	747562.5	2081705.2	5958.2	135.3	13.6	-	119.1	11.9	121.5			1.7	98%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-163	747585.6	2081777.8	5956.7	133.3	12.7	-	118.3	11.9	121.5			0.8	97%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-164	747559.7	2081893.6	5952.5	137.1	13.3	-	121.0	11.9	121.5			1.4	100%	PASS	
6/30/2005	10	BF-04	QC-BF-DT-165	747568.7	2082007.5	5949.5	138.7	11.6	10.4	125.6	10.5	126.9	10.4	128.2	-0.1	99%	PASS	Sand Cone QC-BF-SC-07 taken
6/30/2005	8	BF-02	QC-BF-DT-166	747552.2	2081485.2	5963.9	132.0	11.1	-	118.8	11.9	121.5			-0.8	98%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-167	747537.1	2081620.0	5959.6	125.9	9.7	-	114.8	11.9	121.5			-2.2	94%	FAIL	note 1 and 2
6/30/2005	8	BF-02	QC-BF-DT-167A	747537.1	2081620.0	5959.6	126.1	11.2	-	113.4	11.9	121.5			-0.7	93%	FAIL	note 2
6/30/2005	8	BF-02	QC-BF-DT-167B	747540.9	2081622.2	5959.2	135.4	13.6	-	119.2	11.9	121.5			1.7	98%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-167C	747537.1	2081620.0	5959.6	136.0	11.3	-	122.2	11.9	121.5			-0.6	101%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-168	747536.1	2081750.6	5956.1	134.0	9.5	-	122.4	11.9	121.5			-2.4	101%	FAIL	note 1
6/30/2005	8	BF-02	QC-BF-DT-168A	747536.1	2081750.6	5956.1	134.8	12.2	-	120.1	11.9	121.5			0.3	99%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-168B	747535.8	2081746.2	5956.2	135.0	13.3	-	119.2	11.9	121.5			1.4	98%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-169	747535.4	2081837.1	5954.0	124.3	8.5	-	114.6	11.9	121.5			-3.4	94%	FAIL	note 1 and 2
6/30/2005	8	BF-02	QC-BF-DT-169A	747535.4	2081837.1	5954.0	130.7	10.9	-	117.9	11.9	121.5			-1.0	97%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-169B	747541.0	2081839.2	5953.9	135.4	11.8	-	121.1	11.9	121.5			-0.1	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-170	747552.2	2082179.3	5944.8	129.8	10.0	-	118.0	11.9	121.5			-1.9	97%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-171	747573.1	2082084.7	5948.1	131.2	11.9	-	117.2	11.9	121.5			0.0	97%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-172	747528.0	2082040.1	5947.4	135.9	11.3	-	122.1	11.9	121.5			-0.6	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-173	747556.7	2081954.3	5950.8	134.9	11.5	-	121.0	11.9	121.5			-0.4	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-174	747530.4	2081863.8	5952.8	136.2	11.6	-	122.0	11.9	121.5			-0.3	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-175	747566.7	2081783.6	5956.1	135.1	12.6	-	120.0	11.9	121.5			0.7	99%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-176	747567.2	2081691.7	5958.9	135.5	11.8	-	121.2	11.9	121.5			-0.1	100%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-177	747574.7	2081595.6	5961.7	133.8	11.8	-	119.7	11.9	121.5			-0.1	99%	PASS	
6/30/2005	8	BF-02	QC-BF-DT-178	747575.9	2081508.8	5963.8	133.9	12.1	-	119.4	11.9	121.5			0.2	98%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-179	747524.5	2081767.1	5955.5	135.9	12.3	11.5	121.9	10.5	126.9	11.5	122.4	1.0	96%	PASS	Sand Cone QC-BF-SC-08 taken
7/1/2005	10	BF-04	QC-BF-DT-180	747517.3	2081931.0	5949.9	136.1	11.8	-	121.7	10.5	126.9			1.3	96%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-181	747541.1	2082062.7	5947.3	133.7	12.6	-	118.7	11.9	121.5			0.7	98%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-182	747566.5	2081951.5	5951.8	136.6	12.1	-	121.9	10.5	126.9			1.6	96%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-183	747581.1	2081816.8	5956.1	134.3	14.0	-	117.8	11.9	121.5			2.1	97%	FAIL	note 1
7/1/2005	8	BF-02	QC-BF-DT-183A	747581.1	2081816.8	5956.1	135.4	13.4	-	119.4	11.9	121.5			1.5	98%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-183B	747581.1	2081816.8	5956.1	134.0	13.1	-	118.5	11.9	121.5			1.2	98%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-184	747575.3	2082071.8	5948.9	135.2	11.1	-	121.7	11.9	121.5			-0.8	100%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-185	747586.2	2081886.8	5954.8	132.8	13.9	12.3	118.3	11.9	121.5			0.4	97%	PASS	Oven M.C. sample taken

120

TABLE 2
BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
7/1/2005	10	BF-04	QC-BF-DT-186	747567.6	2081834.2	5955.0	136.3	11.7	-	122.0	10.5	126.9			1.2	96%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-187	747587.6	2081686.8	5960.4	139.2	12.3	-	124.0	10.5	126.9			1.8	98%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-188	747563.5	2081953.2	5951.6	137.0	10.5	-	124.0	10.5	126.9			0.0	98%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-189	747543.3	2081555.8	5962.1	135.0	11.0	-	121.6	10.5	126.9			0.5	96%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-190	747537.6	2081671.7	5959.3	133.0	10.4	-	121.2	10.5	126.9			-0.1	96%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-191	747537.5	2081779.8	5956.4	134.9	11.2	-	121.3	10.5	126.9			0.7	96%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-192	747531.9	2081899.3	5953.1	135.3	11.2	-	121.7	10.5	126.9			0.7	96%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-193	747530.9	2082017.0	5049.1	133.3	10.0	-	121.2	10.5	126.9			-0.5	95%	PASS	
7/1/2005	10	BF-04	QC-BF-DT-194	747533.6	2082138.6	5945.5	134.8	11.4	-	121.0	10.5	126.9			0.9	95%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-195	747546.5	2081572.4	5961.6	135.8	9.1	-	124.5	11.9	121.5			-2.8	102%	FAIL	note 1
7/1/2005	8	BF-02	QC-BF-DT-195A	747540.1	2081572.9	5961.5	136.8	11.1	-	123.1	11.9	121.5			-0.8	101%	PASS	
7/1/2005	8	BF-02	QC-BF-DT-195B	747545.0	2081574.1	5961.7	137.8	11.7	-	123.4	11.9	121.5			-0.2	102%	PASS	
7/5/2005	11	BF-05	QC-BF-DT-196	747583.1	2082210.9	5947.5	133.4	10.3	8.8	122.6	10.2	125.5	8.8	128.5	-1.4	98%	PASS	Sand Cone QC-BF-SC-09 taken
7/5/2005	11	BF-05	QC-BF-DT-197	747590.3	2082127.1	5949.4	135.3	11.3	-	121.6	10.2	125.5			1.1	97%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-198	747596.3	2082007.0	5953.1	132.6	11.1	-	119.4	11.9	121.5			-0.8	98%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-199	747590.4	2081877.5	5956.6	136.6	11.7	-	122.3	11.9	121.5			-0.2	101%	PASS	
7/5/2005	11	BF-05	QC-BF-DT-200	747593.4	2081706.2	5961.8	136.5	11.7	-	122.2	10.2	125.5			1.5	97%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-201	747584.0	2081577.9	5964.1	136.5	12.6	-	121.2	11.9	121.5			0.7	100%	PASS	
7/5/2005	11	BF-05	QC-BF-DT-202	747530.0	2082150.7	5947.0	135.7	11.2	-	122.0	10.2	125.5			1.0	97%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-203	747528.8	2081951.9	5952.6	129.9	12.1	-	115.9	11.9	121.5			0.2	95%	PASS	
7/5/2005	11	BF-05	QC-BF-DT-204	747535.7	2081785.3	5957.2	136.0	11.6	-	121.8	10.2	125.5			1.4	97%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-205	7475559.1	2081591.3	5964.0	138.2	9.2	-	126.5	11.9	121.5			-2.7	104%	FAIL	note 1
7/5/2005	8	BF-02	QC-BF-DT-205A	7475599.1	2081591.3	5964.0	138.0	9.0	-	126.6	11.9	121.5			-2.9	104%	FAIL	note 1
7/5/2005	8	BF-02	QC-BF-DT-205B	747558.7	2081585.1	5964.2	135.6	8.8	-	124.6	11.9	121.5			-3.1	103%	FAIL	note 1
7/5/2005	8	BF-02	QC-BF-DT-205C	747565.2	2081592.8	5964.1	133.6	10.9	-	120.5	11.9	121.5			-1.0	99%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-205D	7475559.1	2081591.3	5964.0	137.4	10.1	-	124.8	11.9	121.5			-1.8	103%	PASS	
7/5/2005	8	BF-02	QC-BF-DT-205E	747552.5	2081590.4	5963.7	133.2	11.1	-	119.9	11.9	121.5			-0.8	99%	PASS	
7/5/2005	10	BF-04	QC-BF-DT-206	747565.1	2082183.3	5947.7	139.2	11.9	-	124.3	10.5	126.9			1.4	98%	PASS	
7/5/2005	10	BF-04	QC-BF-DT-207	747567.2	2082006.0	5953.1	136.5	11.0	-	123.0	10.5	126.9			0.5	97%	PASS	
7/5/2005	10	BF-04	QC-BF-DT-208	747577.9	2081805.9	5959.1	136.5	11.0	-	123.0	10.5	126.9			0.5	97%	PASS	
7/5/2005	10	BF-04	QC-BF-DT-209	747592.5	2081605.1	5964.8	132.9	10.8	-	119.9	10.5	126.9			0.3	95%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-210	747554.5	2081587.1	5964.5	137.6	13.6	-	121.1	10.9	122.7			2.7	99%	FAIL	note 1
7/6/2005	21	LPF-01	QC-BF-DT-210A	747554.5	2081587.1	5964.5	134.6	12.7	-	119.4	10.9	122.7			1.8	97%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-210B	747554.5	2081587.1	5964.5	135.2	12.5	-	120.2	10.9	122.7			1.6	98%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-211	747565.9	2081526.1	5966.8	129.1	14.3	-	112.9	10.9	122.7			3.4	92%	FAIL	note 1 and 2
7/6/2005	21	LPF-01	QC-BF-DT-211A	747565.9	2081526.1	5966.8	135.2	13.3	-	119.3	10.9	122.7			2.4	97%	FAIL	note 1
7/6/2005	21	LPF-01	QC-BF-DT-211B	747565.9	2081526.1	5966.8	135.9	12.4	-	120.9	10.9	122.7			1.5	99%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-211C	747565.9	2081526.1	5966.8	135.0	12.9	-	119.6	10.9	122.7			2.0	97%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-212	747592.2	2081519.7	5967.4	133.9	12.0	-	119.6	10.9	122.7			1.1	97%	PASS	
7/6/2005	11	BF-05	QC-BF-DT-213	747591.7	2081592.2	5965.8	134.6	12.4	11.0	121.3	10.2	125.5	11.0	126.7	0.8	97%	PASS	Sand Cone QC-BF-SC-10 taken
7/6/2005	21	LPF-01	QC-BF-DT-214	747582.6	2082135.9	5959.1	131.2	10.8	-	118.4	10.9	122.7			-0.1	97%	PASS	
7/6/2005	11	BF-05	QC-BF-DT-215	747592.8	2081942.5	5855.9	131.5	10.1	-	119.4	10.2	125.5			-0.1	95%	PASS	
7/6/2005	11	BF-05	QC-BF-DT-216	747596.8	2081757.9	5961.6	133.5	9.2	-	122.3	10.2	125.5			-1.0	97%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-217	747573.6	2081853.7	5957.9	134.3	12.1	-	119.8	10.9	122.7			1.2	98%	PASS	
7/6/2005	10	BF-04	QC-BF-DT-218	747567.9	2082033.1	5952.8	136.4	10.9	-	123.0	10.5	126.9			0.4	97%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-219	747553.1	2082207.3	5947.7	135.6	13.0	-	120.0	10.9	122.7			2.1	98%	FAIL	note 1
7/6/2005	21	LPF-01	QC-BF-DT-219A	747553.1	2082207.3	5947.4	138.0	11.8	-	123.4	10.9	122.7			0.9	101%	PASS	
7/6/2005	21	LPF-01	QC-BF-DT-219B	747551.0	2082207.6	5947.2	137.4	11.2	-	123.6	10.9	122.7			0.3	101%	PASS	
7/6/2005	10	BF-04	QC-BF-DT-220	747555.4	2082073.5	5951.5	133.8	10.1	-	121.5	10.5	126.9			-0.4	96%	PASS	
7/6/2005	10	BF-04	QC-BF-DT-221	747562.1	2081886.8	5956.4	135.8	11.5	-	121.8	10.5	126.9			1.0	96%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-222	747562.6	2081513.6	5967.2	136.7	11.4	-	122.7	10.5	126.9			0.9	97%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-223	747553.8	2081663.3	5963.2	134.2	11.8	-	120.0	10.5	126.9			1.3	95%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-224	747555.0	2081847.5	5958.3	134.0	11.3	-	120.4	10.5	126.9			0.8	95%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-225	747583.9	2081558.1	5967.3	138.5	12.8	-	122.8	10.5	126.9			2.3	97%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-226	747590.3	2081786.9	5961.6	135.6	12.1	-	121.0	10.5	126.9			1.6	95%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-227	747574.1	2082020.2	5954.5	131.0	13.6	-	115.3	10.5	126.9			3.1	91%	FAIL	note 1 and 2
7/7/2005	10	BF-04	QC-BF-DT-227A	747574.1	2082020.2	5954.5	135.6	13.5	-	119.5	10.5	126.9			3.0	94%	FAIL	note 1 and 2
7/7/2005	10	BF-04	QC-BF-DT-227B	747574.1	2082020.2	5954.5	135.0	11.6	-	121.0	10.5	126.9			1.1	95%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-227C	747574.1	2082020.2	5954.5	138.5	12.0	-	123.7	10.5	126.9			1.5	97%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-228	747597.2	2081774.5	5962.4	134.6	12.8	10.7	121.6	10.5	126.9	10.7	127.8	0.2	96%	PASS	Sand Cone QC-BF-SC-11 taken
7/7/2005	24	LPF-04	QC-BF-DT-229	747608.3	2082033.6	5955.5	136.3	12.4	-	121.3	11.1	122.9			1.3	99%	PASS	

TABLE 2
BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
7/7/2005	24	LPF-04	QC-BF-DT-230	747618.0	2081929.3	5959.2	130.9	13.9	-	114.9	11.1	122.9			2.8	94%	FAIL	note 1 and 2
7/8/2005	24	LPF-04	QC-BF-DT-230A	747618.0	2081929.3	5959.2	137.2	14.1	-	120.2	11.1	122.9			3.0	98%	PASS	
7/8/2005	24	LPF-04	QC-BF-DT-230B	747618.0	2081929.3	5959.2	130.3	11.0	-	117.4	11.1	122.9			-0.1	96%	PASS	
7/8/2005	24	LPF-04	QC-BF-DT-230C	747618.0	2081929.3	5959.2	137.2	10.0	-	121.4	11.1	122.9			-1.1	99%	PASS	
7/8/2005	24	LPF-04	QC-BF-DT-230D	747618.0	2081929.3	5959.2	130.3	9.9	-	123.1	11.1	122.9			-1.2	100%	PASS	
7/7/2005	24	LPF-04	QC-BF-DT-231	747563.7	2081478.0	5968.0	134.2	10.4	-	121.6	11.1	122.9			-0.7	99%	PASS	
7/7/2005	24	LPF-04	QC-BF-DT-232	74755.9	2081573.1	5966.9	135.1	10.7	-	122.0	11.1	122.9			-0.4	99%	PASS	
7/7/2005	24	LPF-04	QC-BF-DT-233	747546.4	2081910.0	5957.2	137.1	10.6	-	124.0	11.1	122.9			-0.5	101%	PASS	
7/7/2005	24	LPF-04	QC-BF-DT-234	747542.6	2082012.0	5954.0	130.1	9.8	-	118.5	11.1	122.9			-1.3	96%	PASS	
7/7/2005	24	LPF-04	QC-BF-DT-235	747541.4	2082109.0	5951.8	133.1	10.1	-	120.9	11.1	122.9			-1.0	98%	PASS	
7/7/2005	8	BF-02	QC-BF-DT-236	747547.0	2081773.3	5961.1	130.1	11.1	-	117.1	11.9	121.5			-0.8	96%	PASS	
7/7/2005	10	BF-04	QC-BF-DT-237	747551.9	2081855.2	5959.3	133.1	10.1	-	120.9	10.5	126.9			-0.4	95%	PASS	
7/8/2005	8	BF-02	QC-BF-DT-238	747575.6	2082063.7	5953.8	138.7	12.9	-	122.9	11.9	121.5			1.0	101%	PASS	
7/8/2005	10	BF-04	QC-BF-DT-239	747580.3	2081978.1	5956.7	135.2	12.2	-	120.5	10.5	126.9			1.7	95%	PASS	
7/8/2005	10	BF-04	QC-BF-DT-240	747584.1	2081903.4	5958.8	135.3	12.7	10.9	122.0	10.5	126.9	10.9	133.2	0.4	96%	PASS	Sand Cone QC-BF-SC-12 taken
7/8/2005	10	BF-04	QC-BF-DT-241	747587.2	2081733.4	5964.5	134.9	10.7	-	121.9	10.5	126.9			0.2	96%	PASS	
7/8/2005	10	BF-04	QC-BF-DT-242	747629.1	2081820.7	5963.1	135.8	12.3	-	120.9	10.5	126.9			1.8	95%	PASS	
7/8/2005	8	BF-02	QC-BF-DT-243	747633.4	2081720.8	5966.4	136.4	13.5	-	120.2	11.9	121.5			1.6	99%	PASS	
7/8/2005	8	BF-02	QC-BF-DT-244	747576.5	2081576.2	5968.8	136.4	12.9	-	120.8	11.9	121.5			1.0	99%	PASS	
7/8/2005	8	BF-02	QC-BF-DT-245	747567.1	2081711.0	5966.0	135.0	12.9	-	119.3	11.9	121.5			1.0	98%	PASS	
7/8/2005	8	BF-02	QC-BF-DT-246	747550.6	2081841.9	5961.8	135.3	11.5	-	121.3	11.9	121.5			-0.4	100%	PASS	
7/8/2005	8	BF-02	QC-BF-DT-247	747565.4	2081968.7	5958.2	136.3	13.0	-	120.6	11.9	121.5			1.1	99%	PASS	
7/8/2005	10	BF-04	QC-BF-DT-248	747555.6	2082117.1	5952.1	133.4	10.2	-	121.1	10.5	126.9			-0.3	95%	PASS	
7/8/2005	24	LPF-04	QC-BF-DT-249	747620.7	2082017.5	5957.9	132.4	13.9	-	116.2	11.1	122.9			2.8	95%	FAIL	note 1
7/8/2005	24	LPF-04	QC-BF-DT-249A	747611.5	2082013.9	5957.9	133.5	13.3	-	117.8	11.1	122.9			2.2	96%	FAIL	note 1
7/8/2005	24	LPF-04	QC-BF-DT-249B	747617.3	2082021.5	5957.8	133.1	12.8	-	118.0	11.1	122.9			1.7	96%	PASS	
7/8/2005	24	LPF-04	QC-BF-DT-249C	747618.2	2082005.1	5958.5	135.2	13.3	-	119.3	11.1	122.9			2.2	97%	FAIL	note 1
7/11/2005	24	LPF-04	QC-BF-DT-249D	747618.2	2082005.1	5958.5	134.9	11.9	-	120.6	11.1	122.9			0.8	98%	PASS	
7/8/2005	12	BF-06	QC-BF-DT-250	747623.2	2081858.4	5963.3	130.0	12.5	-	115.6	11.6	121.3			0.9	95%	PASS	
7/8/2005	10	BF-04	QC-BF-DT-251	747624.6	2081702.6	5968.3	135.6	11.8	-	121.3	10.5	126.9			1.3	96%	PASS	
7/8/2005	9	BF-03	QC-BF-DT-252	747609.8	2082112.1	5953.3	141.0	12.6	-	125.2	11.2	123.4			1.4	101%	PASS	
7/11/2005	10	BF-04	QC-BF-DT-253	747612.9	2081533.5	5969.9	138.0	11.9	-	123.3	10.5	126.9			1.4	97%	PASS	
7/11/2005	9	BF-03	QC-BF-DT-254	747628.6	2081658.2	5968.9	137.0	12.6	-	121.7	11.2	123.4			1.4	99%	PASS	
7/11/2005	12	BF-06	QC-BF-DT-255	747616.1	2081748.7	5966.9	136.1	11.7	-	121.8	11.6	121.3			0.1	100%	PASS	
7/11/2005	12	BF-06	QC-BF-DT-256	747622.8	2081848.6	5963.4	132.1	12.1	-	117.8	11.6	121.3			0.5	97%	PASS	
7/11/2005	1	CPF-1	QC-BF-DT-257	747628.7	2081941.1	5960.4	128.6	12.6	-	114.2	12.1	119.3			0.5	96%	PASS	
7/11/2005	15	BF-09	QC-BF-DT-258	747608.7	2082079.9	5954.1	135.0	12.0	10.3	122.4	10.3	125.9			0.0	97%	PASS	Index test sample BF-09 taken
7/11/2005	10	BF-04	QC-BF-DT-259	747558.2	282031.7	5955.5	136.3	10.9	-	122.9	10.5	126.9			0.4	97%	PASS	
7/11/2005	5	PSW-1	QC-BF-DT-260	747582.8	2081799.5	5964.4	129.6	10.6	-	117.2	11.5	123.2			-0.9	95%	PASS	
7/11/2005	14	BF-08	QC-BF-DT-261	747607.2	2081539.4	5970.9	137.0	12.7	12.8	121.5	11.0	123.5	12.8	125.0	1.8	98%	PASS	Sand Cone QC-BF-SC-13 taken
7/11/2005	24	LPF-04	QC-BF-DT-262	747585.5	208144.6	5973.3	130.8	10.3	-	118.7	11.1	122.9			-0.8	97%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-263	747579.6	2081526.9	5971.1	134.4	10.0	-	122.1	11.1	122.9			-1.1	99%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-264	747593.0	2081611.0	5969.2	139.1	11.0	-	125.3	11.1	122.9			-0.1	102%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-265	747565.4	2081701.6	5966.6	125.2	7.9	-	116.0	11.1	122.9			-3.2	94%	FAIL	note 1 and 2
7/12/2005	24	LPF-04	QC-BF-DT-265A	747559.9	2081742.6	5965.8	133.2	9.6	-	121.5	11.1	122.9			-1.5	99%	PASS	
7/12/2005	24	LPF-04	QC-BF-DT-265B	747561.1	2081710.5	5966.3	131.2	11.2	-	118.0	11.1	122.9			0.1	96%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-266	747594.5	2081795.7	5964.9	136.6	12.1	-	121.9	11.1	122.9			1.0	99%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-267	747561.3	2081893.3	5961.4	133.4	9.3	-	122.0	11.1	122.9			-1.8	99%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-268	747590.8	2081985.9	5959.9	132.4	9.3	-	121.1	11.1	122.9			-1.8	99%	PASS	
7/11/2005	24	LPF-04	QC-BF-DT-269	747549.3	2082073.2	5954.4	128.7	8.8	-	118.3	11.1	122.9			-2.3	96%	FAIL	note 1
7/12/2005	24	LPF-04	QC-BF-DT-269A	747547.0	2082037.0	5956.2	133.7	11.4	-	120.0	11.1	122.9			0.3	98%	PASS	
7/12/2005	24	LPF-04	QC-BF-DT-269B	747546.4	2082059.6	5954.9	133.5	11.2	-	120.1	11.1	122.9			0.1	98%	PASS	
7/12/2005	12	BF-06	QC-BF-DT-270	747547.1	2082080.1	5953.8	131.5	11.1	-	118.4	11.6	121.3			-0.5	98%	PASS	
7/12/2005	12	BF-06	QC-BF-DT-271	747562.4	2081656.9	5967.8	136.3	11.2	-	122.6	11.6	121.3			-0.4	101%	PASS	
7/12/2005	5	PSW-1	QC-BF-DT-272	747660.6	2081829.4	5970.5	134.7	12.8	-	119.4	11.5	123.2			1.3	97%	PASS	
7/12/2005	15	BF-09	QC-BF-DT-273	747653.5	2081829.4	5967.4	137.1	11.4	-	123.1	10.3	125.9			1.1	98%	PASS	
7/12/2005	15	BF-09	QC-BF-DT-274	747591.8	2081760.5	5965.7	139.8	11.4	9.6	127.6	10.3	125.9	9.6	132.3	-0.7	101%	PASS	Sand Cone QC-BF-SC-14 taken
7/12/2005	24	LPF-04	QC-BF-DT-275	747601.8	2082116.7	5953.7	129.3	9.1	-	118.5	11.1	122.9			-2.0	96%	PASS	
7/12/2005	10	BF-04	QC-BF-DT-276	747630.4	2082005.5	5959.2	125.4	10.8	-	113.2	10.5	126.9			0.3	89%	FAIL	note 2
7/12/2005	10	BF-04	QC-BF-DT-276A	747620.7	2082002.2	5959.3	135.3	8.9	-	124.2	10.5	126.9			-1.6	98%	PASS	
7/12/2005	10	BF-04	QC-BF-DT-276B	747624.7	2082007.7	5959.0	132.1	9.3	-	120.9	10.5	126.9			-1.2	95%	PASS	

121

TABLE 2

BUTTRESS FILL MOISTURE-DENSITY SUMMARY

FIELD DENSITY TEST LOG																		
								Moisture Contents			Proctor Results		Sand Cone Results		-2 to 2	> 95%		
Date	Soil ID	Proctor	Test #	Northing	Easting	Elevation	WD	Nuke MC	Oven MC	DD	Optimum MC	Optimum DD	MC	DD	% off MC	% Comp.	Pass/Fail	Comments
7/12/2005	10	BF-04	QC-BF-DT-277	747614.7	2081923.0	5962.0	139.4	8.3	-	128.6	10.5	126.9			-2.2	101%	FAIL	note 1
7/12/2005	10	BF-04	QC-BF-DT-277A	747622.9	2081924.6	5961.7	139.7	10.9	-	126.0	10.5	126.9			0.4	99%	PASS	
7/12/2005	10	BF-04	QC-BF-DT-277B	747626.1	2081927.0	5961.9	134.5	11.6	-	120.5	10.5	126.9			1.1	95%	PASS	
7/12/2005	24	LPF-04	QC-BF-DT-278	747639.1	2081832.8	5965.7	131.0	9.4	-	119.8	11.1	122.9			-1.7	97%	PASS	
7/12/2005	24	LPF-04	QC-BF-DT-279	747647.8	2081757.8	5968.9	132.3	10.6	-	119.6	11.1	122.9			-0.5	97%	PASS	
7/12/2005	24	LPF-04	QC-BF-DT-280	747641.1	2081669.4	5970.1	135.8	12.7	-	120.5	11.1	122.9			1.6	98%	PASS	

Note 1: material was re-conditioned prior to re-testing

Note 2: material was re-compacted prior to re-testing

Note 3: Re-tests of failed initial tests are denoted with upper case "A, B, C, etc" as a suffix of the original test number

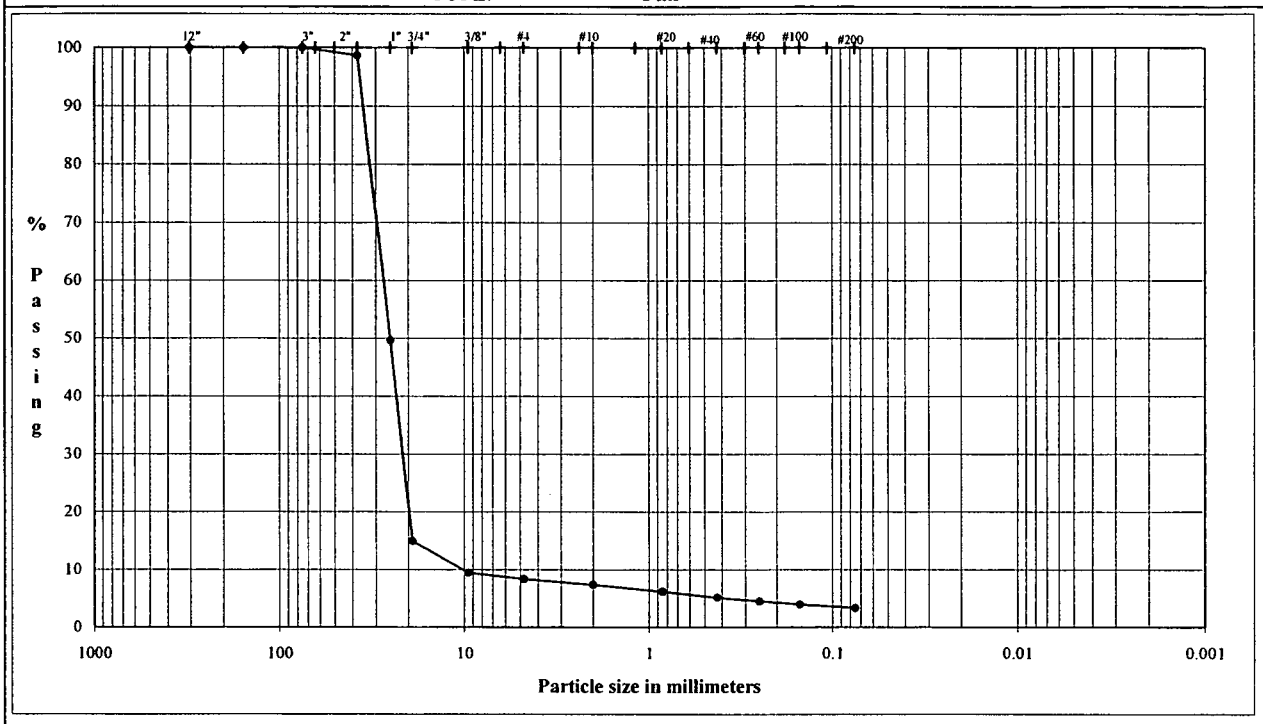
SECTION 1

CHARACTERIZATION TESTING RESULTS

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

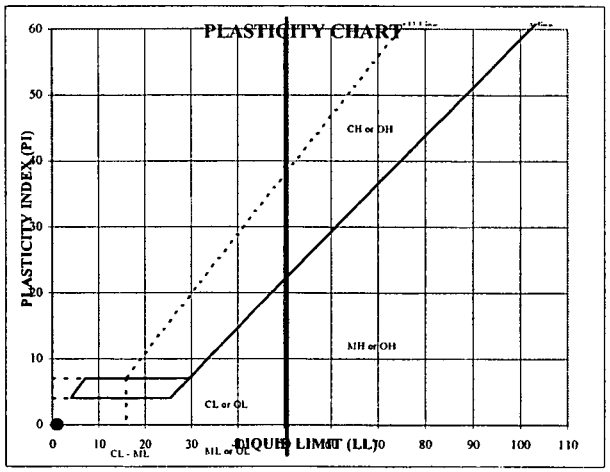
PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **DG-01** Depth (ft): --
TYPE: **Pail**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	98.7		
1.0"	25.0	49.6		
0.75"	19.0	14.9	Coarse Gravel	85.09
0.375"	9.5	9.4		
#4	4.8	8.3	Fine Gravel	6.58
#10	2.0	7.3	Coarse Sand	0.98
#20	0.9	6.2		
#40	0.4	5.1	Medium Sand	2.20
#60	0.3	4.5		
#100	0.2	3.9		
#200	0.1	3.3	Fine Sand	1.81
			Fines	3.33



ATTERBERG LIMITS

M_c	LL	PL	PI	SG
--	--	--	--	--

DESCRIPTION: Yellowish brown poorly graded gravel

USCS: GP

TECH	MGC
DATE	5/17/05
REVIEW	MB

123

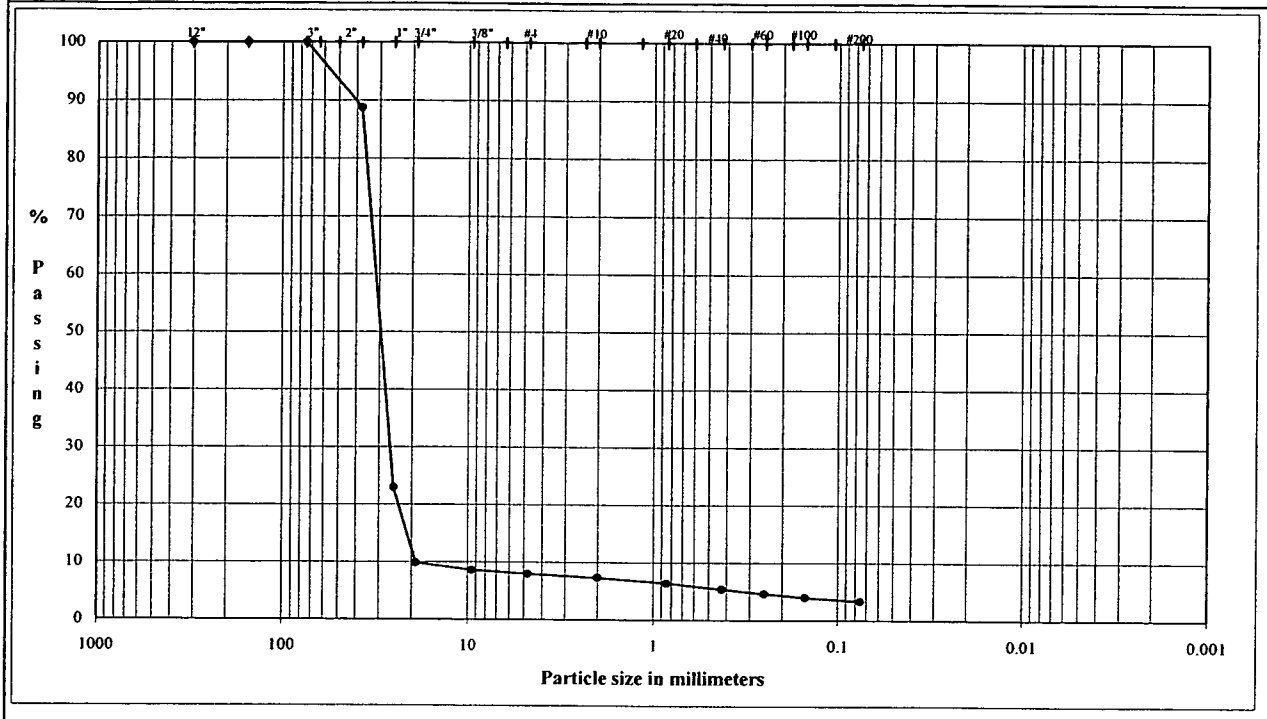
May-05

053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

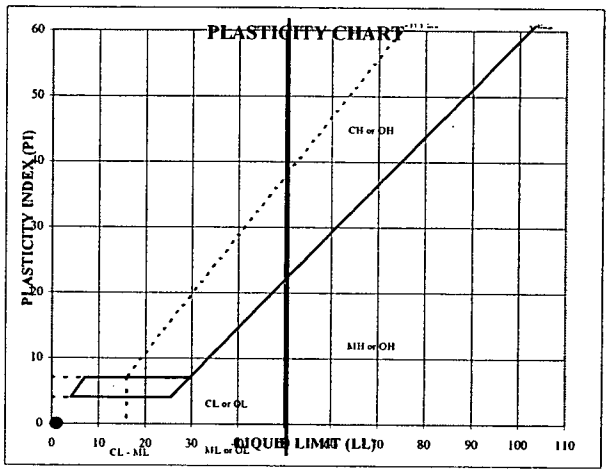
PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **DG-02** Depth (ft): --
TYPE: **Pail**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	88.7		
1.0"	25.0	22.9		
0.75"	19.0	9.8	Coarse Gravel	90.20
0.375"	9.5	8.6		
#4	4.8	7.9	Fine Gravel	1.88
#10	2.0	7.3	Coarse Sand	0.61
#20	0.9	6.4		
#40	0.4	5.3	Medium Sand	1.97
#60	0.3	4.6		
#100	0.2	4.0		
#200	0.1	3.3	Fine Sand	2.05
			Fines	3.29



ATTERBERG LIMITS

M_c	LL	PL	PI	SG
--	--	--	--	--

DESCRIPTION: Yellowish brown poorly graded gravel

USCS: GP

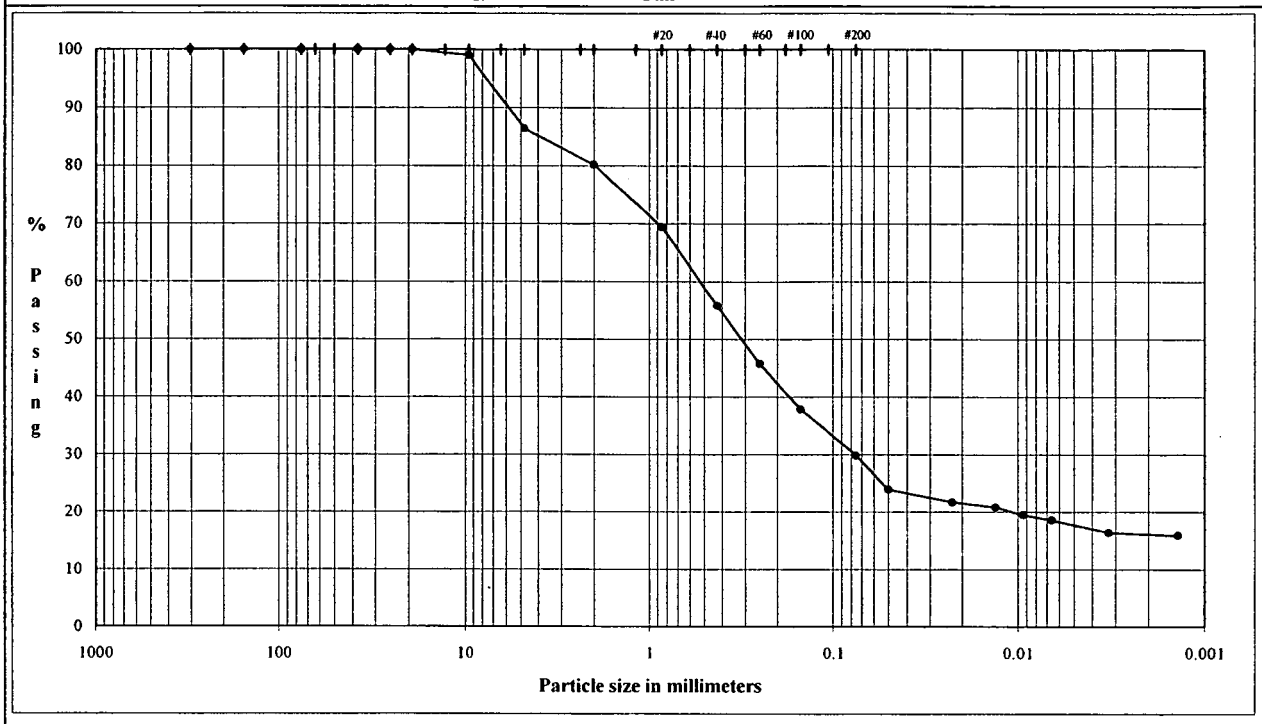
TECH	MGC
DATE	5/17/05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **CPF-1** Depth (ft): -
TYPE: **Pail**



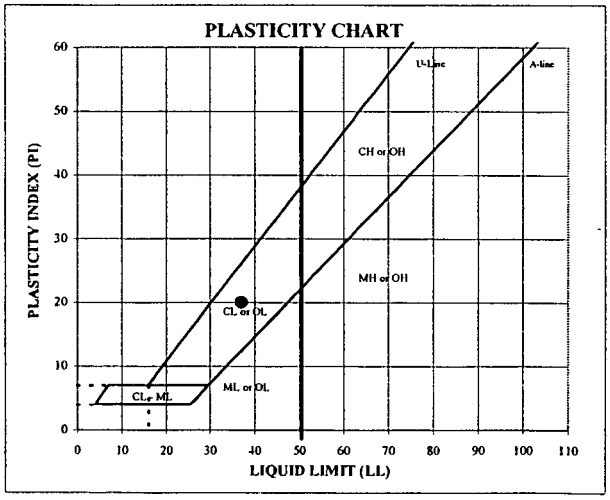
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	99.0		
#4	4.8	86.4	Fine Gravel	13.63
#10	2.00	80.1	Coarse Sand	6.24
#20	0.85	69.4		
#40	0.43	55.8	Medium Sand	24.34
#60	0.25	45.7		
#100	0.15	37.8		
#200	0.075	29.8	Fine Sand	25.98

Hydrometer Analysis

(mm)	%Finer		
0.050	23.9		
0.023	21.7		
0.013	20.8	Fines	
0.0093	19.5	Silt or Clay	29.81
0.0066	18.6		
0.0033	16.4		
0.0014	15.9		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	37	17	20	--

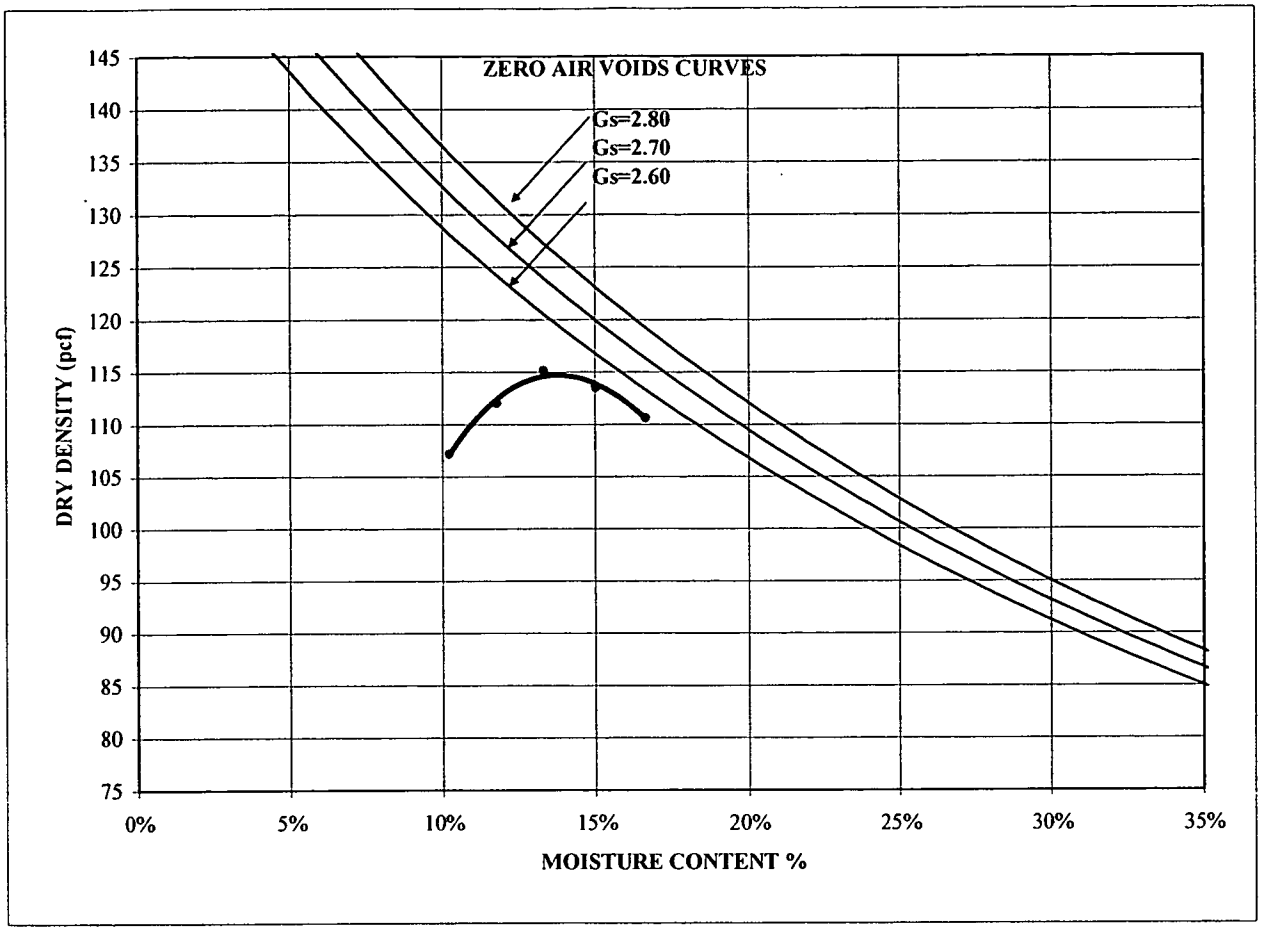
DESCRIPTION: Moderate yellowish brown clayey sand

USCS: SC

TECH DT
DATE 5/10/2005
REVIEW MB

124

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	115.1	Corrected Maximum Dry Density (pcf)	119.3
OPTIMUM MOISTURE (%)	13.4	Corrected Optimum Moisture (%)	12.1

SAMPLE ID	CPF-1
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	37
PL	17
PI	20
MC	#DIV/0!

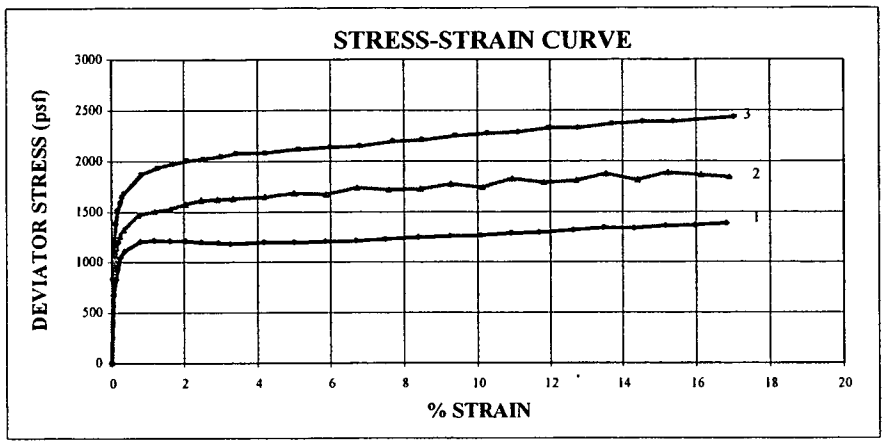
DESCRIPTION	Moderate yellowish brown clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

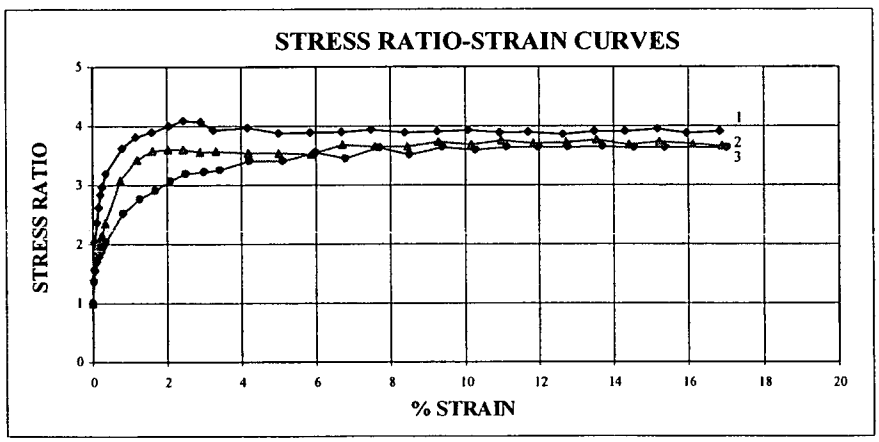
TECH	MKS
DATE	5-11-05
REVIEW	MB

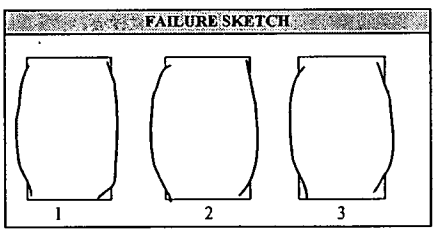
TRIAXIAL COMPRESSION TEST - CONSOLIDATED UNDRAINED WITH PORE PRESSURE
ASTM D 4767

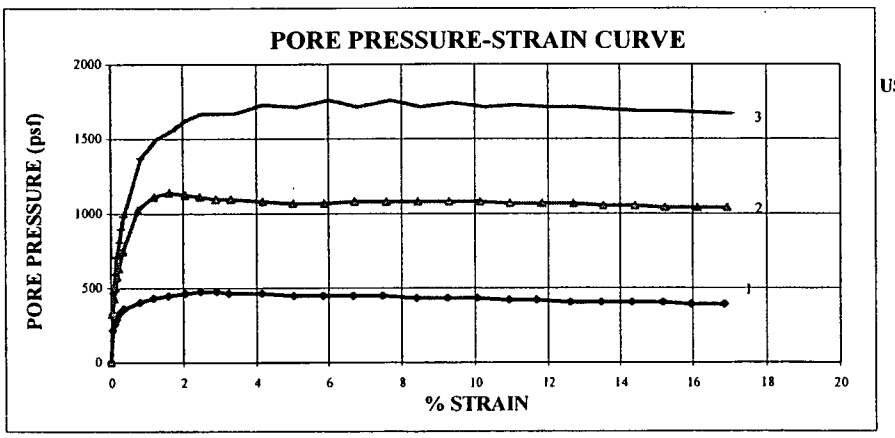
PROJECT NAME: KAISER HILL/ROCKY FLATS FIELD & LAB/CO
PROJECT NUMBER: 053-2203
SAMPLE ID: CPF - 1 DEPTH: - Sample Type: Bulk



Specimen	Effective Confining Pressure (psf)	Initial Dry Density (pcf)	Initial Moisture Content (%)
1	864	108.9	15.9
2	1728	109.0	15.9
3	2592	109.2	15.8
	Average	109.0	15.9







Soil Description

Yellowish Brown, MEDIUM TO FINE SAND, and silty clay, little fine gravel.

USCS (SC)

LL	PL	PI
-	-	-

Comments

Sample was remolded to approx. 95% of the Max. Dry Density, @ Opt. Moisture Content+2.5% Data provided by client.

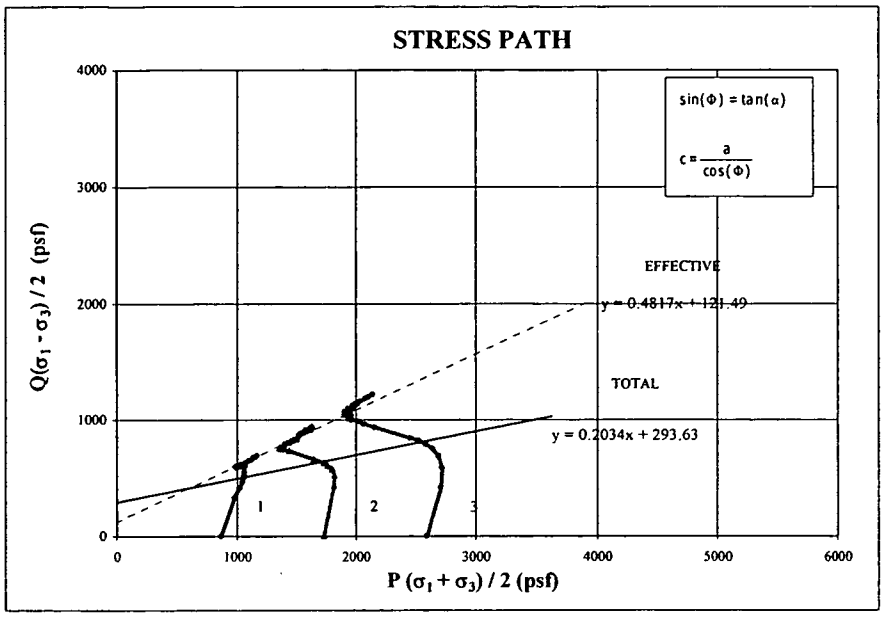
* Failure based on effective stress rati or 15% strain.

CHECK
REVIEW

125

TRIAXIAL COMPRESSION TEST - CONSOLIDATED UNDRAINED WITH PORE PRESSURE
ASTM D 4767

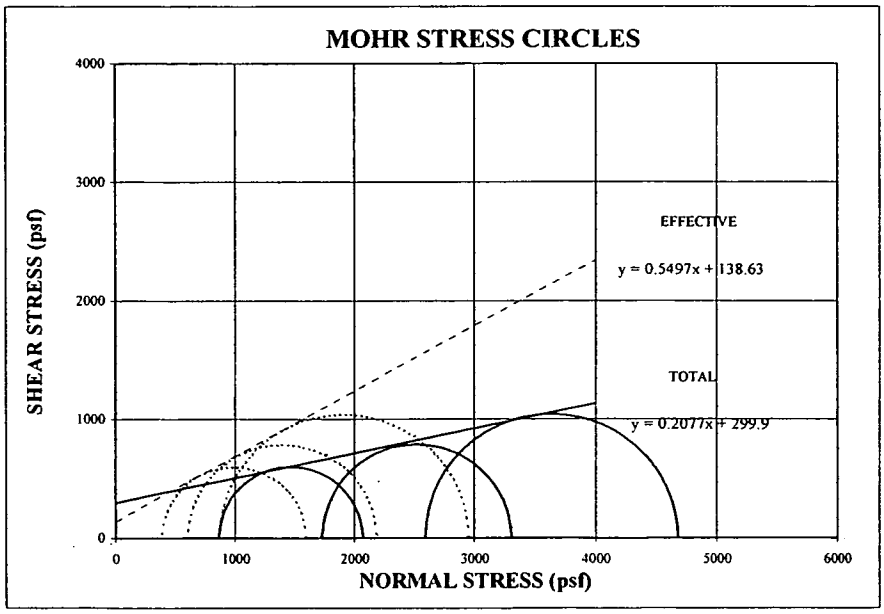
PROJECT NAME: KAISER HILL/ROCKY FLATS FIELD & LAB/CO
PROJECT NUMBER: 053-2203
SAMPLE ID: CPF - 1 DEPTH: - Sample Type: Bulk



Specimen	Effective Confining Pressure (psf)	Initial Dry Density (pcf)	Initial Moisture Content (%)
1	864	108.9	15.9
2	1728	109.0	15.9
3	2592	109.2	15.8

Specimen	Strain Rate (%)	Initial Saturation (%)	Saturation Before Shearing (%)
1	0.10	76.2	94.3
2	0.10	76.5	94.5
3	0.10	76.1	93.7

STRESS PATH			MOHR CIRCLES		
*TOTAL STRESS PARAMETER			*TOTAL STRENGTH PARAMETER		
α	=	11.5 °	ϕ	=	11.7 °
a	=	293.6 psf	c	=	299.9 psf
* EFFECTIVE STRESS PARAMETER			*EFFECTIVE STRENGTH PARAMETER		
α '	=	25.7 °	ϕ '	=	28.8 °
a '	=	121.5 psf	c '	=	138.6 psf



Soil Description

Yellowish Brown, MEDIUM TO FINE SAND, and silty clay, little fine gravel.

USCS (SC)

LL	PL	PI
-	-	-

Comments

Sample was remolded to approx. 95% of the Max. Dry Density, @ Opt. Moisture Content+2.5%. Data provided by client.

*** Failure based on effective stress ratio or 15% strain.**

CHECK
REVIEW

126

TRIAXIAL COMPRESSION TEST (ASTM D 4767) CONSOLIDATED UNDRAINED WITH PORE PRESSURE

PROJECT TITLE	KAISER HILL/ROCKY FLATS FIELD & LAB/CC
PROJECT NUMBER	053-2203
SAMPLE ID	CPF - 1
SAMPLE TYPE	Bulk
DEPTH INTERVAL	-
MACHINE SPEED (in/min)	0.006
STRAIN RATE (%/min)	0.10
CELL PRESSURE (psi)	98.0
SAMPLE PRESSURE (psi)	80.0
EFF. CONSOLIDATION PRESSURE, σ_3 (psi)	18.0
PRESSURE, σ_3 (psf)	2592.0
FINAL "B" VALUE	1.00
t_{50} (minutes)	0.23
Mounting Method	Wet

INITIAL SAMPLE DATA	cm	in	corrected
HEIGHT	15.232	5.997	5.865
DIAMETER	7.087	2.790	2.760
AREA	39.44	6.11	5.98
VOLUME	600.80	36.66	35.08
WEIGHT (g)	1216.68		1230.68
% MOISTURE	15.8		17.10
SPECIFIC GRAVITY	2.74		
MOIST DENSITY (pcf)	126.4		
DRY DENSITY, calc (pcf)	109.2		
VOLUME OF SOLIDS	383.00		
VOLUME OF VOIDS	217.81		
VOID RATIO	0.569		
SATURATION	76.1		

CORRECTED SAMPLE DATA	
DRY DENSITY, calc (pcf)	114.1
VOLUME OF SOLIDS	383.00
VOLUME OF VOIDS	191.81
VOID RATIO	0.501
WATER CONTENT (% MOISTURE)	
WT SOIL & TARE, MOIST (g)	1230.68
WT SOIL & TARE, DRY (g)	1050.94
WT TARE (g)	0.00
WT MOISTURE (g)	179.74
WT DRY SOIL (g)	1050.94
% MOISTURE	17.10

TIME (MIN)	ACCUM. DEFLECT. (inches)	AXIAL LOAD (lbs)	PORE PRESS. (psi)=U	PWP change DU (psf) (acc)	ε % STRAIN (%)	(1-ε)	CORR. AREA (in 2)	CORR. HEIGHT (in)	DEV. STRESS (psf)	SIGMA 1 devstr+cp (σ_1)	SIGMA 1 EFF. (σ_1-dU)	SIGMA 3 EFF. (σ_3-dU)	EFF.PRN STR RATIO (σ_1'/σ_3')	$\frac{(\sigma_1'+\sigma_3')}{2}$ (P)	$\frac{(\sigma_1'-\sigma_3')}{2}$ (Q)	(A)
0.0	0.000	14	80.7	0.0	0.00	1.00	5.98	5.865	0.0	2592.0	2592.0	2592.0	1.00	2592.0	0.0	0
0.3	0.002	48	82.8	302.4	0.03	1.00	5.98	5.863	835.2	3427.2	3124.8	2289.6	1.36	2707.2	417.6	0.36
0.7	0.004	62	83.9	460.8	0.07	1.00	5.98	5.861	1174.2	3766.2	3305.4	2131.2	1.55	2718.3	587.1	0.39
1.2	0.007	71	84.8	590.4	0.12	1.00	5.99	5.858	1380.4	3972.4	3382.0	2001.6	1.69	2691.8	690.2	0.43
1.7	0.010	76	85.6	705.6	0.17	1.00	5.99	5.855	1509.5	4101.5	3395.9	1886.4	1.80	2641.1	754.7	0.47
2.3	0.014	80	86.3	806.4	0.24	1.00	6.00	5.851	1585.3	4177.3	3370.9	1785.6	1.89	2578.3	792.7	0.51
2.8	0.017	82	86.9	892.8	0.29	1.00	6.00	5.848	1646.9	4238.9	3346.1	1699.2	1.97	2522.7	823.5	0.54
3.5	0.021	84	87.5	979.2	0.36	1.00	6.00	5.844	1684.2	4276.2	3297.0	1612.8	2.04	2454.9	842.1	0.58
8.2	0.049	92	90.2	1368.0	0.84	0.99	6.03	5.816	1864.7	4456.7	3088.7	1224.0	2.52	2156.4	932.4	0.73
12.5	0.075	95	91.1	1497.6	1.28	0.99	6.06	5.790	1934.8	4526.8	3029.2	1094.4	2.77	2061.8	967.4	0.77
16.7	0.100	97	91.5	1555.2	1.71	0.98	6.08	5.765	1976.2	4568.2	3013.0	1036.8	2.91	2024.9	988.1	0.79
20.5	0.123	99	92.0	1627.2	2.10	0.98	6.11	5.742	2001.3	4593.3	2966.1	964.8	3.07	1965.5	1000.7	0.81
24.7	0.148	100	92.3	1670.4	2.52	0.97	6.14	5.717	2020.8	4612.8	2942.4	921.6	3.19	1932.0	1010.4	0.83
29.3	0.176	101	92.3	1670.4	3.00	0.97	6.17	5.689	2048.2	4640.2	2969.8	921.6	3.22	1945.7	1024.1	0.82
33.5	0.201	103	92.3	1670.4	3.43	0.97	6.19	5.664	2074.1	4666.1	2995.7	921.6	3.25	1958.7	1037.1	0.81
41.2	0.247	104	92.7	1728.0	4.21	0.96	6.24	5.618	2082.6	4674.6	2946.6	864.0	3.41	1905.3	1041.3	0.83
50.2	0.301	106	92.6	1713.6	5.13	0.95	6.30	5.564	2115.2	4707.2	2993.6	878.4	3.41	1936.0	1057.6	0.81
58.7	0.352	108	92.9	1756.8	6.00	0.94	6.36	5.513	2134.2	4726.2	2969.4	835.2	3.56	1902.3	1067.1	0.82
66.5	0.399	109	92.6	1713.6	6.80	0.93	6.42	5.466	2149.7	4741.7	3028.1	878.4	3.45	1953.3	1074.9	0.80
75.3	0.452	112	92.9	1756.8	7.71	0.92	6.48	5.413	2195.5	4787.5	3030.7	835.2	3.63	1933.0	1097.8	0.80
83.2	0.499	114	92.6	1713.6	8.51	0.91	6.54	5.366	2207.3	4799.3	3085.7	878.4	3.51	1982.1	1103.7	0.78
91.8	0.551	117	92.8	1742.4	9.39	0.91	6.60	5.314	2249.2	4841.2	3098.8	849.6	3.65	1974.2	1124.6	0.77
100.5	0.603	119	92.6	1713.6	10.28	0.90	6.67	5.262	2272.5	4864.5	3150.9	878.4	3.59	2014.7	1136.3	0.75
108.7	0.652	120	92.7	1728.0	11.12	0.89	6.73	5.213	2283.5	4875.5	3147.5	864.0	3.64	2005.7	1141.7	0.76
117.2	0.703	123	92.6	1713.6	11.99	0.88	6.80	5.162	2324.7	4916.7	3203.1	878.4	3.65	2040.8	1162.4	0.74
124.8	0.749	124	92.6	1713.6	12.77	0.87	6.86	5.116	2325.0	4917.0	3203.4	878.4	3.65	2040.9	1162.5	0.74
134.0	0.804	128	92.5	1699.2	13.71	0.86	6.93	5.061	2370.6	4962.6	3263.4	892.8	3.66	2078.1	1185.3	0.72
142.3	0.854	130	92.4	1684.8	14.56	0.85	7.00	5.011	2388.4	4980.4	3295.6	907.2	3.63	2101.4	1194.2	0.71
150.5	0.903	131	92.4	1684.8	15.40	0.85	7.07	4.962	2389.4	4981.4	3296.6	907.2	3.63	2101.9	1194.7	0.71
166.7	1.000	135	92.3	1670.4	17.05	0.83	7.21	4.865	2430.6	5022.6	3352.2	921.6	3.64	2136.9	1215.3	0.69

DU @ FAILURE	1728.0	DEVIATORIC STRESS @ FAILURE	2082.6	EFFECTIVE PRINCIPLE STRESS RATIO @ FAILURE	3.41

TECH	SDM/DW/PWM
DATE	6/6/2005
CHECKED	
REVIEWED	

Golder Associates Inc.

TRIAXIAL COMPRESSION TEST (ASTM D 4767) CONSOLIDATED UNDRAINED WITH PORE PRESSURE

PROJECT TITLE	KAISER HILL/ROCKY FLATS FIELD & LAB/CC
PROJECT NUMBER	053-2203
SAMPLE ID	CPF - 1
SAMPLE TYPE	Bulk
DEPTH INTERVAL	-
MACHINE SPEED (in/min)	0.006
STRAIN RATE (%/min)	0.10
CELL PRESSURE (psi)	92.0
SAMPLE PRESSURE (psi)	80.0
EFF. CONSOLIDATION PRESSURE, σ_3 (psi)	12.0
PRESSURE, σ_3 (psf)	1728.0
FINAL "B" VALUE	0.99
t_{50} (minutes)	0.31

Mounting Method: Wet

INITIAL SAMPLE DATA	cm	in	corrected
HEIGHT	15.222	5.993	5.909
DIAMETER	7.087	2.790	2.780
AREA	39.44	6.11	6.07
VOLUME	600.40	36.64	35.86
WEIGHT (g)	1215.58		1242.78
% MOISTURE	15.9		18.51
SPECIFIC GRAVITY	2.74		
MOIST DENSITY (pcf)	126.3		
DRY DENSITY, calc (pcf)	109.0		
VOLUME OF SOLIDS	382.17		
VOLUME OF VOIDS	218.23		
VOID RATIO	0.571		
SATURATION	76.5		

CORRECTED SAMPLE DATA	
DRY DENSITY, calc (pcf)	111.4
VOLUME OF SOLIDS	382.17
VOLUME OF VOIDS	205.43
VOID RATIO	0.538

WATER CONTENT (% MOISTURE)	
WT SOIL & TARE, MOIST (g)	1242.78
WT SOIL & TARE, DRY (g)	1048.68
WT TARE (g)	0.00
WT MOISTURE (g)	194.10
WT DRY SOIL (g)	1048.68
% MOISTURE	18.51

TIME (MIN)	ACCUM. DEFLECT. (inches)	AXIAL LOAD (lbs)	PORE PRESS. (psi)=U	PWP change DU (psf) (acc)	ε % STRAIN (%)	(1-ε)	CORR. AREA (in 2)	CORR. HEIGHT (in)	DEV. STRESS (psf)	SIGMA 1 devstr+cp (σ_1)	SIGMA 1 EFF. (σ_1-dU)	SIGMA 3 EFF. (σ_3-dU)	EFF.PRN STR RATIO (σ_1'/σ_3')	$\frac{(\sigma_1'+\sigma_3')}{2}$ (P)	$\frac{(\sigma_1-\sigma_3)}{2}$ (Q)	(A)
0.0	0.000	13	80.6	0.0	0.00	1.00	6.07	5.909	0.0	1728.0	1728.0	1728.0	1.00	1728.0	0.0	0.00
0.5	0.003	49	83.0	345.6	0.05	1.00	6.07	5.906	863.3	2591.3	2245.7	1382.4	1.62	1814.1	431.7	0.40
1.0	0.006	57	83.6	432.0	0.10	1.00	6.07	5.903	1047.8	2775.8	2343.8	1296.0	1.81	1819.9	523.9	0.41
1.3	0.008	62	84.1	504.0	0.14	1.00	6.08	5.901	1149.3	2877.3	2373.3	1224.0	1.94	1798.7	574.7	0.44
1.8	0.011	64	84.6	576.0	0.19	1.00	6.08	5.898	1215.1	2943.1	2367.1	1152.0	2.05	1759.5	607.5	0.47
2.3	0.014	67	85.0	633.6	0.24	1.00	6.08	5.895	1266.5	2994.5	2360.9	1094.4	2.16	1727.7	633.3	0.50
3.3	0.020	69	85.8	748.8	0.34	1.00	6.09	5.889	1324.4	3052.4	2303.6	979.2	2.35	1641.4	662.2	0.57
7.5	0.045	75	87.7	1022.4	0.76	0.99	6.11	5.864	1467.1	3195.1	2172.7	705.6	3.08	1439.2	733.6	0.70
11.8	0.071	77	88.3	1108.8	1.20	0.99	6.14	5.838	1502.8	3230.8	2122.0	619.2	3.43	1370.6	751.4	0.74
16.0	0.096	78	88.5	1137.6	1.62	0.98	6.17	5.813	1524.4	3252.4	2114.8	590.4	3.58	1352.6	762.2	0.75
20.2	0.121	81	88.4	1123.2	2.05	0.98	6.20	5.788	1575.9	3303.9	2180.7	604.8	3.61	1392.8	788.0	0.71
24.2	0.145	83	88.3	1108.8	2.45	0.98	6.22	5.764	1611.1	3339.1	2230.3	619.2	3.60	1424.7	805.5	0.69
28.5	0.171	83	88.2	1094.4	2.89	0.97	6.25	5.738	1622.2	3350.2	2255.8	633.6	3.56	1444.7	811.1	0.67
32.7	0.196	84	88.2	1094.4	3.32	0.97	6.28	5.713	1628.9	3356.9	2262.5	633.6	3.57	1448.1	814.5	0.67
41.2	0.247	86	88.1	1080.0	4.18	0.96	6.33	5.662	1648.5	3376.5	2296.5	648.0	3.54	1472.2	824.2	0.66
49.3	0.296	88	88.0	1065.6	5.01	0.95	6.39	5.613	1681.6	3409.6	2344.0	662.4	3.54	1503.2	840.8	0.63
57.8	0.347	88	88.0	1065.6	5.87	0.94	6.45	5.562	1670.7	3398.7	2333.1	662.4	3.52	1497.8	835.4	0.64
66.2	0.397	92	88.1	1080.0	6.72	0.93	6.51	5.512	1737.6	3465.6	2385.6	648.0	3.68	1516.8	868.8	0.62
74.7	0.448	91	88.1	1080.0	7.58	0.92	6.57	5.461	1719.4	3447.4	2367.4	648.0	3.65	1507.7	859.7	0.63
83.2	0.499	92	88.1	1080.0	8.44	0.92	6.63	5.410	1720.7	3448.7	2368.7	648.0	3.66	1508.3	860.3	0.63
91.5	0.549	95	88.1	1080.0	9.29	0.91	6.69	5.360	1769.4	3497.4	2417.4	648.0	3.73	1532.7	884.7	0.61
100.0	0.600	95	88.1	1080.0	10.15	0.90	6.75	5.309	1741.9	3469.9	2389.9	648.0	3.69	1518.9	870.9	0.62
108.0	0.648	99	88.0	1065.6	10.97	0.89	6.82	5.261	1825.4	3553.4	2487.8	662.4	3.76	1575.1	912.7	0.58
116.7	0.700	99	88.0	1065.6	11.85	0.88	6.88	5.209	1788.5	3516.5	2450.9	662.4	3.70	1556.7	894.3	0.60
125.3	0.752	100	88.0	1065.6	12.73	0.87	6.95	5.157	1805.9	3533.9	2468.3	662.4	3.73	1565.3	902.9	0.59
133.3	0.800	104	87.9	1051.2	13.54	0.86	7.02	5.109	1871.2	3599.2	2548.0	676.8	3.76	1612.4	935.6	0.56
142.0	0.852	102	87.9	1051.2	14.42	0.86	7.09	5.057	1813.5	3541.5	2490.3	676.8	3.68	1583.6	906.8	0.58
150.0	0.900	107	87.8	1036.8	15.23	0.85	7.16	5.009	1886.8	3614.8	2578.0	691.2	3.73	1634.6	943.4	0.55
158.8	0.953	106	87.8	1036.8	16.13	0.84	7.24	4.956	1858.9	3586.9	2550.1	691.2	3.69	1620.7	929.5	0.56
166.7	1.000	107	87.8	1036.8	16.92	0.83	7.30	4.909	1843.2	3571.2	2534.4	691.2	3.67	1612.8	921.6	0.56

DU @ FAILURE	1123.2	DEVIATORIC STRESS @ FAILURE	1575.9	EFFECTIVE PRINCIPLE STRESS RATIO @ FAILURE	3.61

TECH	SDM/DW/PWM
DATE	6/6/2005
CHECKED	
REVIEWED	

127

TRIAXIAL COMPRESSION TEST (ASTM D 4767) CONSOLIDATED UNDRAINED WITH PORE PRESSURE

PROJECT TITLE	KAISER HILL/ROCKY FLATS FIELD & LAB/CO
PROJECT NUMBER	053-2203
SAMPLE ID	CPF - 1
SAMPLE TYPE	Bulk
DEPTH INTERVAL	-
MACHINE SPEED (in/min)	0.006
STRAIN RATE (%/min)	0.10
CELL PRESSURE (psi)	86.0
SAMPLE PRESSURE (psi)	80.0
EFF. CONSOLIDATION PRESSURE, σ_3 (psi)	6.0
PRESSURE, σ_3 (psf)	864.0
FINAL "B" VALUE	0.98
t_{50} (minutes)	0.23
Mounting Method	Wet

INITIAL SAMPLE DATA	cm	in	corrected
HEIGHT	15.237	5.999	5.937
DIAMETER	7.087	2.790	2.788
AREA	39.44	6.11	6.10
VOLUME	601.01	36.68	36.24
WEIGHT (g)	1215.59		1248.39
% MOISTURE	15.9		19.03
SPECIFIC GRAVITY	2.74		
MOIST DENSITY (pcf)	126.2		
DRY DENSITY, calc (pcf)	108.9		
VOLUME OF SOLIDS	382.22		
VOLUME OF VOIDS	218.79		
VOID RATIO	0.572		
SATURATION	76.2		

CORRECTED SAMPLE DATA	
DRY DENSITY, calc (pcf)	110.2
VOLUME OF SOLIDS	382.22
VOLUME OF VOIDS	211.59
VOID RATIO	0.554
WATER CONTENT (% MOISTURE)	
WT SOIL & TARE, MOIST (g)	1248.39
WT SOIL & TARE, DRY (g)	1048.80
WT TARE (g)	0.00
WT MOISTURE (g)	199.59
WT DRY SOIL (g)	1048.80
% MOISTURE	19.03

TIME (MIN)	ACCUM. DEFLECT. (inches)	AXIAL LOAD (lbs)	PORE PRESS. (psi)=U	PWP change DU (psf) (acc)	ε % STRAIN (%)	(1-ε)	CORR. AREA (in 2)	CORR. HEIGHT (in)	DEV. STRESS (psf)	SIGMA 1 devstr+cp (σ_1)	SIGMA 1 EFF. (σ_1-dU)	SIGMA 3 EFF. (σ_3-dU)	EFF.PRN STR RATIO (σ_1'/σ_3')	$\frac{(\sigma_1'+\sigma_3')}{2}$ (P)	$\frac{(\sigma_1-\sigma_3)}{2}$ (Q)	(A)
0.0	0.000	10	80.1	0.0	0.00	1.00	6.10	5.937	0.0	864.0	864.0	864.0	1.00	864.0	0.0	0.00
0.5	0.003	39	81.6	216.0	0.05	1.00	6.11	5.934	672.1	1536.1	1320.1	648.0	2.04	984.0	336.0	0.32
1.2	0.007	45	81.9	259.2	0.12	1.00	6.11	5.930	829.5	1693.5	1434.3	604.8	2.37	1019.6	414.8	0.31
1.7	0.010	50	82.1	288.0	0.17	1.00	6.11	5.927	932.7	1796.7	1508.7	576.0	2.62	1042.4	466.4	0.31
2.0	0.012	53	82.3	316.8	0.20	1.00	6.12	5.925	1005.4	1869.4	1552.6	547.2	2.84	1049.9	502.7	0.32
2.5	0.015	55	82.4	331.2	0.25	1.00	6.12	5.922	1049.6	1913.6	1582.4	532.8	2.97	1057.6	524.8	0.32
3.5	0.021	57	82.6	360.0	0.35	1.00	6.13	5.916	1107.3	1971.3	1611.3	504.0	3.20	1057.7	553.7	0.33
8.0	0.048	62	82.9	403.2	0.81	0.99	6.15	5.889	1207.6	2071.6	1668.4	460.8	3.62	1064.6	603.8	0.33
11.7	0.070	62	83.1	432.0	1.18	0.99	6.18	5.867	1214.7	2078.7	1646.7	432.0	3.81	1039.4	607.4	0.36
15.8	0.095	62	83.2	446.4	1.60	0.98	6.20	5.842	1209.5	2073.5	1627.1	417.6	3.90	1022.4	604.8	0.37
20.3	0.122	62	83.3	460.8	2.05	0.98	6.23	5.815	1208.6	2072.6	1611.8	403.2	4.00	1007.5	604.3	0.38
24.3	0.146	62	83.4	475.2	2.46	0.98	6.26	5.791	1201.3	2065.3	1590.1	388.8	4.09	989.4	600.6	0.40
28.8	0.173	62	83.4	475.2	2.91	0.97	6.29	5.764	1193.4	2057.4	1582.2	388.8	4.07	985.5	596.7	0.40
32.2	0.193	62	83.3	460.8	3.25	0.97	6.31	5.744	1180.1	2044.1	1583.3	403.2	3.93	993.3	590.1	0.39
41.2	0.247	63	83.3	460.8	4.16	0.96	6.37	5.690	1196.2	2060.2	1599.4	403.2	3.97	1001.3	598.1	0.39
49.7	0.298	64	83.2	446.4	5.02	0.95	6.43	5.639	1201.1	2065.1	1618.7	417.6	3.88	1018.2	600.6	0.37
57.8	0.347	64	83.2	446.4	5.84	0.94	6.48	5.590	1204.0	2068.0	1621.6	417.6	3.88	1019.6	602.0	0.37
66.2	0.397	65	83.2	446.4	6.69	0.93	6.54	5.540	1210.9	2074.9	1628.5	417.6	3.90	1023.0	605.4	0.37
74.0	0.444	66	83.2	446.4	7.48	0.93	6.60	5.493	1229.0	2093.0	1646.6	417.6	3.94	1032.1	614.5	0.36
83.0	0.498	68	83.1	432.0	8.39	0.92	6.66	5.439	1247.1	2111.1	1679.1	432.0	3.89	1055.6	623.6	0.35
91.5	0.549	69	83.1	432.0	9.25	0.91	6.73	5.388	1256.9	2120.9	1688.9	432.0	3.91	1060.4	628.4	0.34
99.7	0.598	70	83.1	432.0	10.07	0.90	6.79	5.339	1266.6	2130.6	1698.6	432.0	3.93	1065.3	633.3	0.34
108.2	0.649	71	83.0	417.6	10.93	0.89	6.85	5.288	1290.3	2154.3	1736.7	446.4	3.89	1091.5	645.1	0.32
115.7	0.694	72	83.0	417.6	11.69	0.88	6.91	5.243	1293.9	2157.9	1740.3	446.4	3.90	1093.3	646.9	0.32
125.0	0.750	74	82.9	403.2	12.63	0.87	6.99	5.187	1317.2	2181.2	1778.0	460.8	3.86	1119.4	658.6	0.31
133.3	0.800	76	82.9	403.2	13.47	0.87	7.05	5.137	1339.2	2203.2	1800.0	460.8	3.91	1130.4	669.6	0.30
141.7	0.850	76	82.9	403.2	14.32	0.86	7.12	5.087	1338.3	2202.3	1799.1	460.8	3.90	1129.9	669.1	0.30
150.2	0.901	78	82.9	403.2	15.18	0.85	7.20	5.036	1356.9	2220.9	1817.7	460.8	3.94	1139.2	678.4	0.30
157.8	0.947	79	82.8	388.8	15.95	0.84	7.26	4.990	1366.3	2230.3	1841.5	475.2	3.88	1158.3	683.1	0.28
166.7	1.000	81	82.8	388.8	16.84	0.83	7.34	4.937	1383.2	2247.2	1858.4	475.2	3.91	1166.8	691.6	0.28

DU @ FAILURE	475.20	DEVIATORIC STRESS @ FAILURE	1201.28	EFFECTIVE PRINCIPLE STRESS RATIO @ FAILURE	4.09

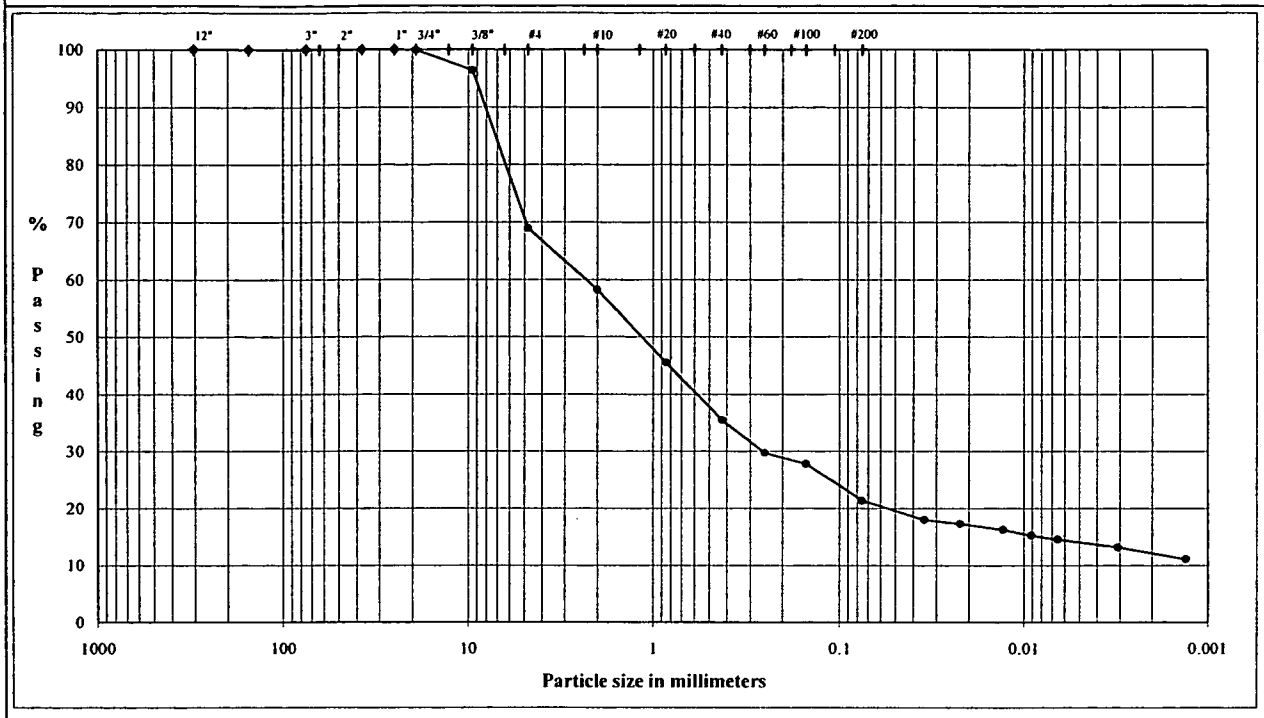
TECH	SDM/DW/PWM
DATE	6/6/05
CHECKED	
REVIEWED	

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **CPF-2** Depth (ft): -
TYPE: **Pail**



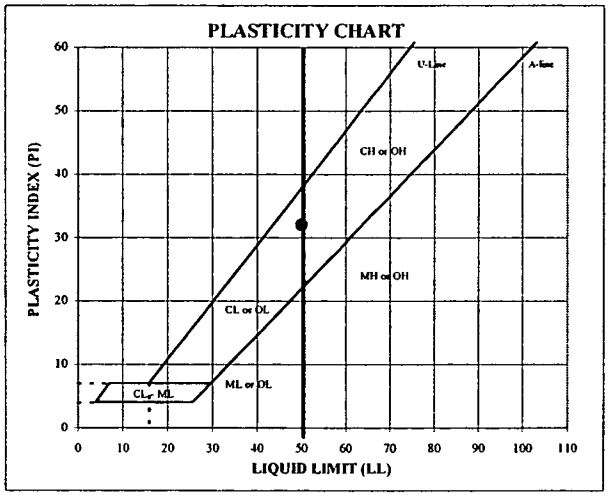
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.10
0.75"	19.0	99.9		
0.375"	9.5	96.4		
#4	4.8	68.9	Fine Gravel	30.99
#10	2.00	58.2	Coarse Sand	10.71
#20	0.85	45.5		
#40	0.43	35.4	Medium Sand	22.80
#60	0.25	29.7		
#100	0.15	27.7		
#200	0.075	21.3	Fine Sand	14.09

Hydrometer Analysis

(mm)	%Finer		
0.035	18.0		
0.022	17.3		
0.013	16.2	Fines	
0.0091	15.2	Silt or Clay	21.32
0.0065	14.5		
0.0031	13.1		
0.0013	11.1		



ATTERBERG LIMITS

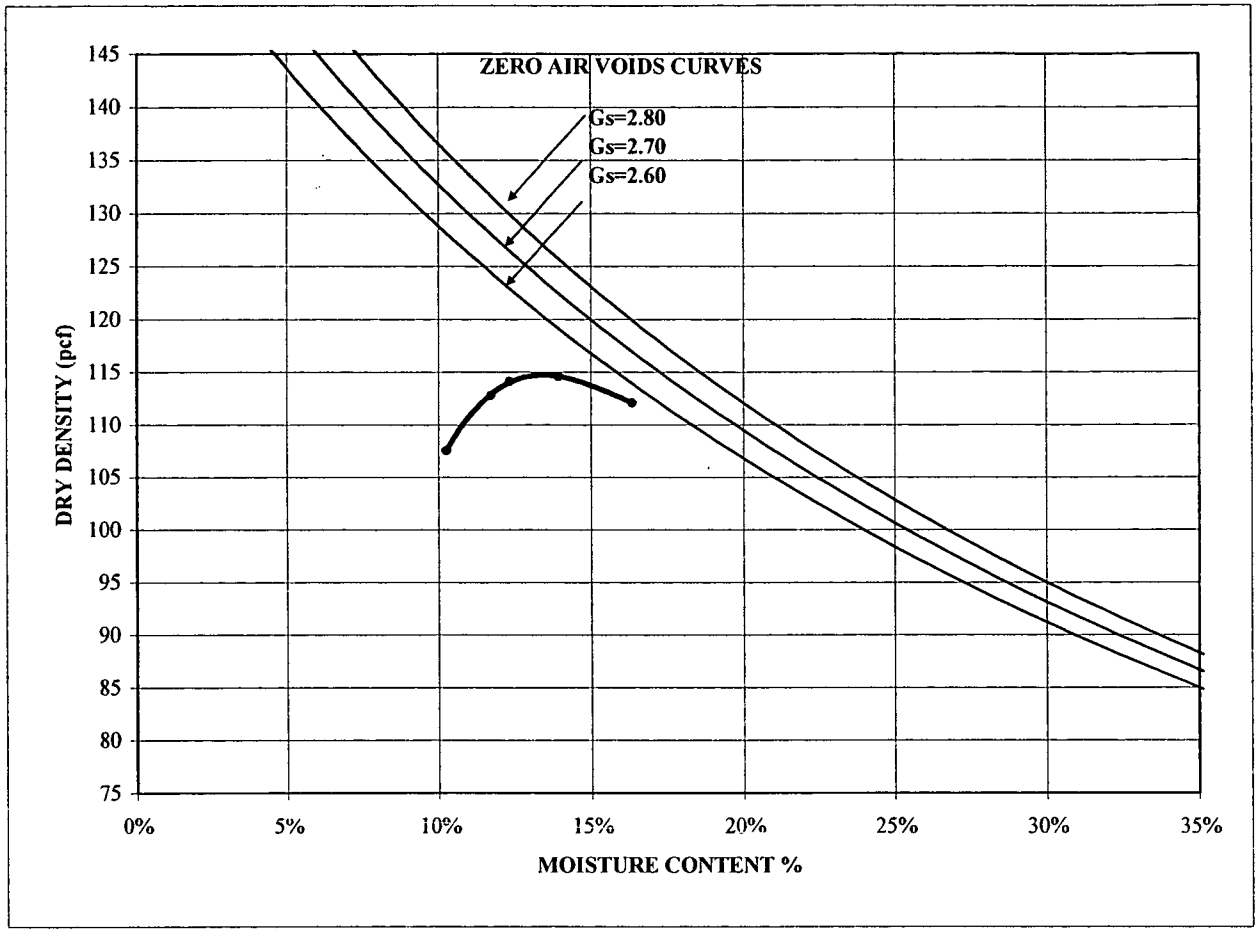
M_c	LL	PL	PI	SpG
--	50	18	32	--

DESCRIPTION: Moderate yellowish brown clayey sand with gravel

USCS: SC

TECH	DS
DATE	5/12/2005
REVIEW	MB

MOISTURE / DRY DENSITY CURVE
D 698 METHOD B



MAXIMUM DRY DENSITY (pcf)	114.8	Corrected Maximum Dry Density (pcf)	116.0
OPTIMUM MOISTURE (%)	13.7	Corrected Optimum Moisture (%)	13.3

SAMPLE ID	CPF-2
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	50
PL	18
PI	32
MC	--

DESCRIPTION	Moderate yellowish brown clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

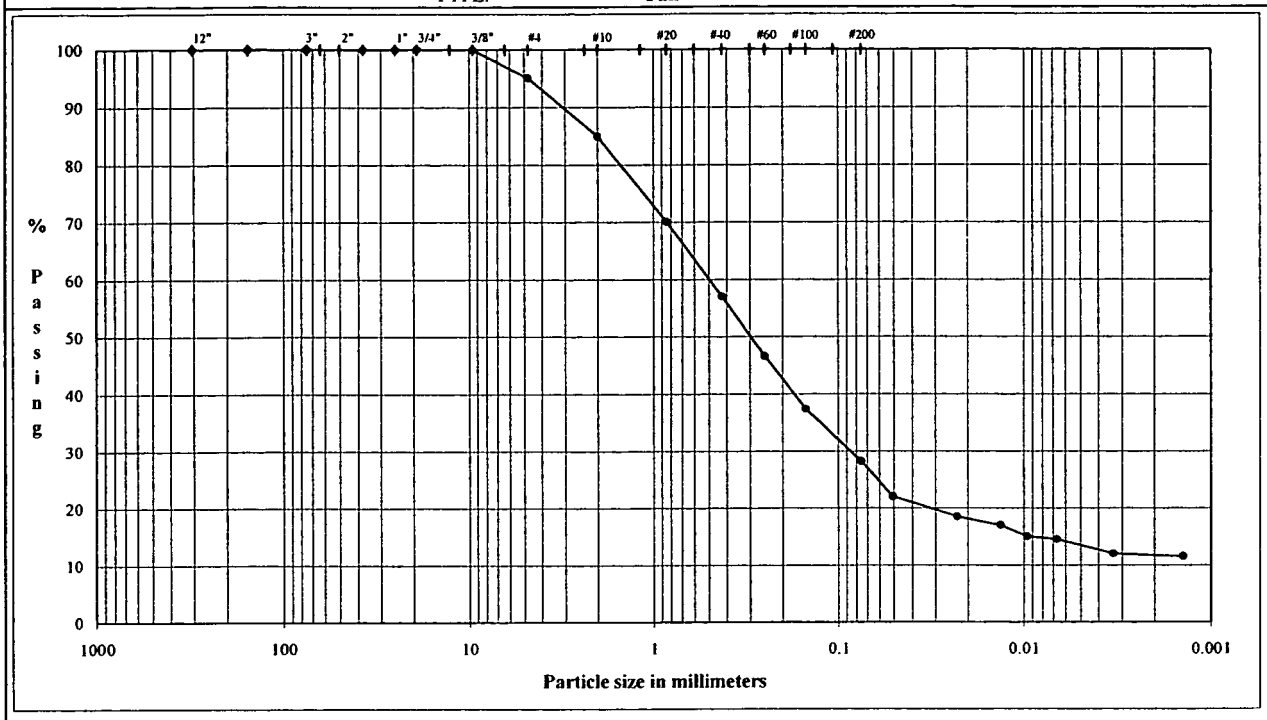
TECH	MKS
DATE	5-11-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSE-1** Depth (ft): -
TYPE: **Pail**



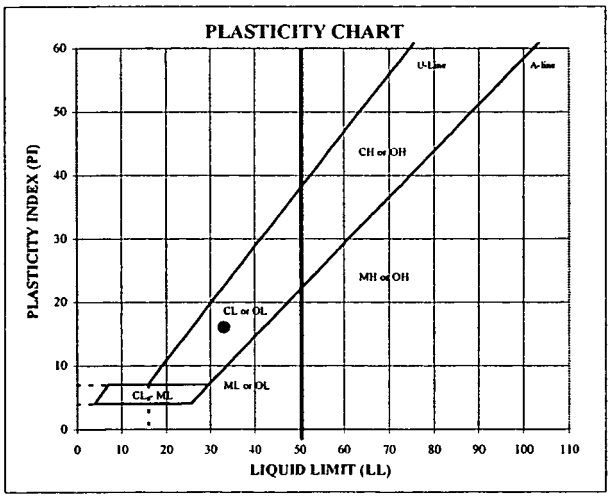
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	99.9		
#4	4.8	95.1	Fine Gravel	4.91
#10	2.00	84.9	Coarse Sand	10.15
#20	0.85	70.1		
#40	0.43	57.0	Medium Sand	27.91
#60	0.25	46.6		
#100	0.15	37.3		
#200	0.075	28.2	Fine Sand	28.88

Hydrometer Analysis

(mm)	%Finer		
0.051	22.0		
0.023	18.5		
0.013	17.0	Fines	
0.0096	15.0	Silt or Clay	28.16
0.0067	14.5		
0.0033	12.0		
0.0014	11.5		



ATTERBERG LIMITS

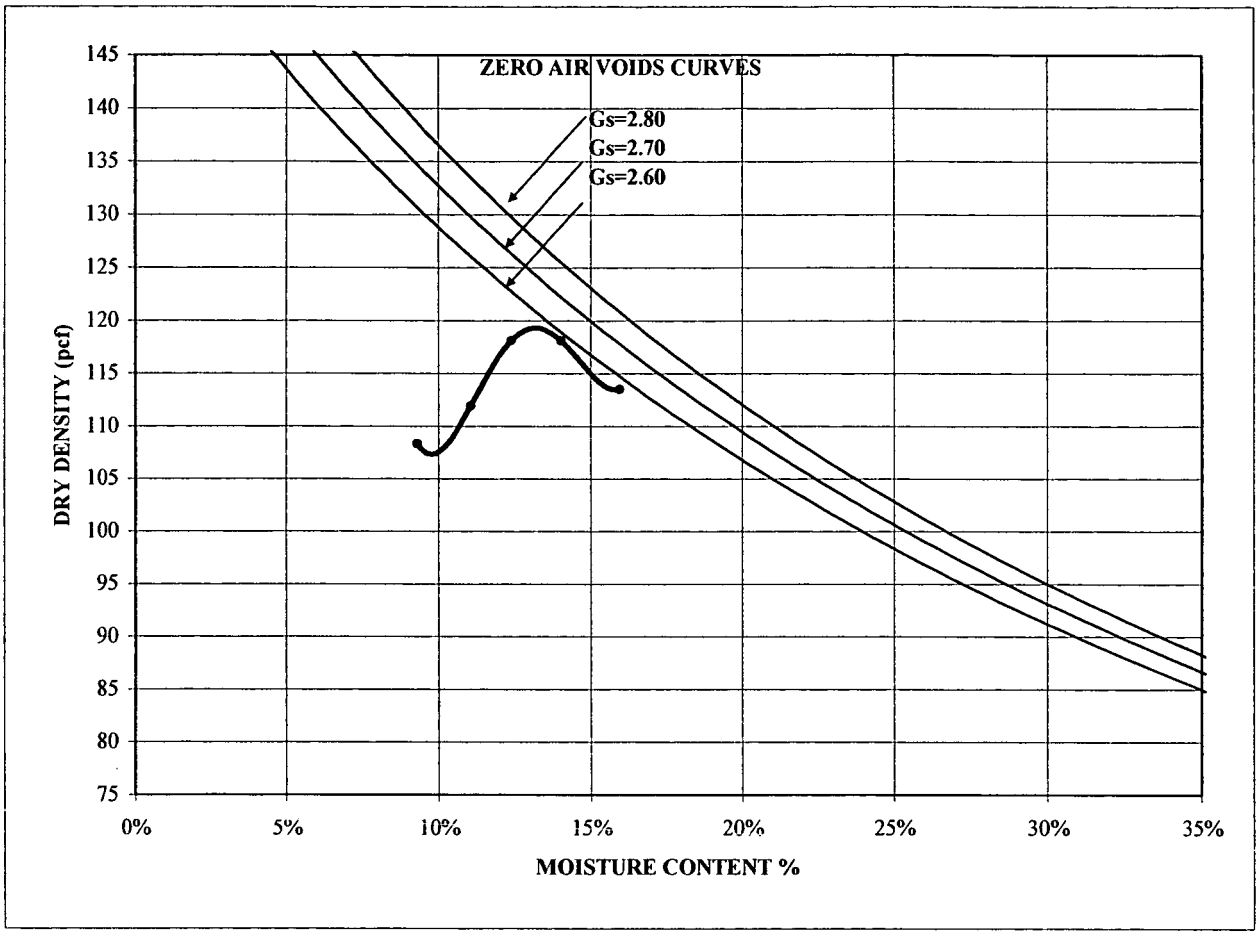
M_c	LL	PL	PI	SpG
--	33	17	16	--

DESCRIPTION: Moderate yellowish brown clayey sand

USCS: SC

TECH	DT
DATE	5/10/2005
REVIEW	MB

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	119.0	
OPTIMUM MOISTURE (%)	13.2	NO CORRECTION REQUIRED

SAMPLE ID	PSE-1
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	33
PL	17
PI	16
MC	#DIV/0!

DESCRIPTION	Moderate yellowish brown clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

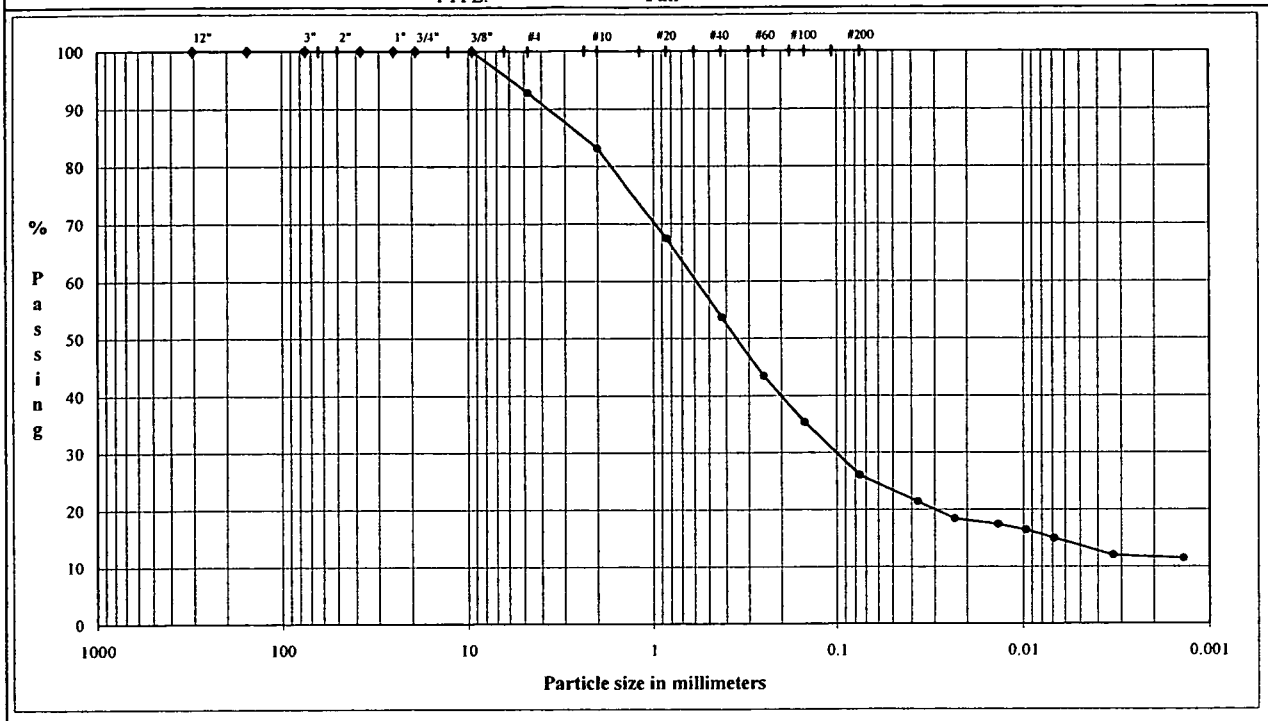
TECH	MKS
DATE	5-11-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSE-2** Depth (ft): -
TYPE: **Pail**



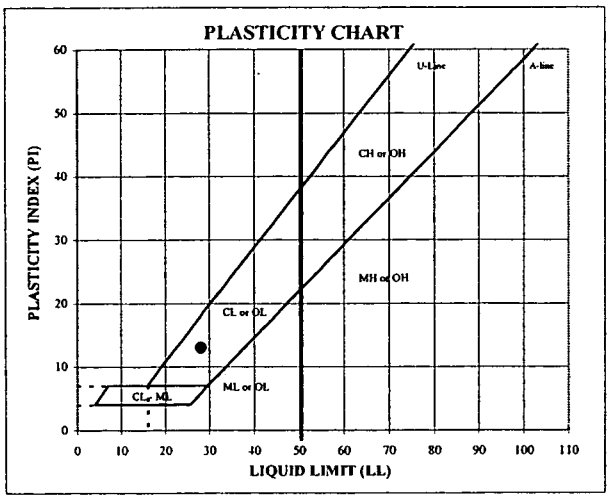
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	100.0		
#4	4.8	92.9	Fine Gravel	7.15
#10	2.00	83.1	Coarse Sand	9.73
#20	0.85	67.4		
#40	0.43	53.7	Medium Sand	29.43
#60	0.25	43.4		
#100	0.15	35.3		
#200	0.075	26.0	Fine Sand	27.71

Hydrometer Analysis

(mm)	%Finer		
0.037	21.4		
0.023	18.4		
0.014	17.4	Fines	
0.0096	16.4	Silt or Clay	25.98
0.0069	14.9		
0.0033	11.9		
0.0014	11.4		



ATTERBERG LIMITS

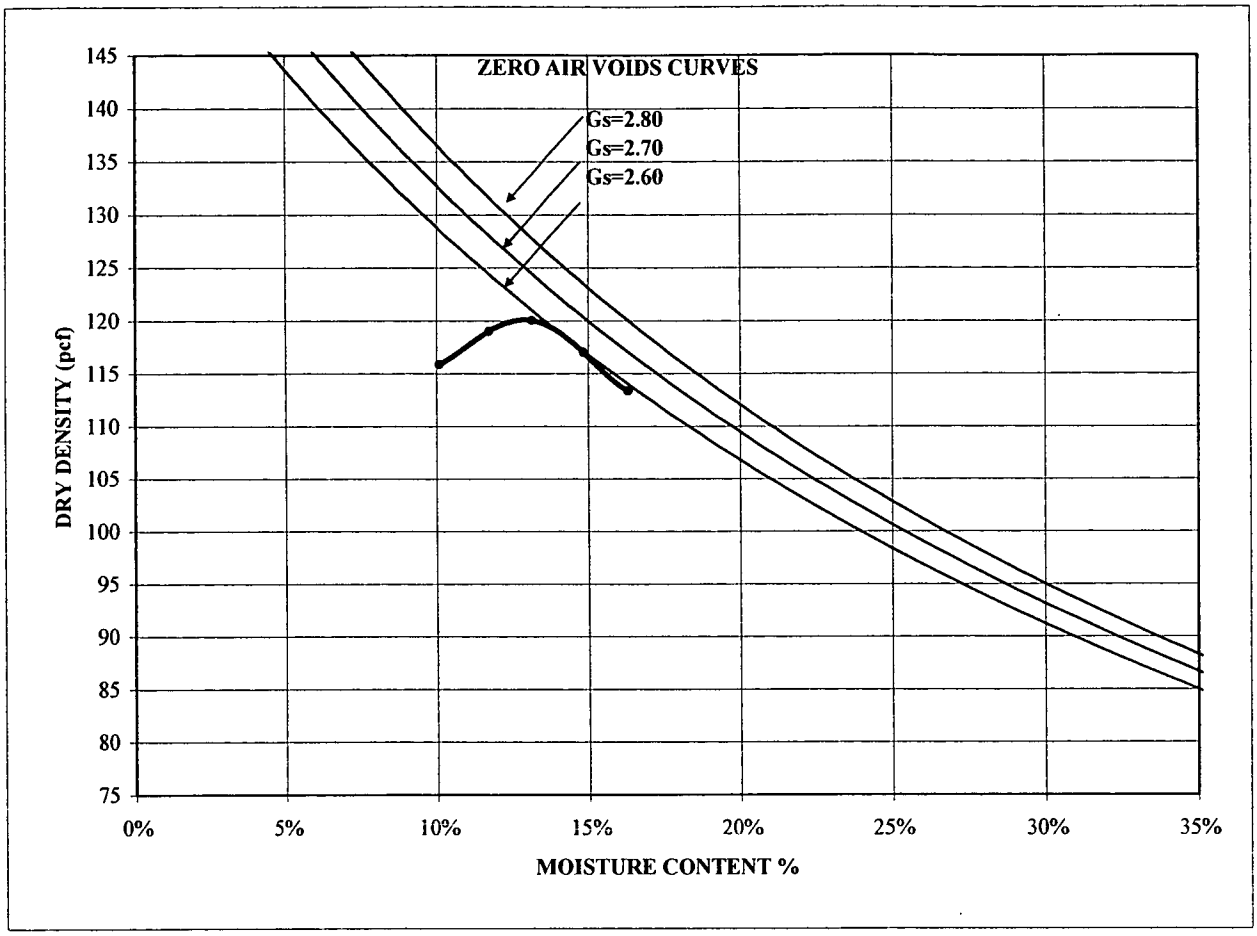
M_c	LL	PL	PI	SpG
--	28	15	13	--

DESCRIPTION: Moderate yellowish brown clayey sand

USCS: SC

TECH	DT
DATE	5/10/2005
REVIEW	MB

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	120.0	Corrected Maximum Dry Density (pcf)	122.0
OPTIMUM MOISTURE (%)	12.9	Corrected Optimum Moisture (%)	12.2

SAMPLE ID	PSE-2
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	28
PL	15
PI	13
MC	0.00%

DESCRIPTION	Moderate yellowish brown clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

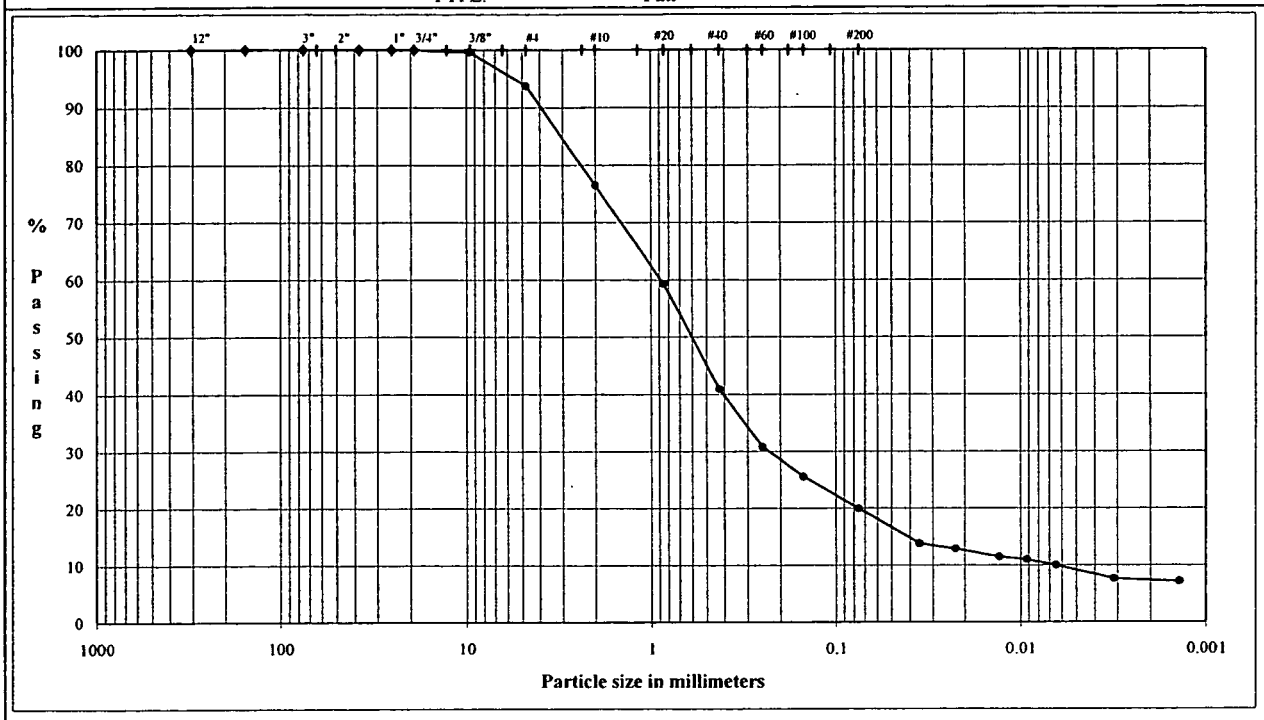
TECH	MKS
DATE	5-13-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSE-3** Depth (ft): -
TYPE: **Pail**



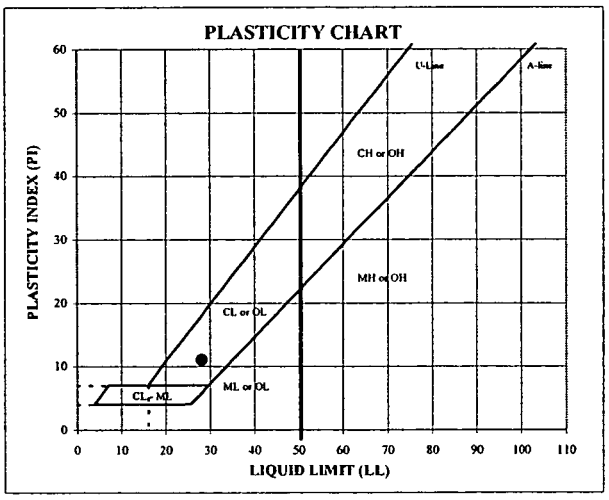
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.05
0.75"	19.0	99.9		
0.375"	9.5	99.6		
#4	4.8	93.8	Fine Gravel	6.15
#10	2.00	76.4	Coarse Sand	17.37
#20	0.85	59.3		
#40	0.43	40.9	Medium Sand	35.54
#60	0.25	30.7		
#100	0.15	25.5		
#200	0.075	19.9	Fine Sand	20.99

Hydrometer Analysis

(mm)	%Finer		
0.035	13.8		
0.022	12.8		
0.013	11.4	Fines	
0.0092	10.9	Silt or Clay	19.89
0.0064	10.0		
0.0031	7.6		
0.0014	7.1		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	28	17	11	--

DESCRIPTION: Brown (7.5 YR 4/4) clayey sand

USCS: SC

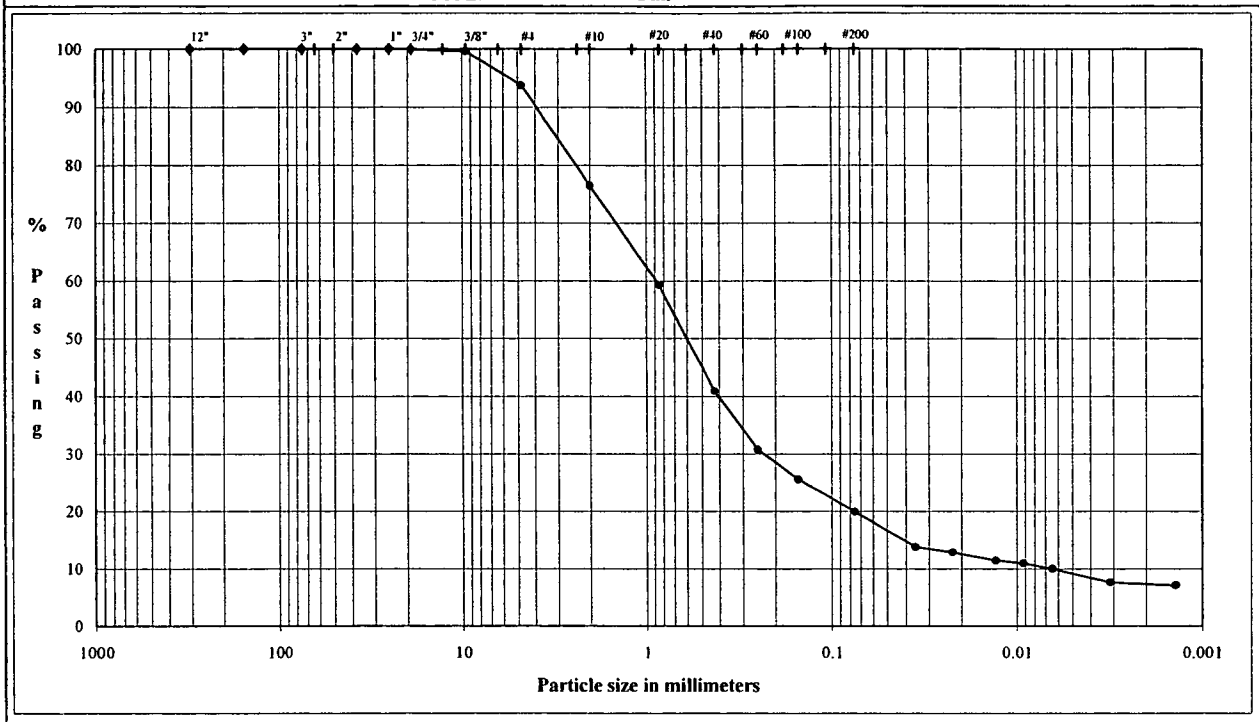
TECH DT
DATE 5/10/2005
REVIEW MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSE-3** Depth (ft): -
TYPE: **Pail**



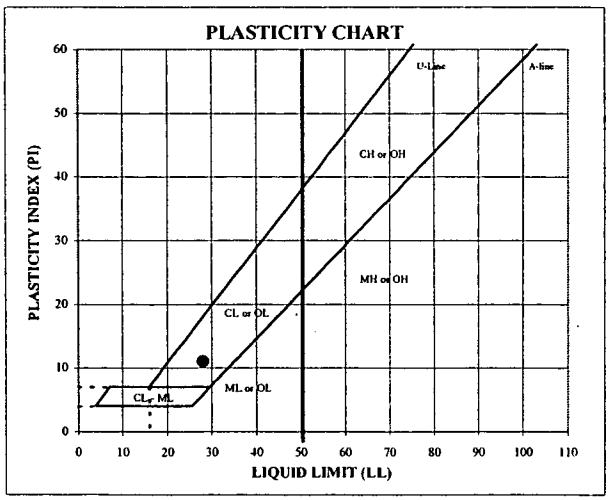
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.05
0.75"	19.0	99.9		
0.375"	9.5	99.6		
#4	4.8	93.8	Fine Gravel	6.15
#10	2.00	76.4	Coarse Sand	17.37
#20	0.85	59.3		
#40	0.43	40.9	Medium Sand	35.54
#60	0.25	30.7		
#100	0.15	25.5		
#200	0.075	19.9	Fine Sand	20.99

Hydrometer Analysis

(mm)	%Finer		
0.035	13.8		
0.022	12.8		
0.013	11.4	Fines	
0.0092	10.9	Silt or Clay	19.89
0.0064	10.0		
0.0031	7.6		
0.0014	7.1		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	28	17	11	--

DESCRIPTION: Brown (7.5 YR 4/4) clayey sand

USCS: SC

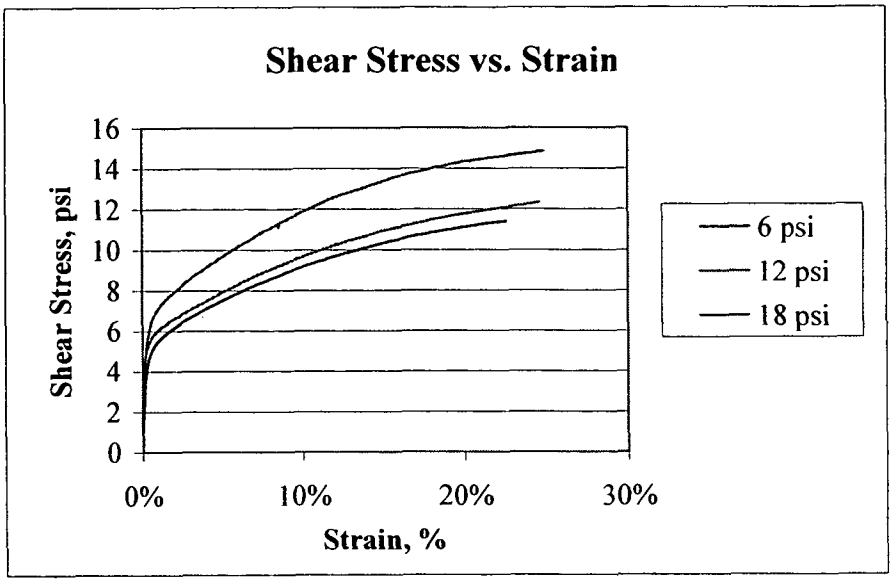
TECH: DT
DATE: 5/10/2005
REVIEW: MB

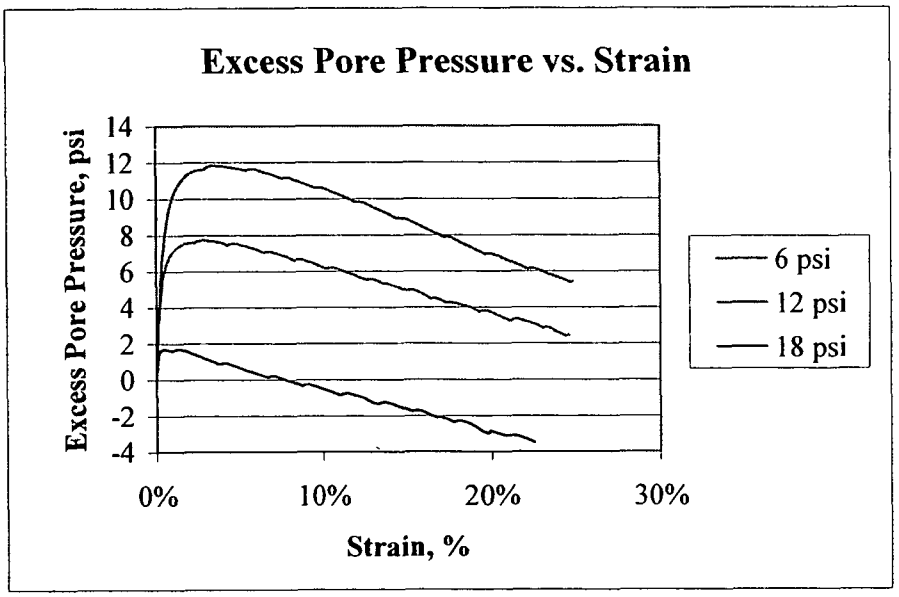
131

Sample # =	PSE 3		Sample # =	PSE 3		Sample # =	PSE 3	
Point # =	1		Point # =	2		Point # =	3	
	Initial			**Initial**			**Initial**	
Length =	14.78	cm	Length =	14.82	cm	Length =	14.71	cm
Diameter =	7.30	cm	Diameter =	7.30	cm	Diameter =	7.30	cm
Wet Weight =	1283.90	g	Wet Weight =	1285.30	g	Wet Weight =	1285.30	g
Area =	41.9	sq.cm	Area =	41.9	sq.cm	Area =	41.9	sq.cm
Sample Area =	6.49	sq. in.	Sample Area =	6.49	sq. in.	Sample Area =	6.49	sq. in.
Volume =	618.6	cc	Volume =	620.3	cc	Volume =	615.7	cc
Moisture Content =	14.8%		Moisture Content =	14.8%		Moisture Content =	14.8%	
Specific Gravity =	na		Specific Gravity =	na		Specific Gravity =	na	
Dry Weight of Solids =	1118.38	g	Dry Weight of Solids =	1119.60	g	Dry Weight of Solids =	1119.60	g
Wet Density =	2.08	g/cc	Wet Density =	2.07	g/cc	Wet Density =	2.09	g/cc
Dry Density =	1.81	g/cc	Dry Density =	1.81	g/cc	Dry Density =	1.82	g/cc
Wet Density =	129.5	pcf	Wet Density =	129.3	pcf	Wet Density =	130.3	pcf
Dry Density =	112.8	pcf	Dry Density =	112.6	pcf	Dry Density =	113.5	pcf
Cell Pressure =	100	psi	Cell Pressure =	100	psi	Cell Pressure =	100	psi
Back Pressure =	94	psi	Back Pressure =	88	psi	Back Pressure =	82	psi
Confining Pressure =	6	psi	Confining Pressure =	12	psi	Confining Pressure =	18	psi

Notes:
1. Sample was remolded to approximately 95% of the maximum dry density and +2% relative to OMC (based on standard Proctor).
2. Sample consisted of brown clayey sand.
3. Failure was defined as the maximum deviator stress.

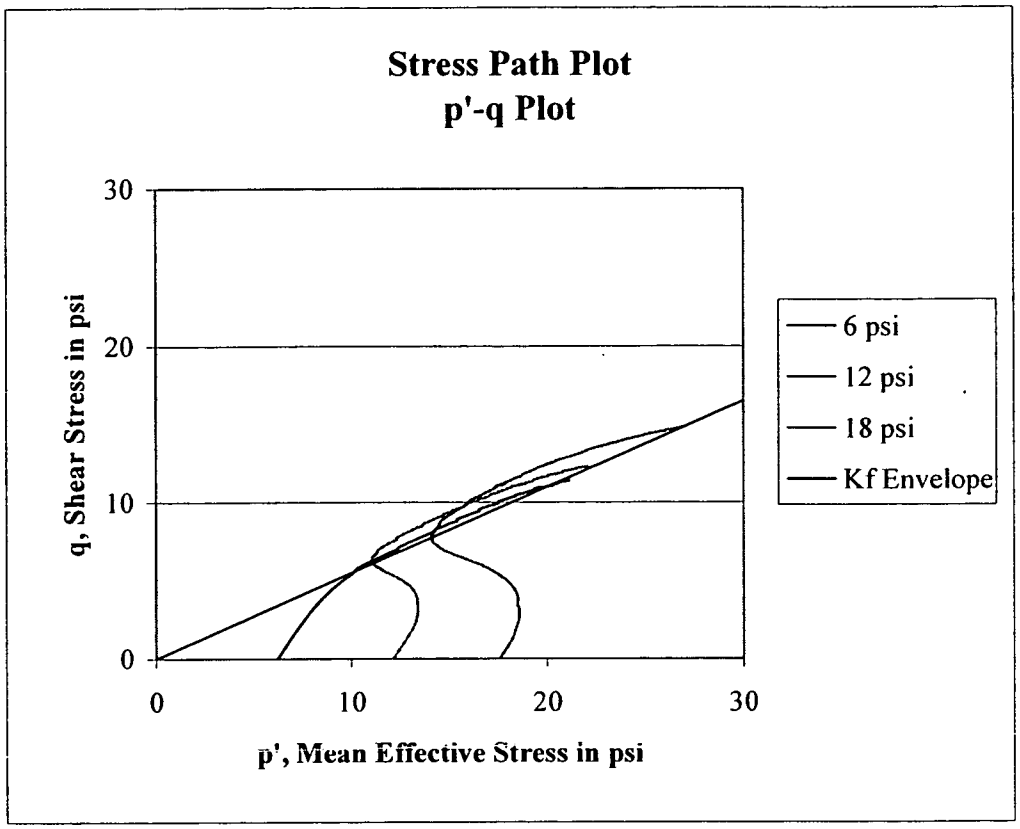
Golder Associates, Inc. **Denver, Colorado**	**Title:** **TRIAXIAL SHEAR TEST REPORT** **SAMPLE DATA AND CALCULATIONS**				
Job Short Title: Kaiser Hill/Rocky Flats Field and Lab					
Sample No. **PSE 3**	**Reviewed:** JEO	**Date:** 07/06/05	**Job Number:** 053-2203-0001	**Figure:** 1	





Golder Associates, Inc. Denver, Colorado	Title: CU TRIAXIAL SHEAR DATA STRESS AND Δ PORE PRESSURE PLOTS			
Job Short Title: Kaiser Hill/Rocky Flats Field and Lab				
Sample No. PSE 3	Reviewed: JEO	Date: 07/06/05	Job Number: 053-2203-0001	Figure: 2

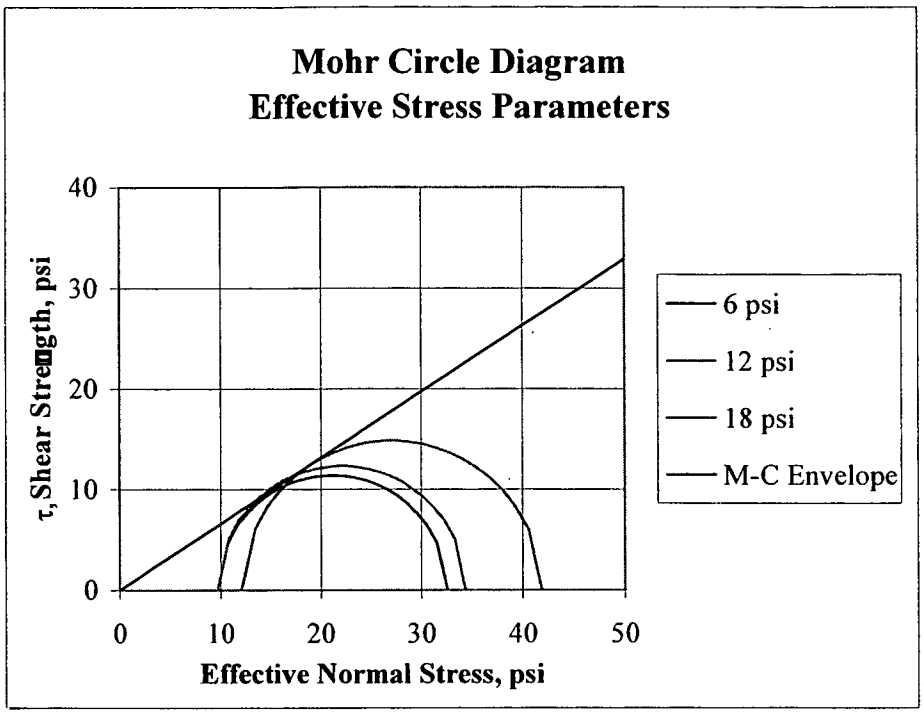
132



Stress Path Parameters

ψ' = 28.8 degrees
a' = 0.0 psi

Golder Associates, Inc. Denver, Colorado	Title: CU TRIAXIAL SHEAR DATA STRESS PATH PLOT			
Job Short Title: Kaiser Hill/Rocky Flats Field and Lab				
Sample No. PSE 3	Reviewed: JEO	Date: 07/06/05	Job Number: 053-2203-0001	Figure: 3



Mohr-Coulomb Parameters

$\phi' =$ 33.4 degrees
$c' =$ 0.0 psi

Golder Associates, Inc. **Denver, Colorado**	**Title:** **CU TRIAXIAL SHEAR DATA** **MOHR CIRCLE DIAGRAM**			
Job Short Title: **Kaiser Hill/Rocky Flats Field and Lab**				
Sample No. **PSE 3**	Reviewed: **JEO**	Date: **07/06/05**	Job Number: **053-2203-0001**	Figure: **4**

133.

Consolidated Undrained Triaxial Lab Data
From: GOLDER ASSOCIATES INC.

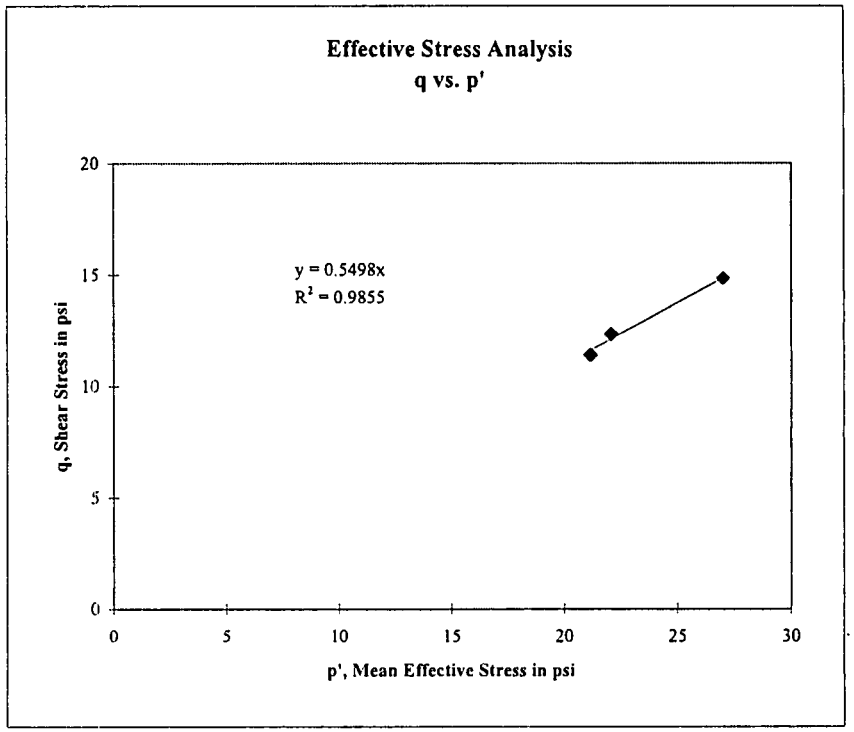
Project: **Kaiser Hill/Rocky Flats Field and Lab**
Project Number: **053-2203-0001**

Sample Number	PSE-3
Depth	
Effective Stress Analysis	

Point Number	p' (psi)	q (psi)
1	21.1	11.4
2	22.0	12.3
3	27.0	14.9

tan(ψ') = 0.5498
a' = 0

ϕ' = 33.4 degrees
c' = 0.0 psi



134

Consolidated Undrained Triaxial Lab Data
From: GOLDER ASSOCIATES INC.

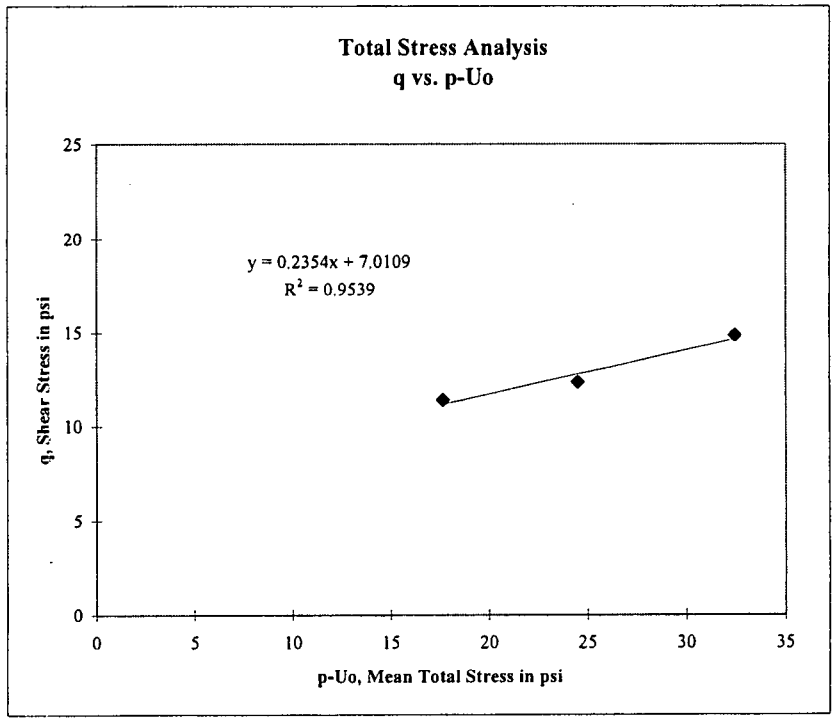
Project: **Kaiser Hill/Rocky Flats Field and Lab**
Project Number: **053-2203-0001**

Sample Number	PSE 3
Depth	
Total Stress Analysis	

Point Number	p-Uo (psi)	q (psi)
1	17.6	11.4
2	24.5	12.3
3	32.4	14.9

tan(ψ) = 0.2354
a = 7.0109

ϕ = 13.6 degrees
c = 7.2 psi



Consolidated Undrained Triaxial Lab Data
From: GOLDER ASSOCIATES INC.
Project: **Kaiser Hill/Rocky Flats Field and Lab**
Project Number: 053-2203-0001
Explanation of Terminology

Mohr-Coulomb Failure Criteria:

$$\tau_{ff} = c' + \sigma_{ff}' \tan \phi'$$
$$\tau_{ff} = c + \sigma_{ff} \tan \phi$$

Where:
c', c = effective and total cohesive intercept
ϕ', ϕ = effective and total friction angle
τ^{ff} = Shear Strength on the failure surface at failure
σ'^{ff}, σ^{ff} = effective and total normal stress on the failure surface at failure

Stress Path Space:

$$q = \frac{\sigma_1 - \sigma_3}{2} \qquad p' = \frac{\sigma_1' + \sigma_3'}{2} \qquad p = \frac{\sigma_1 + \sigma_3}{2}$$

Where:
q = shear stress
p', p = mean effective and total stress
σ'^1, σ^1 = Effective and Total Axial Stress
σ'^3, σ^3 = Effective and Total Confining Stress

$$q = a + p' \tan \psi$$
$$q = a + (p - u_0) \tan \psi$$

Where:
a', a = intercept of the q-axis in effective stress of total stress space
ψ', ψ = angle of the failure line in effective stress of total stress space
p' = mean effective stress
p-Uo = mean total minus the initial pore pressure

with the relationship between ψ and ϕ and a and c are as follows:

$$\tan(\psi) = \sin(\phi)$$

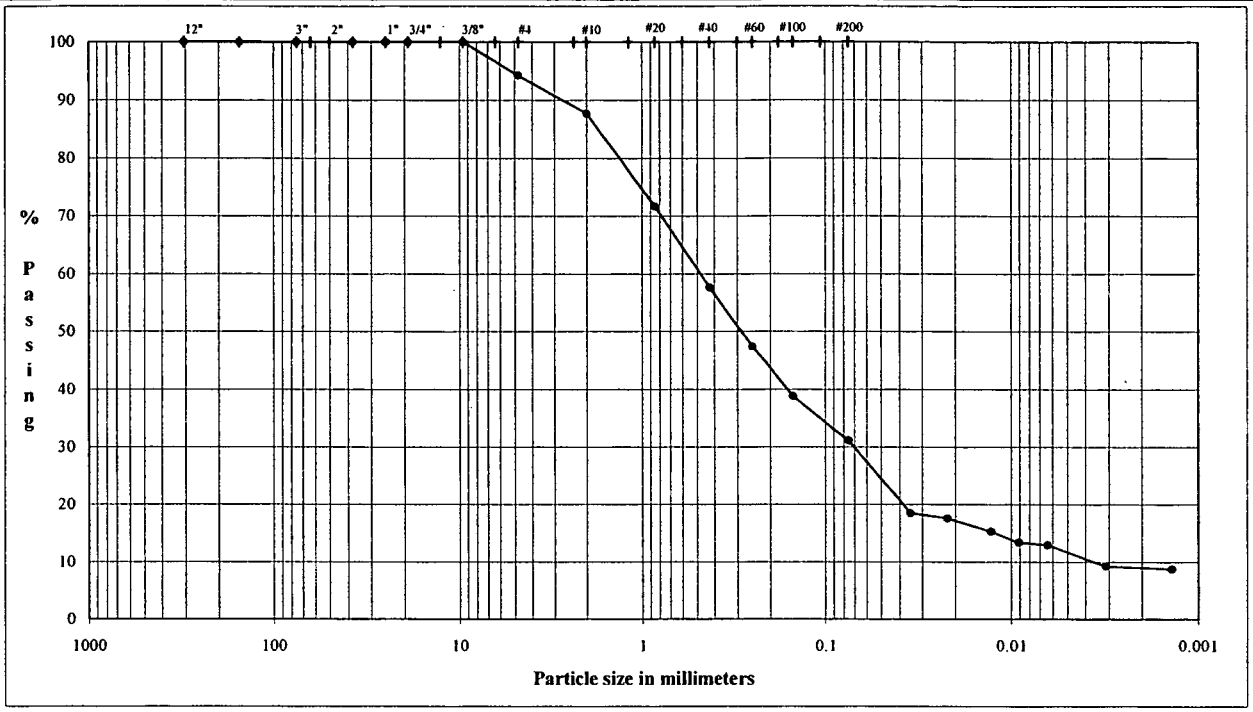
$$a = c * \cos(\phi)$$

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSE-4** Depth (ft): -
TYPE: **Pail**



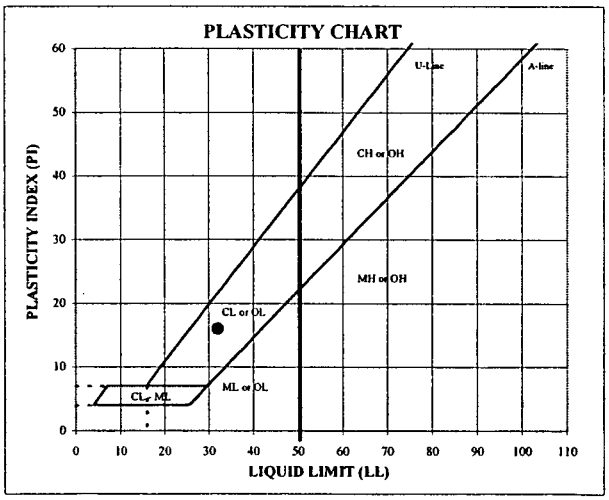
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	100.0		
#4	4.8	94.3	Fine Gravel	5.74
#10	2.00	87.7	Coarse Sand	6.56
#20	0.85	71.7		
#40	0.43	57.7	Medium Sand	30.03
#60	0.25	47.4		
#100	0.15	38.8		
#200	0.075	31.0	Fine Sand	26.67

Hydrometer Analysis

(mm)	%Finer		
0.035	18.4		
0.022	17.5		
0.013	15.2	Fines	
0.0091	13.4	Silt or Clay	31.01
0.0064	12.9		
0.0031	9.2		
0.0014	8.8		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	32	16	16	--

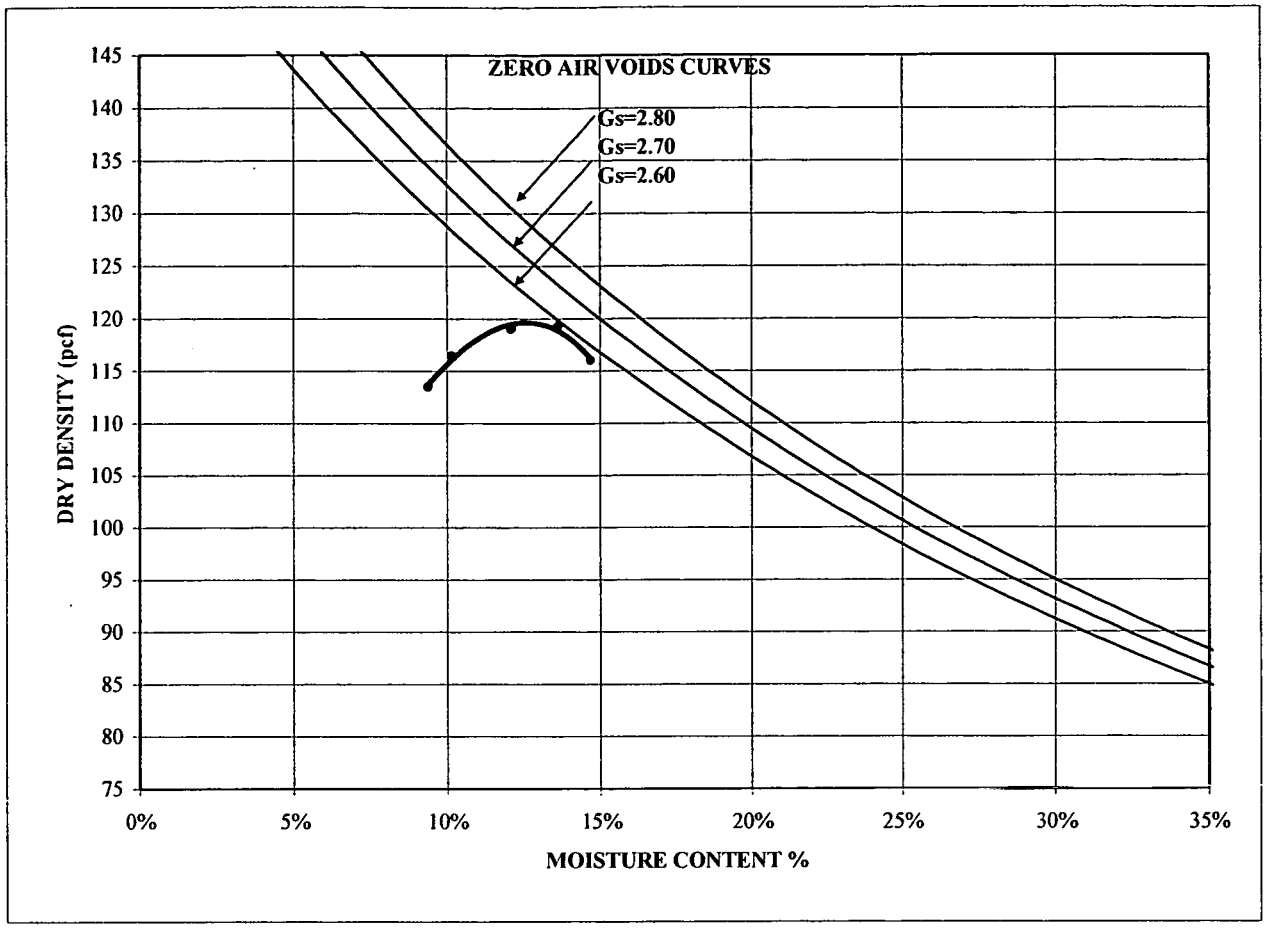
DESCRIPTION: Brown (7.5 YR 4/4) clayey sand

USCS: SC

TECH: DT
DATE: 5/23/2005
REVIEW: MB

135

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	119.2	Corrected Maximum Dry Density (pcf)	121.1
OPTIMUM MOISTURE (%)	12.5	Corrected Optimum Moisture (%)	11.8

SAMPLE ID	PSE-4
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	32
PL	16
PI	16
MC	--

DESCRIPTION	Brown (7.5 YR 4/4) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

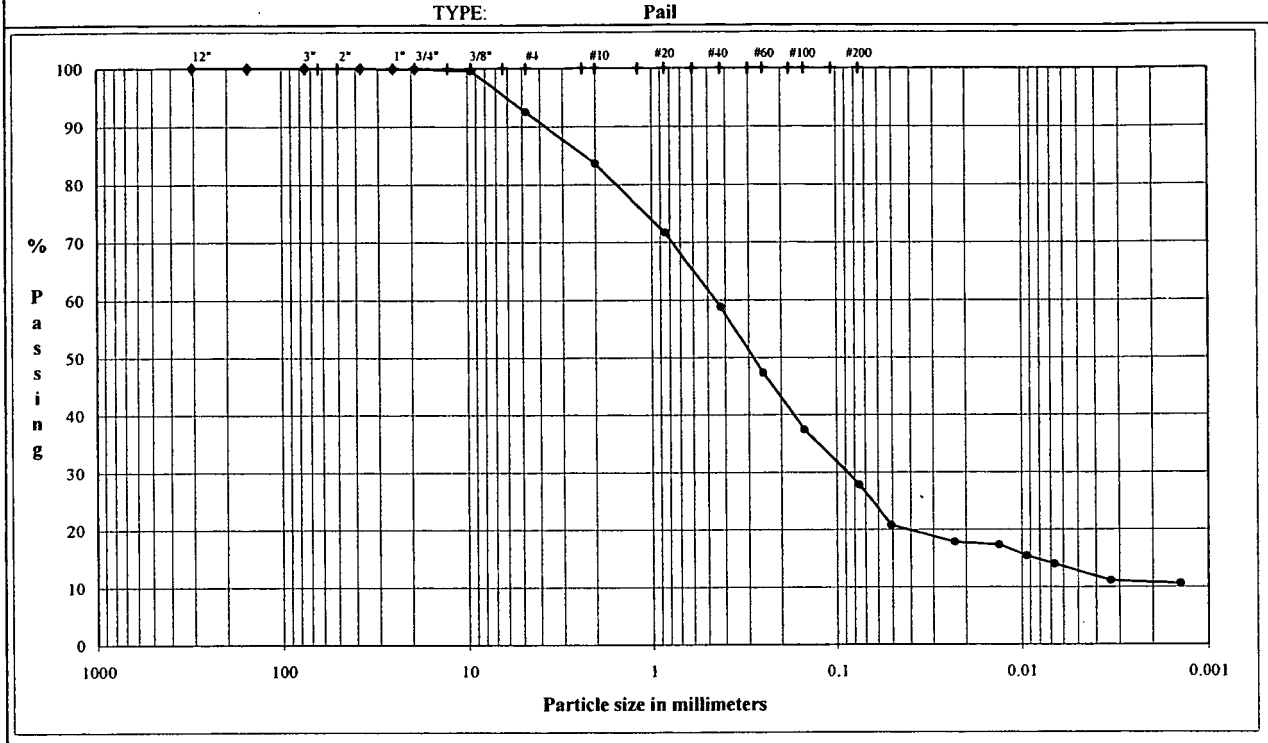
TECH	DT
DATE	5-23-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSW-1** Depth (ft): -
TYPE: **Pail**



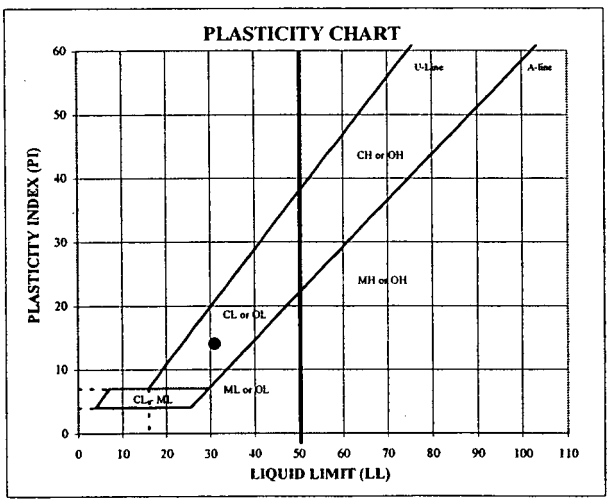
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	99.9	Coarse Gravel	0.13
0.75"	19.0	99.9		
0.375"	9.5	99.6		
#4	4.8	92.5	Fine Gravel	7.36
#10	2.00	83.6	Coarse Sand	8.90
#20	0.85	71.7		
#40	0.43	58.8	Medium Sand	24.84
#60	0.25	47.3		
#100	0.15	37.4		
#200	0.075	27.8	Fine Sand	30.97

Hydrometer Analysis

(mm)	%Finer		
0.051	20.7		
0.023	17.8		
0.013	17.3	Fines	
0.0094	15.4	Silt or Clay	27.80
0.0067	14.0		
0.0033	11.1		
0.0014	10.6		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	31	17	14	--

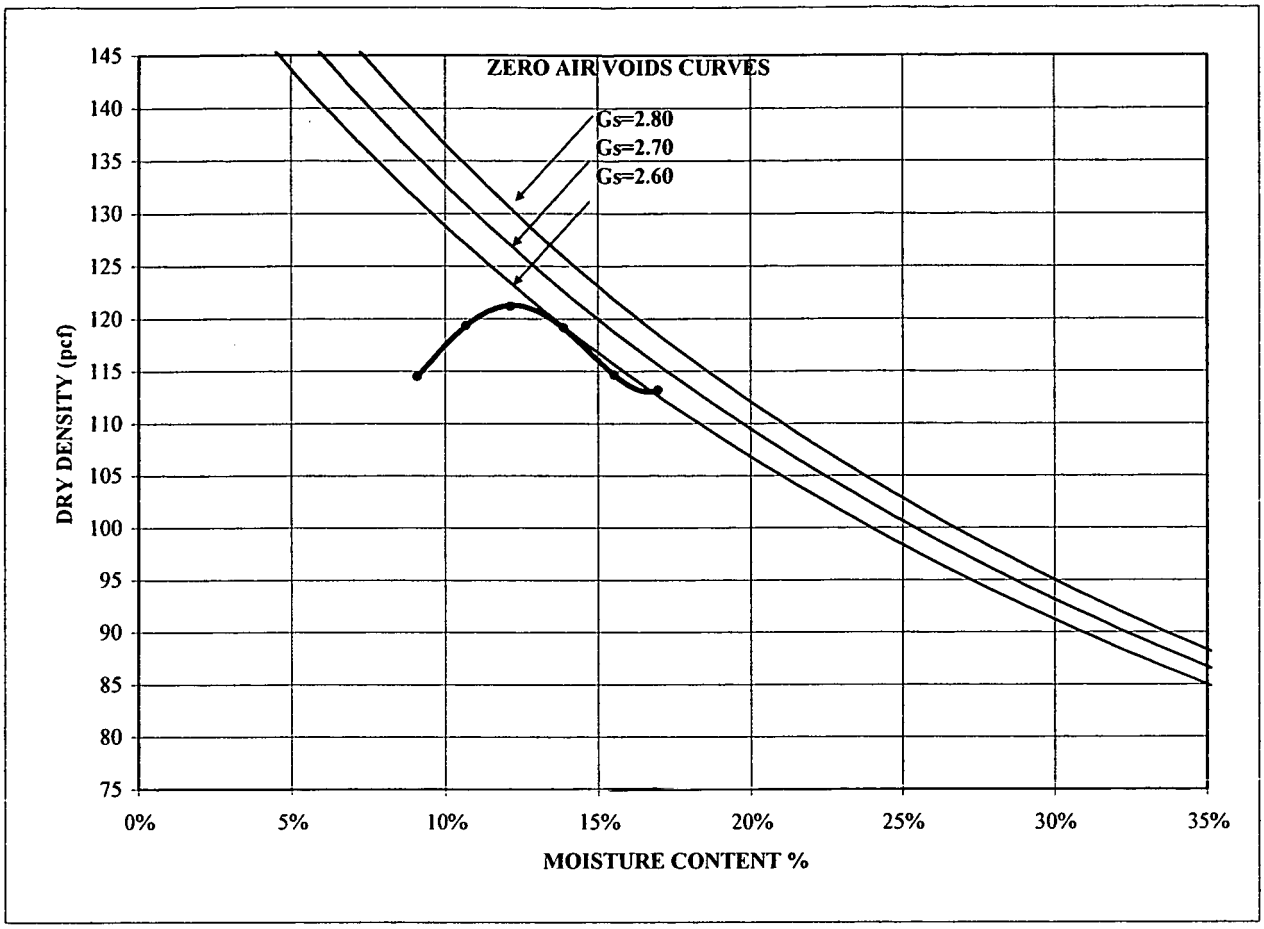
DESCRIPTION: Moderate yellowish brown clayey sand

USCS: SC

TECH: DT
DATE: 5/10/2005
REVIEW: MB

136

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	121.2	Corrected Maximum Dry Density (pcf)	123.2
OPTIMUM MOISTURE (%)	12.1	Corrected Optimum Moisture (%)	11.5

SAMPLE ID	PSW-1
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	31
PL	17
PI	14
MC	0.00%

DESCRIPTION	Moderate yellowish brown clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

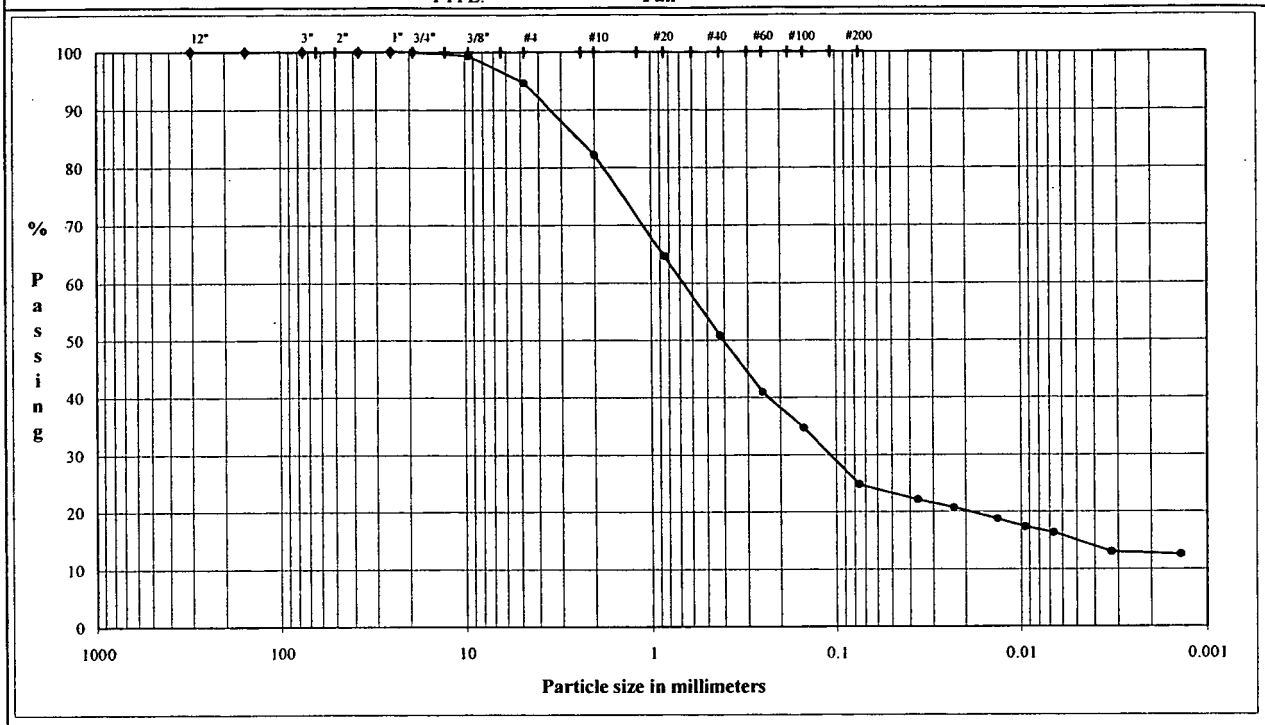
TECH	MKS
DATE	5-11-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSW-2** Depth (ft): -
TYPE: **Pail**



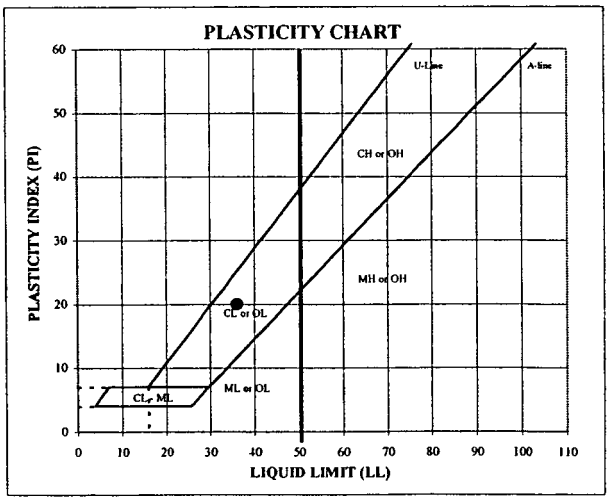
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	99.4		
#4	4.8	94.7	Fine Gravel	5.29
#10	2.00	82.2	Coarse Sand	12.53
#20	0.85	64.7		
#40	0.43	50.9	Medium Sand	31.32
#60	0.25	40.9		
#100	0.15	34.6		
#200	0.075	24.8	Fine Sand	26.11

Hydrometer Analysis

(mm)	%Finer		
0.036	22.1		
0.023	20.7		
0.013	18.8	Fines	
0.0094	17.3	Silt or Clay	24.75
0.0066	16.3		
0.0032	13.0		
0.0014	12.5		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	36	16	20	--

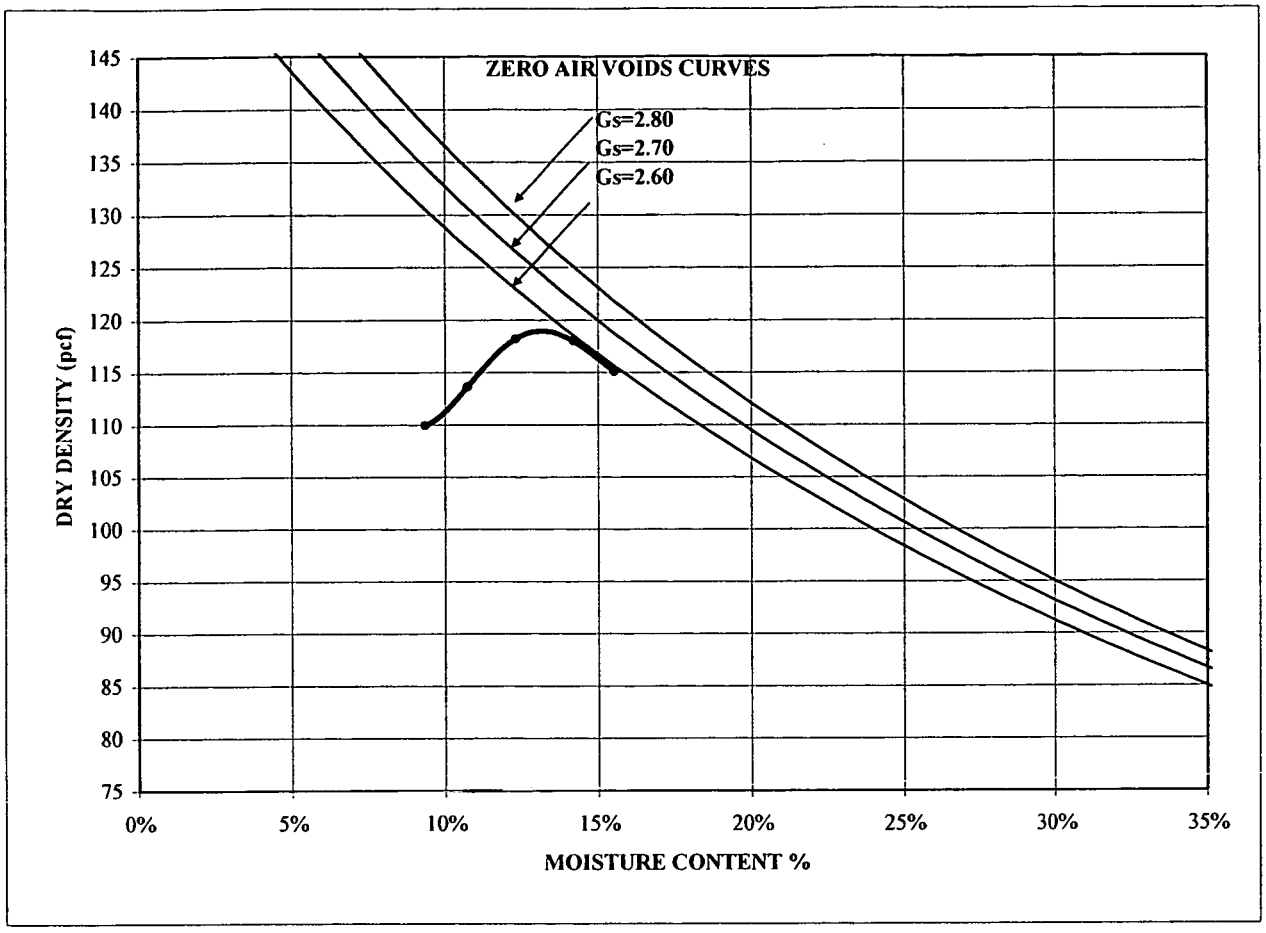
DESCRIPTION: Moderate brown clayey sand

USCS: SC

TECH	DS
DATE	5/12/2005
REVIEW	MB

137

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	118.9	Corrected Maximum Dry Density (pcf)	120.4
OPTIMUM MOISTURE (%)	13.2	Corrected Optimum Moisture (%)	12.7

SAMPLE ID	PSW-2
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	36
PL	16
PI	20
MC	0.0

DESCRIPTION	Moderate brown clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

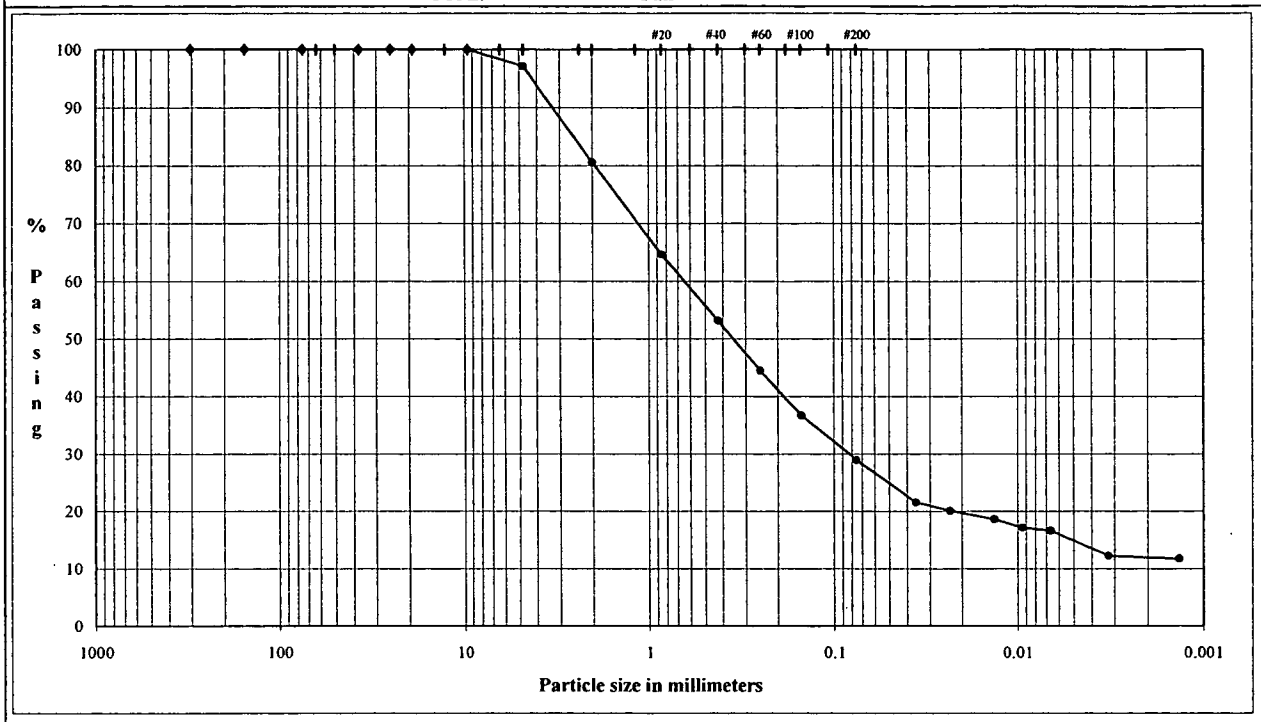
TECH	MKS
DATE	5-12-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSW-3** Depth (ft): -
TYPE: **Pail**



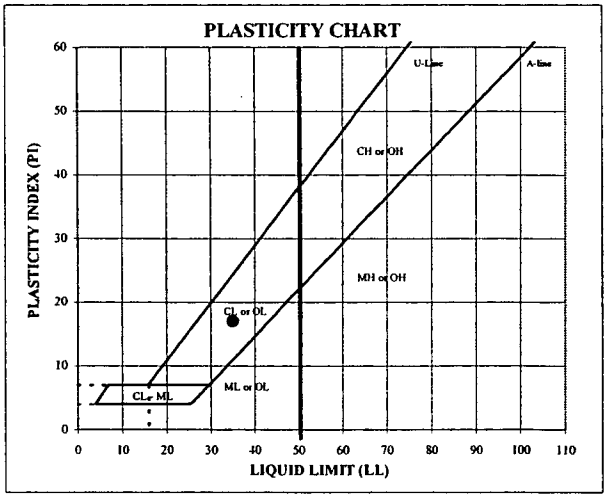
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	100.0		
#4	4.8	97.1	Fine Gravel	2.87
#10	2.00	80.5	Coarse Sand	16.61
#20	0.85	64.6		
#40	0.43	53.1	Medium Sand	27.37
#60	0.25	44.5		
#100	0.15	36.6		
#200	0.075	28.9	Fine Sand	24.25

Hydrometer Analysis

(mm)	%Finer		
0.036	21.5		
0.023	20.0		
0.013	18.6	Fines	
0.0094	17.1	Silt or Clay	28.90
0.0066	16.6		
0.0032	12.2		
0.0014	11.7		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	35	18	17	--

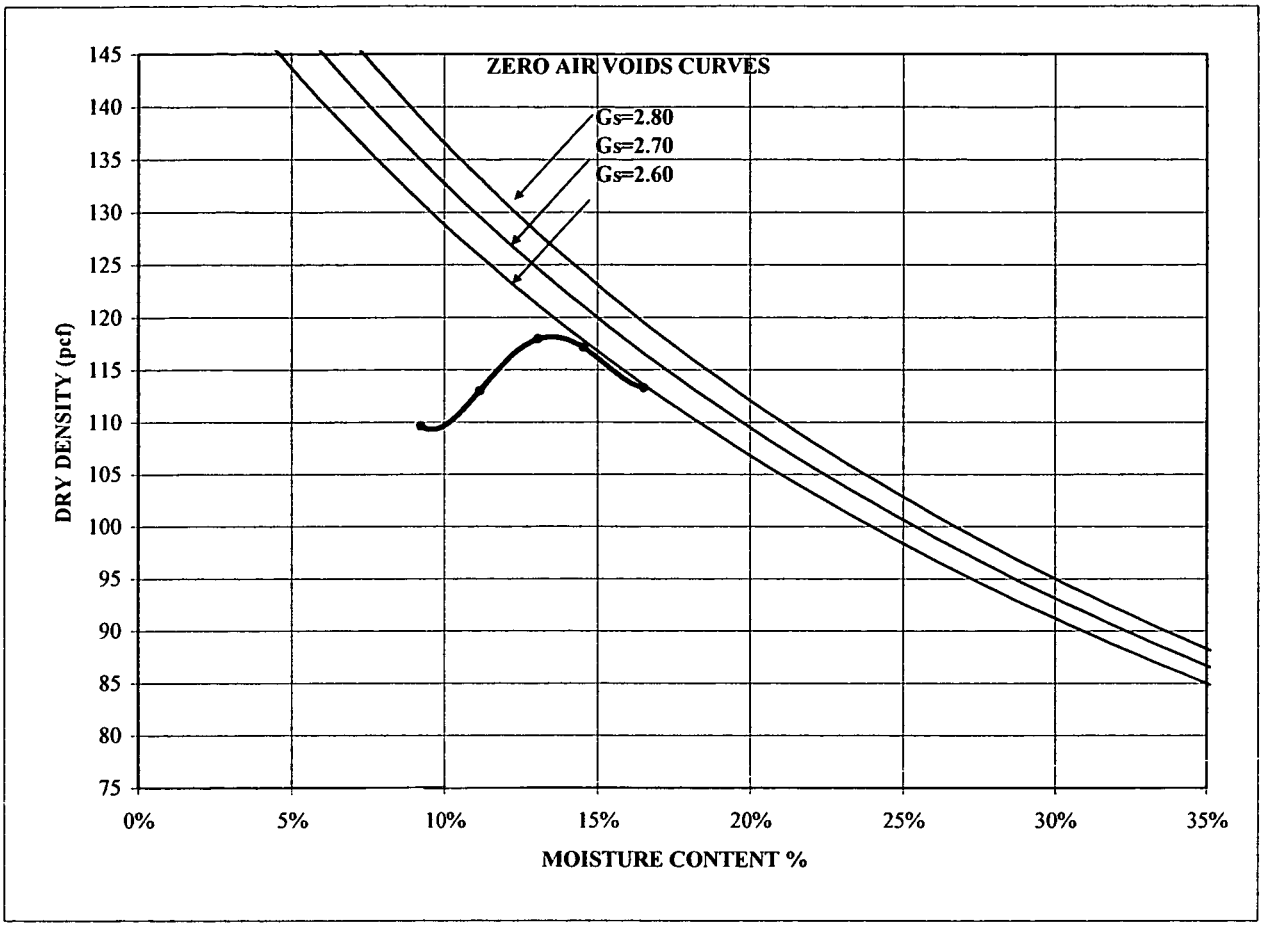
DESCRIPTION: Yellowish brown (10 YR 5/4) clayey sand

USCS: SC

TECH	DT
DATE	5/10/2005
REVIEW	MB

138

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	118.1	
OPTIMUM MOISTURE (%)	13.4	NO CORRECTION REQUIRED

SAMPLE ID	PSW-3
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	35
PL	18
PI	17
MC	--

DESCRIPTION	Yellowish brown (10 YR 5/4) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

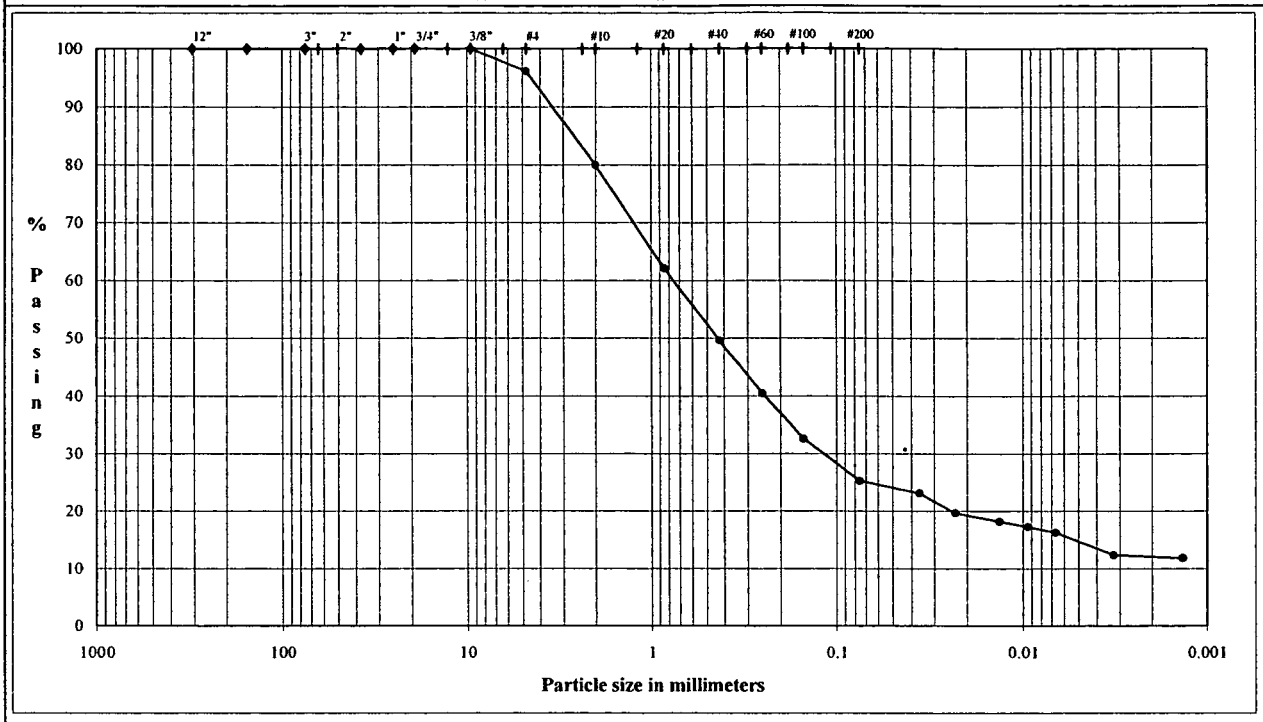
TECH	MKS
DATE	5-25-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **PSW-4** Depth (ft): -
TYPE: **Pail**



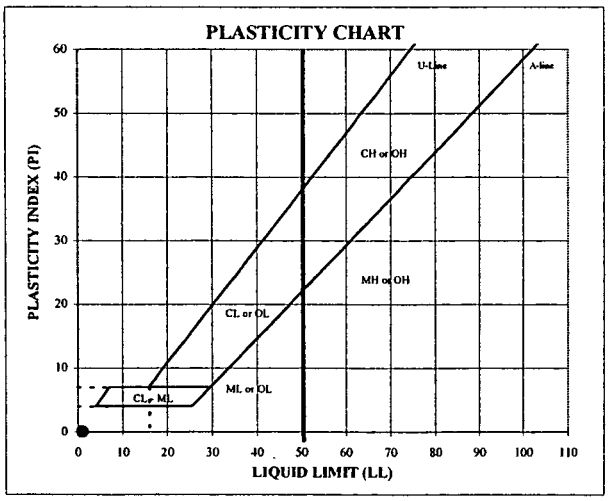
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	99.9		
#4	4.8	96.1	Fine Gravel	3.86
#10	2.00	80.0	Coarse Sand	16.19
#20	0.85	62.1		
#40	0.43	49.6	Medium Sand	30.36
#60	0.25	40.4		
#100	0.15	32.5		
#200	0.075	25.2	Fine Sand	24.35

Hydrometer Analysis

(mm)	%Finer		
0.036	23.1		
0.023	19.6		
0.013	18.2	Fines	
0.0094	17.2	Silt or Clay	25.24
0.0066	16.2		
0.0032	12.3		
0.0014	11.8		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	--	--	--	--

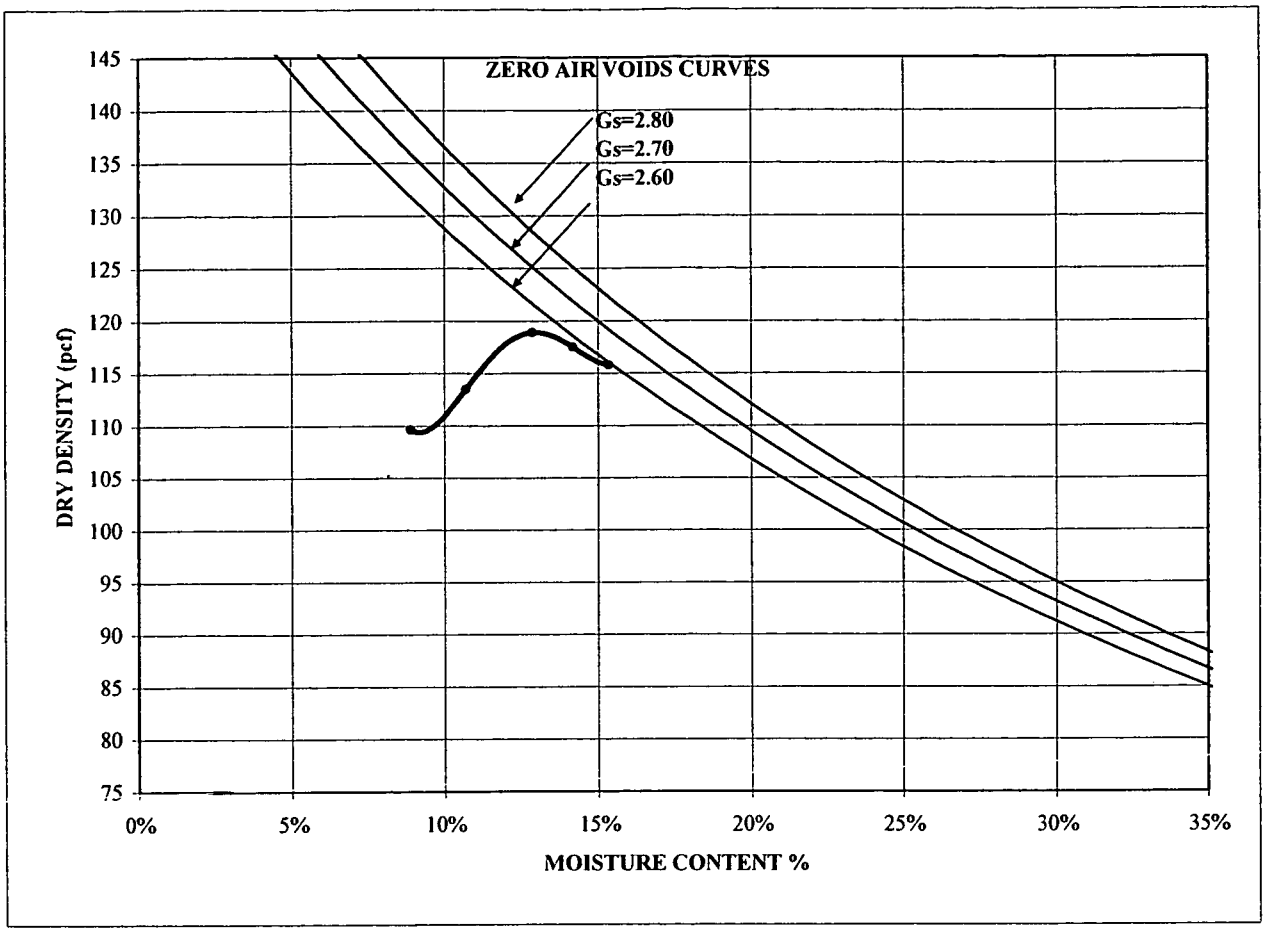
DESCRIPTION: Yellowish brown (10 YR 5/4) clayey sand

USCS: SC

TECH	DS
DATE	5/24/2005
REVIEW	MB

139

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	118.9	
OPTIMUM MOISTURE (%)	12.9	NO CORRECTION REQUIRED

SAMPLE ID	PSW-4
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	--
PL	--
PI	--
MC	--

DESCRIPTION	Yellowish brown (10 YR 5/4) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

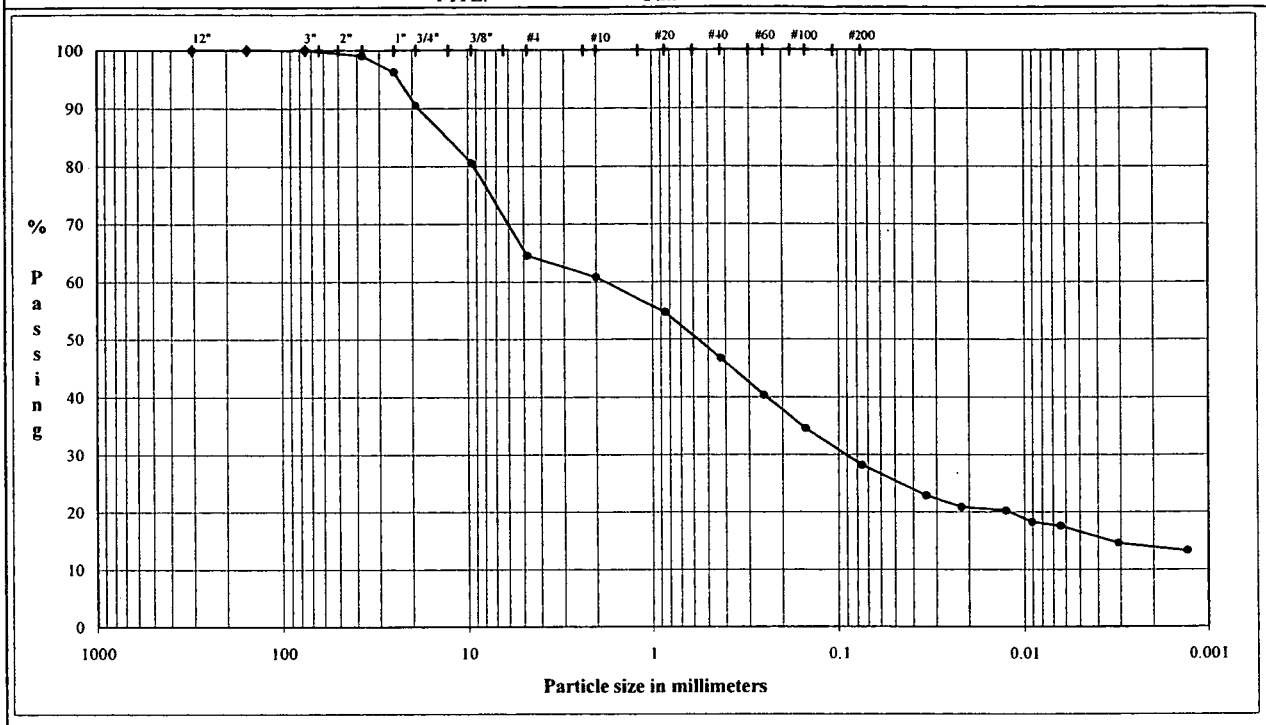
TECH	MKS
DATE	5-26-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **CERB-1** Depth (ft): -
TYPE: **Pail**



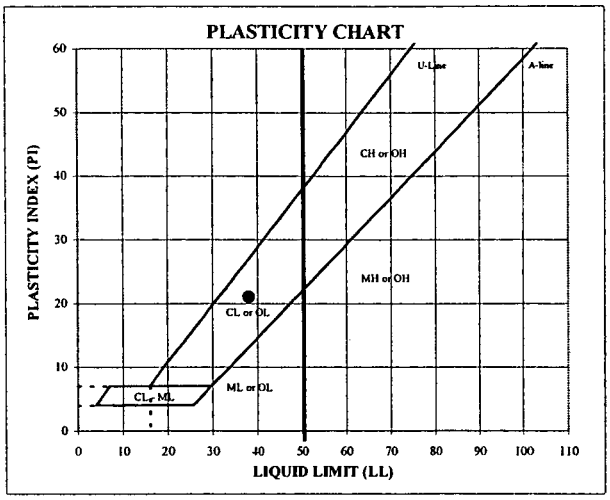
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	99.1		
1.0"	25.0	96.3	Coarse Gravel	9.54
0.75"	19.0	90.5		
0.375"	9.5	80.6		
#4	4.8	64.5	Fine Gravel	25.93
#10	2.00	60.8	Coarse Sand	3.70
#20	0.85	54.7		
#40	0.43	46.7	Medium Sand	14.10
#60	0.25	40.3		
#100	0.15	34.5		
#200	0.075	28.1	Fine Sand	18.61

Hydrometer Analysis

(mm)	%Finer		
0.034	22.8		
0.022	20.8		
0.013	20.2	Fines	
0.0090	18.2	Silt or Clay	28.11
0.0064	17.5		
0.0031	14.6		
0.0013	13.2		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
–	38	17	21	2.70

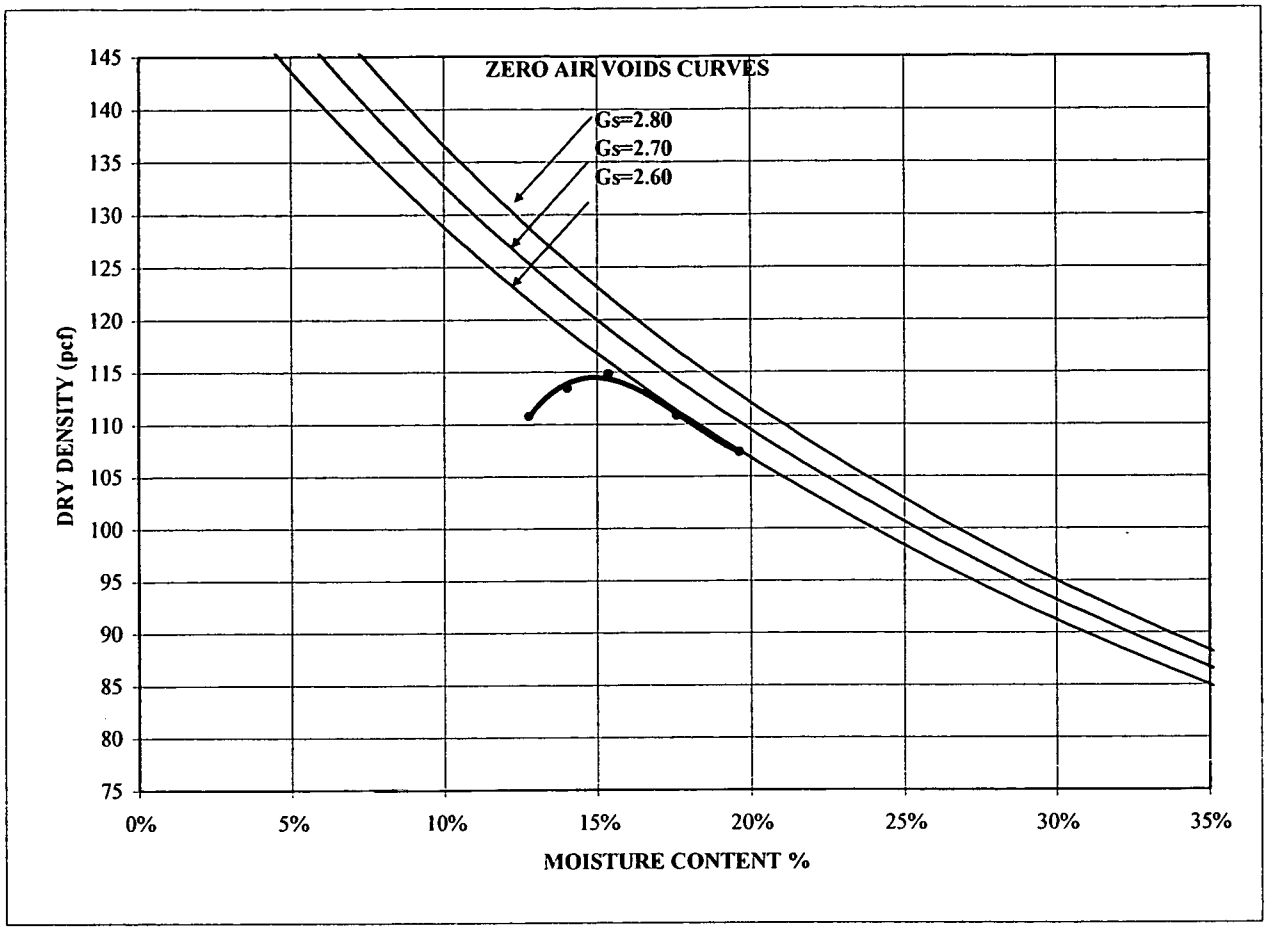
DESCRIPTION: Reddish yellow clayey sand with gravel

USCS: SC

TECH: DS
DATE: 5/12/2005
REVIEW: MB

140

MOISTURE / DRY DENSITY CURVE
D 698 METHOD B



MAXIMUM DRY DENSITY (pcf)	114.8	Corrected Maximum Dry Density (pcf)	121.6
OPTIMUM MOISTURE (%)	15.4	Corrected Optimum Moisture (%)	12.8

SAMPLE ID	CERB-1
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	38
PL	17
PI	21
MC	--

DESCRIPTION	Reddish yellow clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

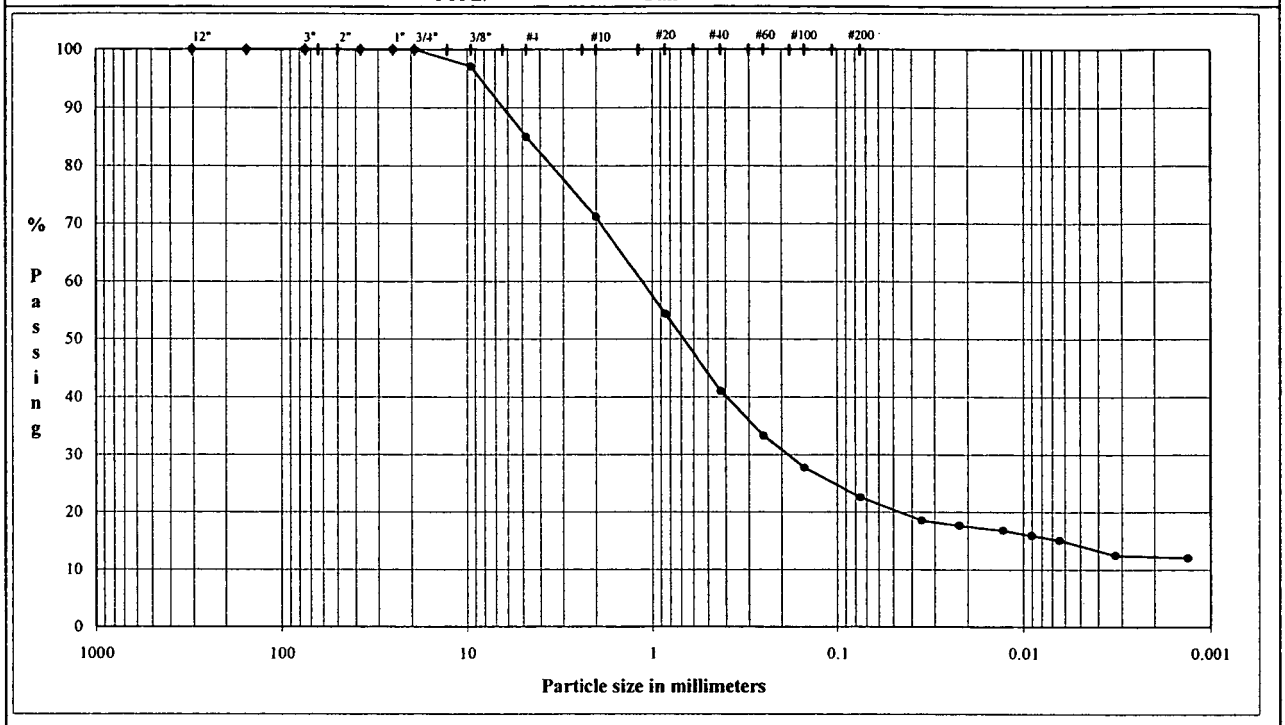
TECH	MKS
DATE	6-9-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-1** Depth (ft): -
TYPE: **Pail**



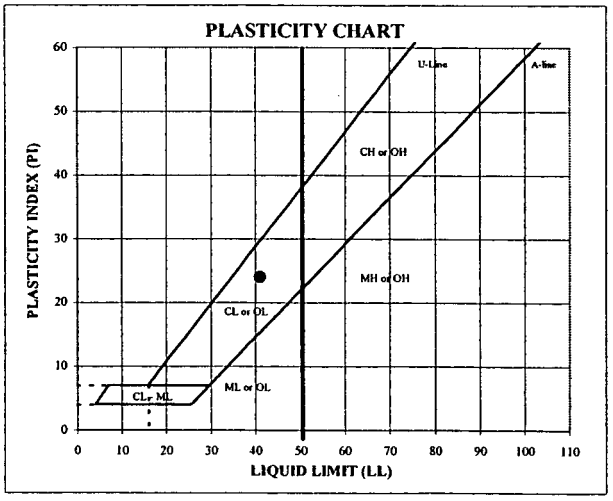
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.1		
#4	4.8	85.0	Fine Gravel	15.03
#10	2.00	71.2	Coarse Sand	13.80
#20	0.85	54.4		
#40	0.43	41.0	Medium Sand	30.18
#60	0.25	33.2		
#100	0.15	27.7		
#200	0.075	22.5	Fine Sand	18.48

Hydrometer Analysis

(mm)	%Finer		
0.035	18.5		
0.022	17.6		
0.013	16.8	Fines	
0.0090	15.9	Silt or Clay	22.51
0.0064	15.1		
0.0032	12.5		
0.0013	12.0		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	41	17	24	--

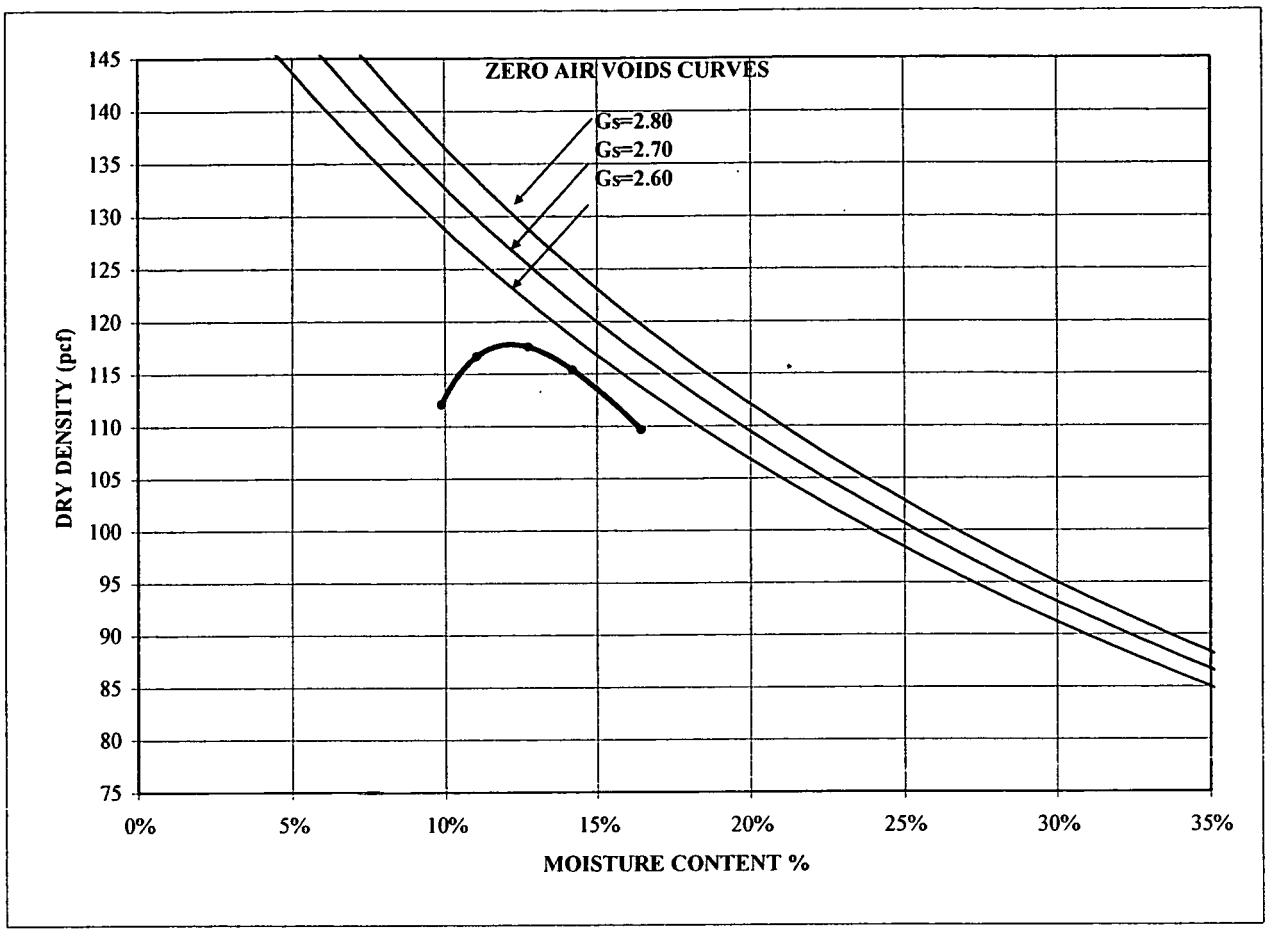
DESCRIPTION: Moderate yellowish brown clayey sand with gravel

USCS: SC

TECH DS
DATE 5/19/2005
REVIEW MB

141

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	117.8	Corrected Maximum Dry Density (pcf)	122.7
OPTIMUM MOISTURE (%)	12.5	Corrected Optimum Moisture (%)	10.9

SAMPLE ID	LPF-1
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	41
PL	17
PI	24
MC	--

DESCRIPTION	Moderate yellowish brown clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

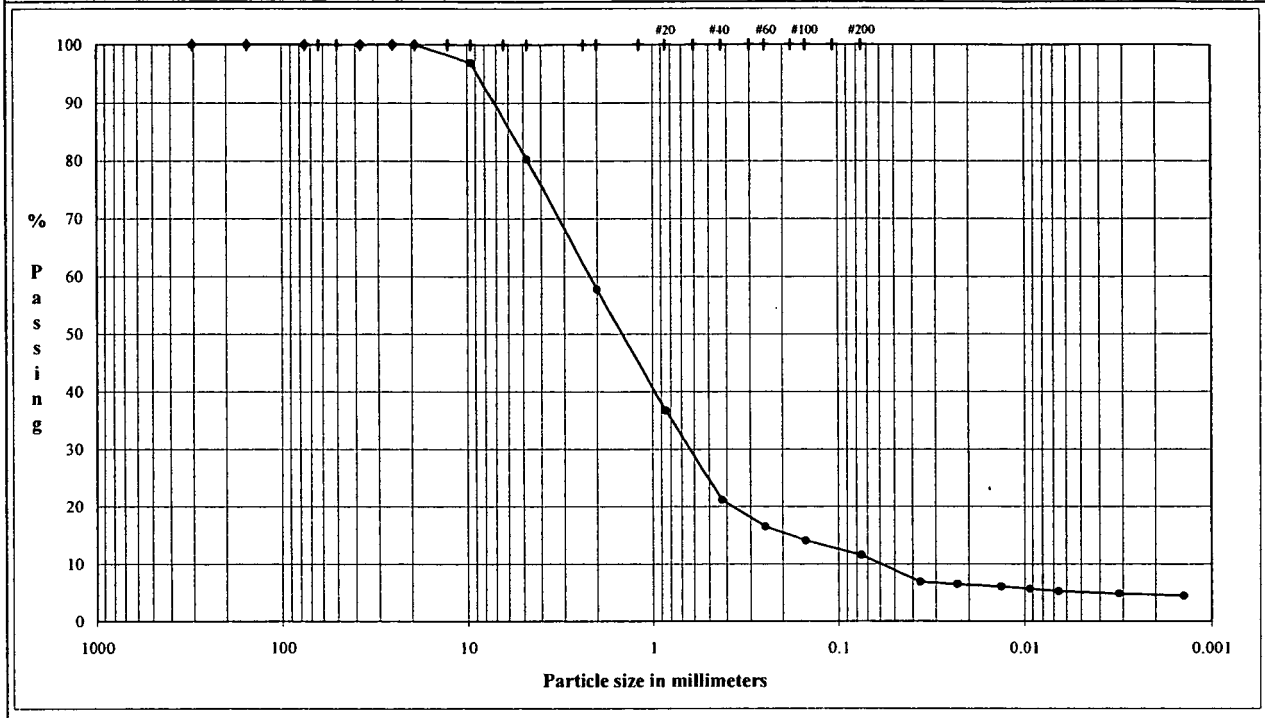
TECH	DT/DS
DATE	5-20-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-2** Depth (ft): -
TYPE: **Pail**



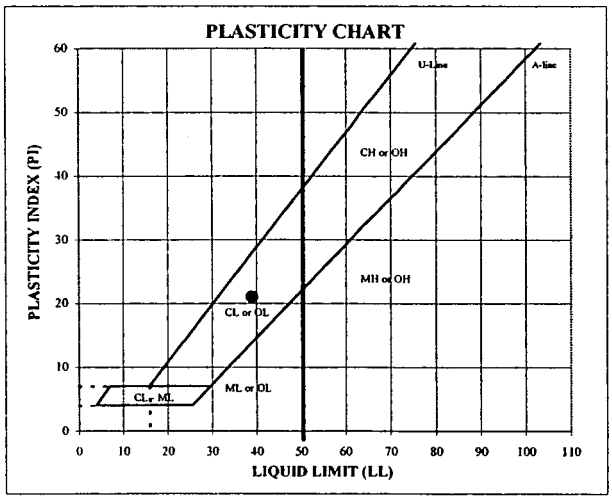
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	96.9		
#4	4.8	80.2	Fine Gravel	19.76
#10	2.00	57.7	Coarse Sand	22.51
#20	0.85	36.7		
#40	0.43	21.1	Medium Sand	36.62
#60	0.25	16.5		
#100	0.15	14.0		
#200	0.075	11.5	Fine Sand	9.61

Hydrometer Analysis

(mm)	%Finer		
0.036	6.9		
0.023	6.4		
0.013	6.0	Fines	
0.0093	5.6	Silt or Clay	11.50
0.0066	5.2		
0.0032	4.8		
0.0014	4.4		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	39	18	21	--

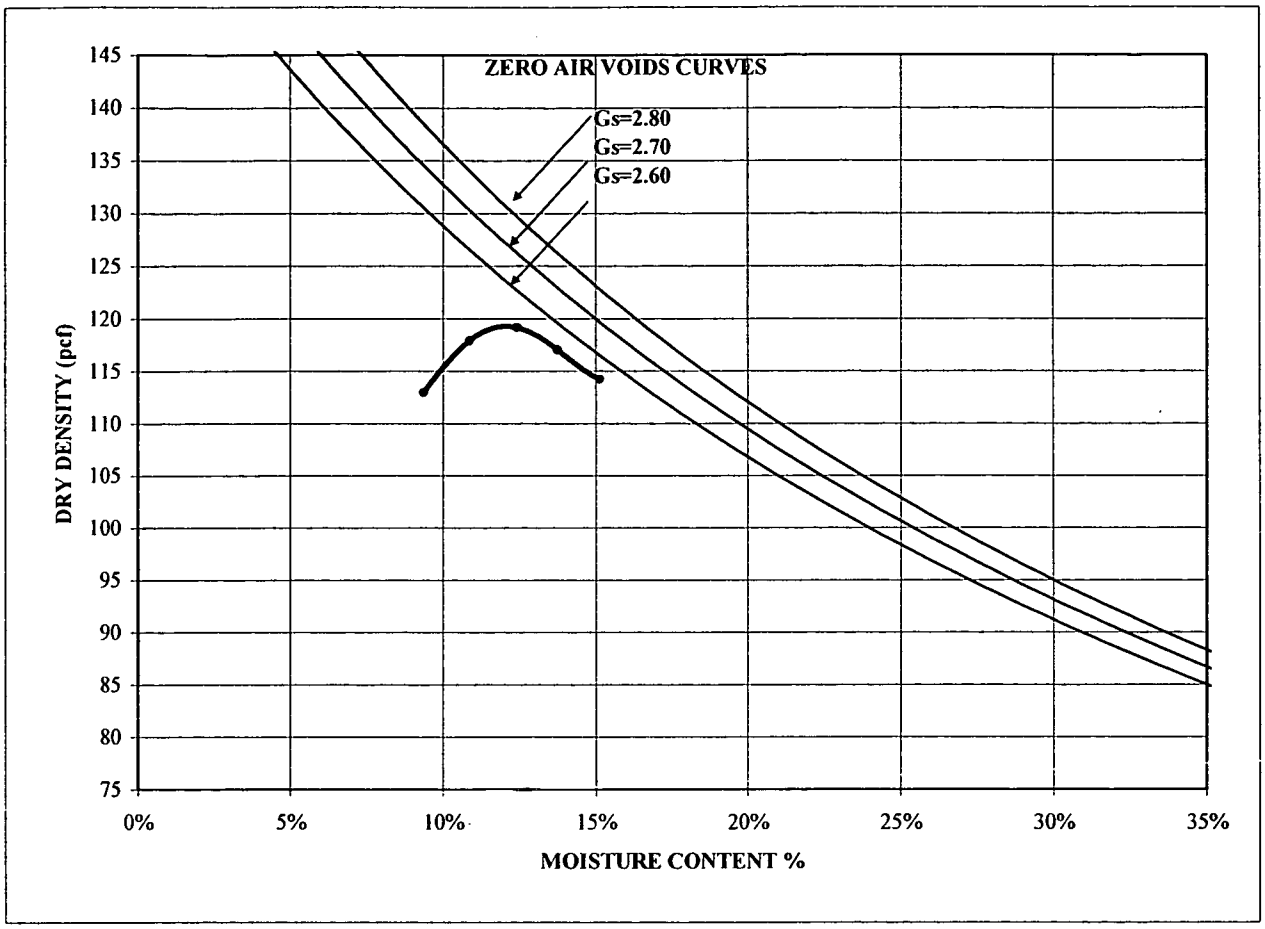
DESCRIPTION: Brown (7.5 YR 5/4) poorly graded sand with clay an

USCS: SP-SC

TECH	DT
DATE	5/23/2005
REVIEW	MB

142

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	119.2	Corrected Maximum Dry Density (pcf)	125.9
OPTIMUM MOISTURE (%)	12.2	Corrected Optimum Moisture (%)	10.0

SAMPLE ID	LPF-2
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	39
PL	18
PI	21
MC	--

DESCRIPTION	Brown (7.5 YR 5/4) poorly graded sand with clay and gravel
USCS	SP-SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

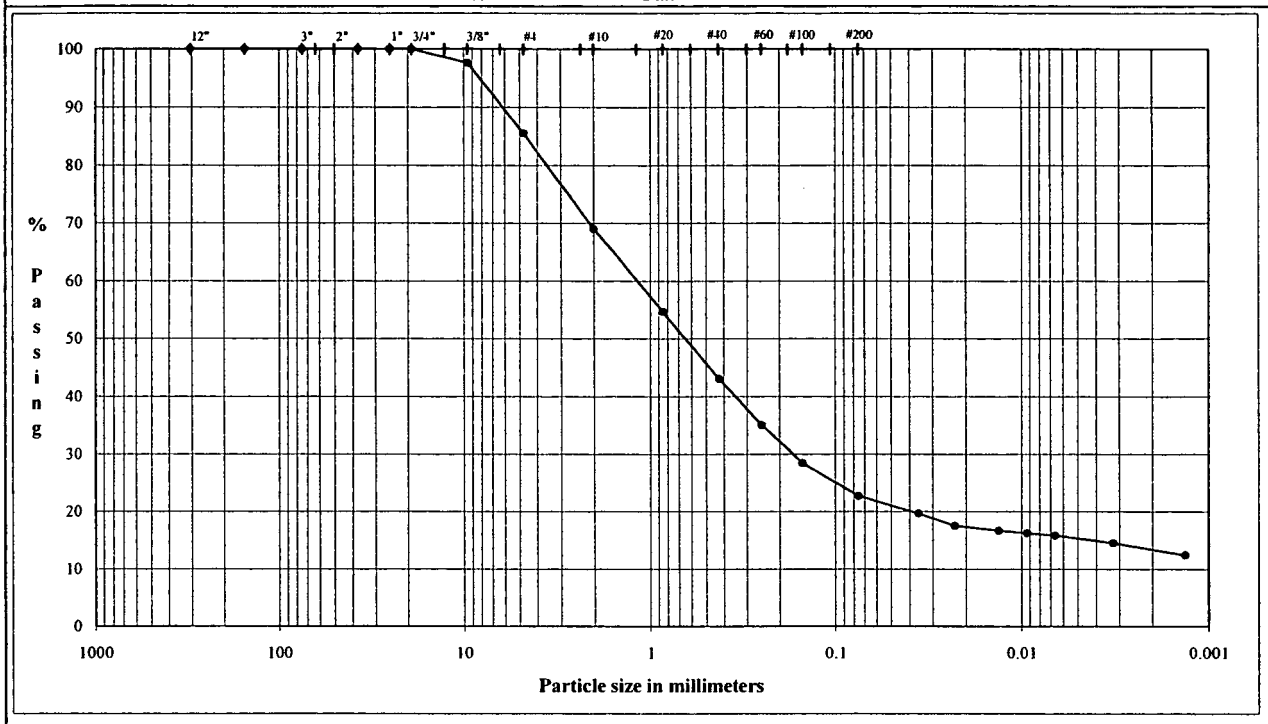
TECH	MKS
DATE	5-25-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-3** Depth (ft): -
TYPE: **Pail**



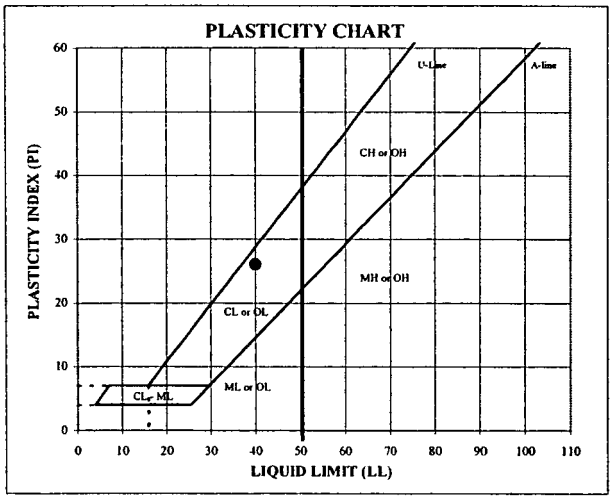
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.6		
#4	4.8	85.5	Fine Gravel	14.51
#10	2.00	69.0	Coarse Sand	16.47
#20	0.85	54.7		
#40	0.43	43.0	Medium Sand	25.99
#60	0.25	35.0		
#100	0.15	28.4		
#200	0.075	22.7	Fine Sand	20.35

Hydrometer Analysis

(mm)	%Finer		
0.036	19.6		
0.023	17.5		
0.013	16.6	Fines	
0.0093	16.2	Silt or Clay	22.67
0.0066	15.8		
0.0032	14.5		
0.0013	12.4		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	40	14	26	--

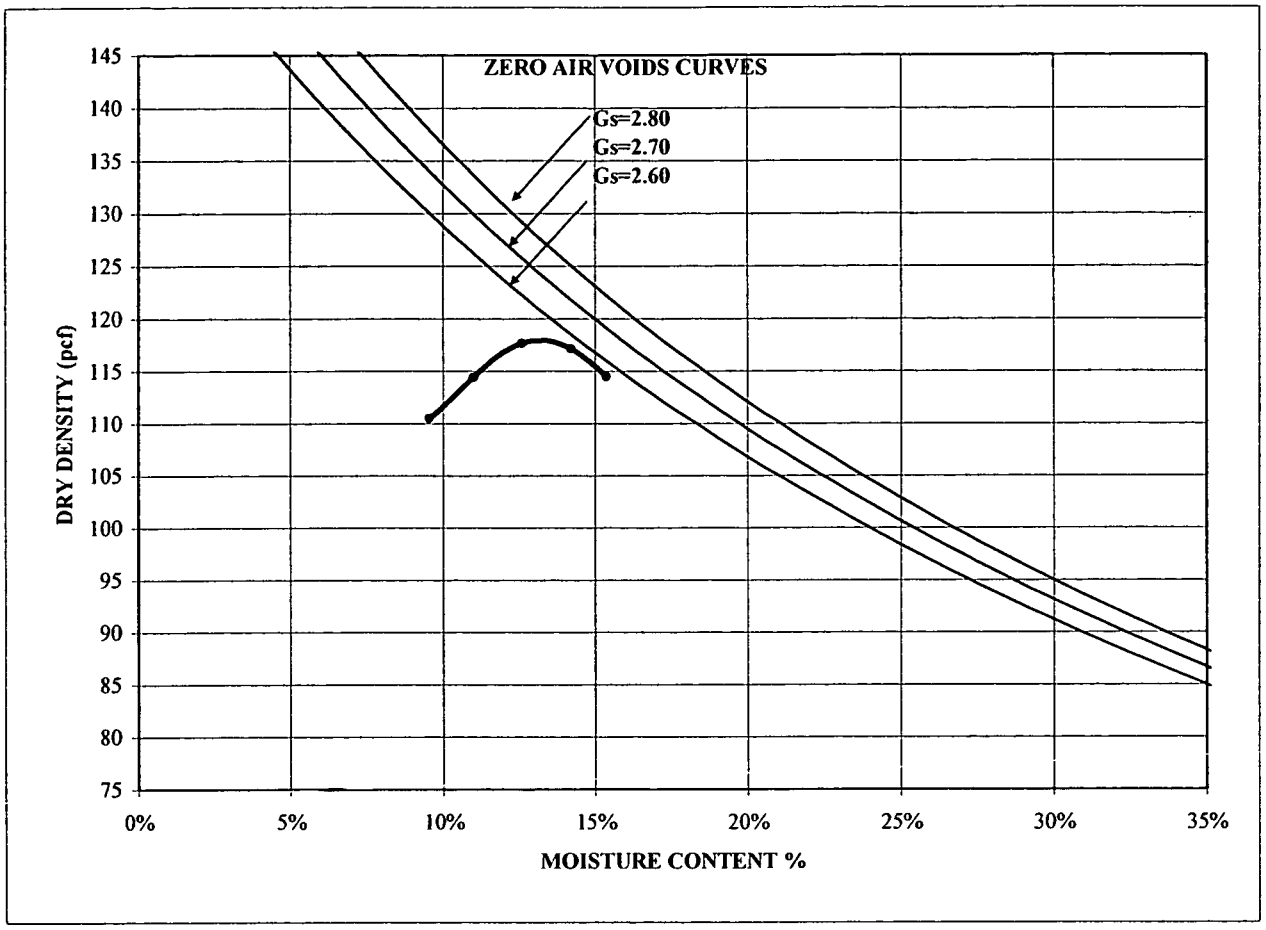
DESCRIPTION: Brownish yellow (10 YR 6/8) clayey sand

USCS: SC

TECH	DT
DATE	5/24/2005
REVIEW	MB

143

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	117.9	Corrected Maximum Dry Density (pcf)	122.9
OPTIMUM MOISTURE (%)	12.8	Corrected Optimum Moisture (%)	11.1

SAMPLE ID	LPF-3
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	40
PL	14
PI	26
MC	--

DESCRIPTION	Brownish yellow (10 YR 6/8) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

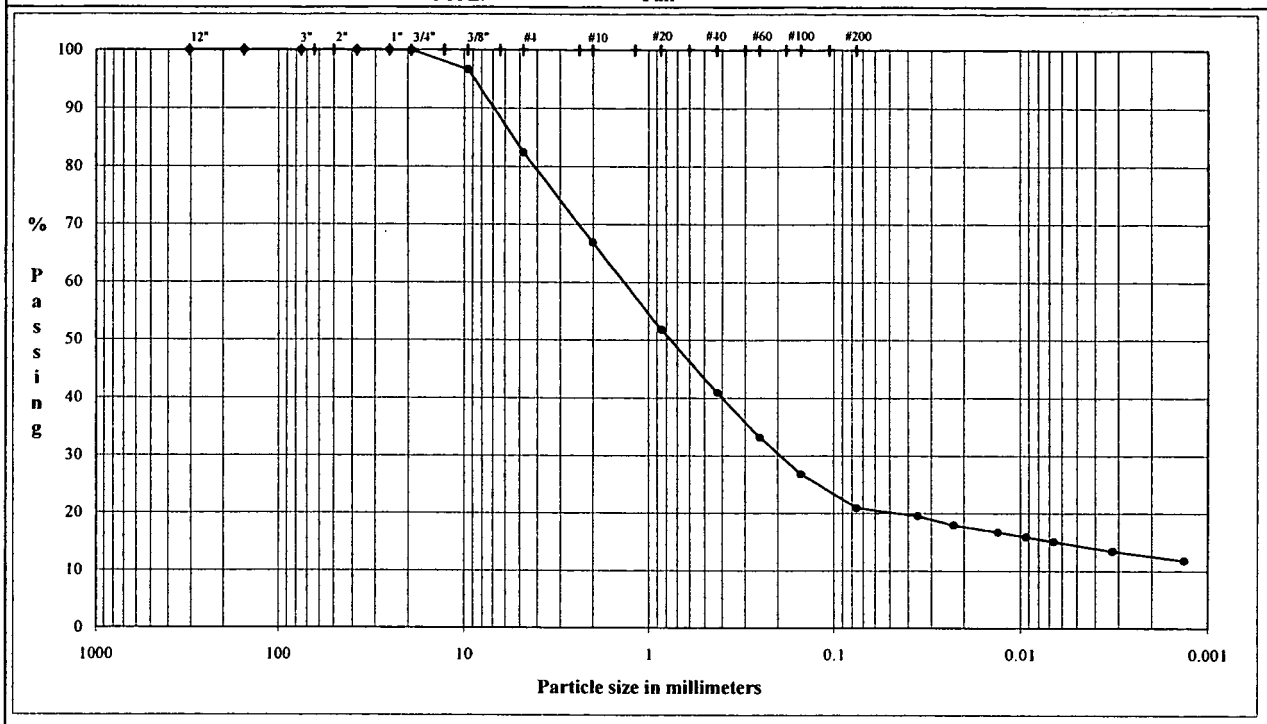
TECH	MKS
DATE	5-25-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-4** Depth (ft): -
TYPE: **Pail**



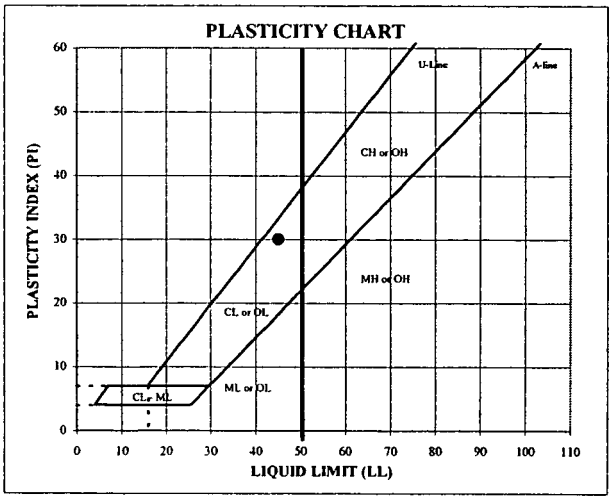
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.05
0.75"	19.0	99.9		
0.375"	9.5	96.6		
#4	4.8	82.4	Fine Gravel	17.56
#10	2.00	66.9	Coarse Sand	15.53
#20	0.85	51.9		
#40	0.43	40.8	Medium Sand	26.02
#60	0.25	33.1		
#100	0.15	26.7		
#200	0.075	20.9	Fine Sand	19.98

Hydrometer Analysis

(mm)	%Finer		
0.036	19.5		
0.023	17.9		
0.013	16.7	Fines	
0.0093	15.9	Silt or Clay	20.86
0.0066	15.0		
0.0032	13.4		
0.0013	11.8		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	45	15	30	--

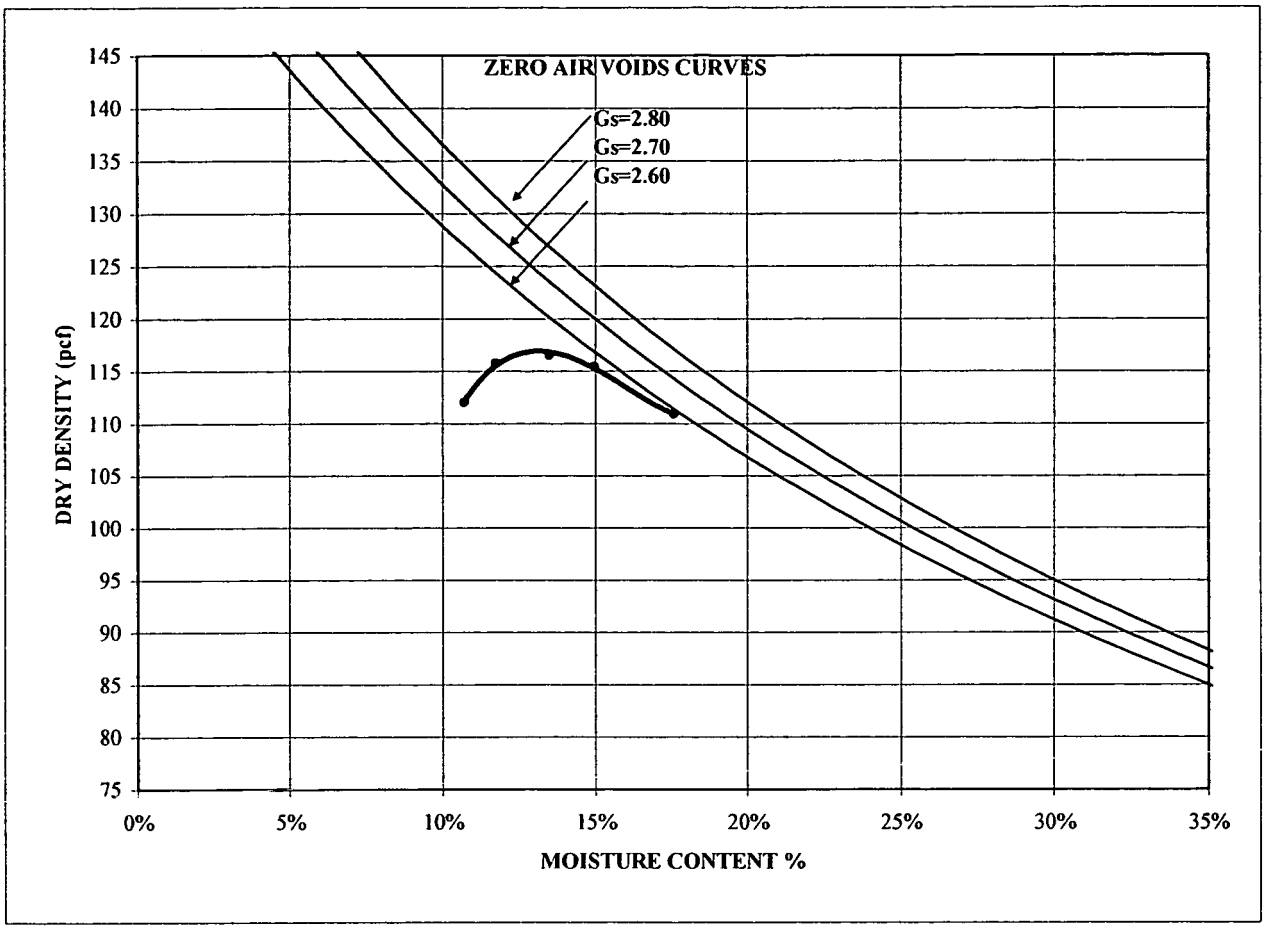
DESCRIPTION: Brownish yellow (10 YR 6/8) clayey sand with grav

USCS: SC

TECH DT
DATE 5/27/2005
REVIEW MB

144

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	116.7	Corrected Maximum Dry Density (pcf)	122.9
OPTIMUM MOISTURE (%)	13.3	Corrected Optimum Moisture (%)	11.1

SAMPLE ID	LPF-4
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	45
PL	15
PI	30
MC	--

DESCRIPTION	Brownish yellow (10 YR 6/8) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

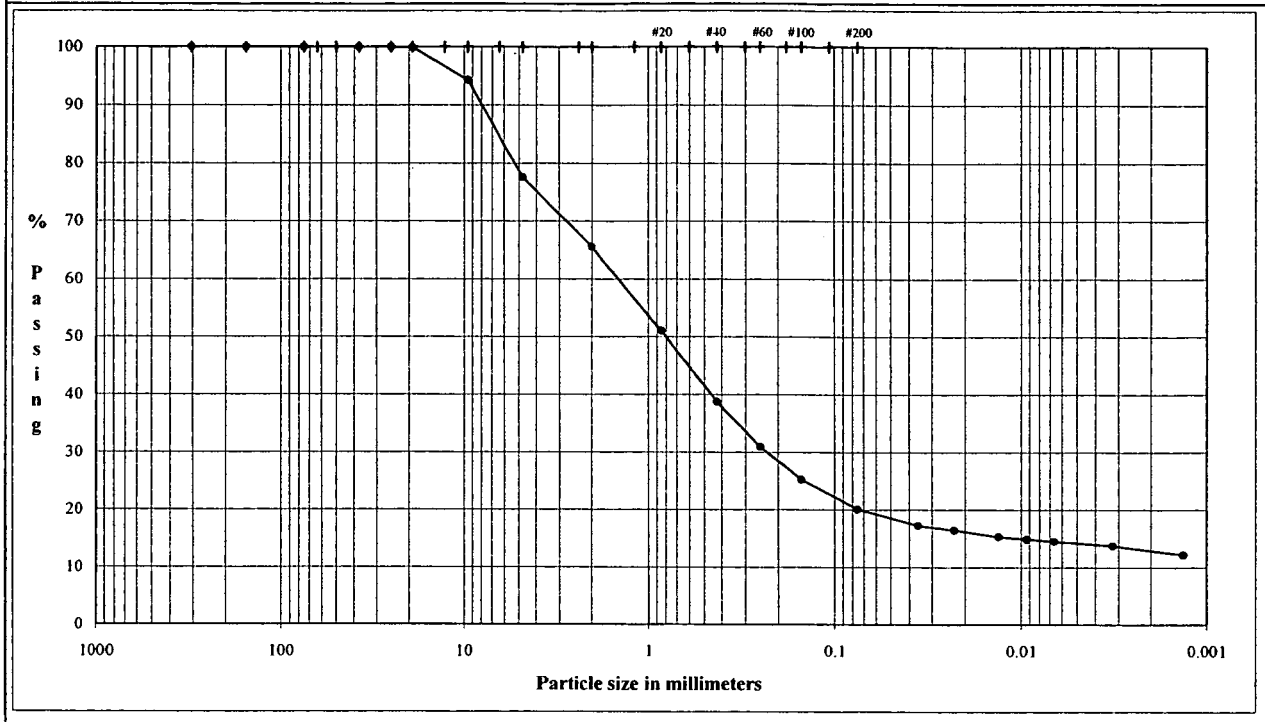
TECH	MKS
DATE	5-25-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-5** Depth (ft): -
TYPE: **Pail**



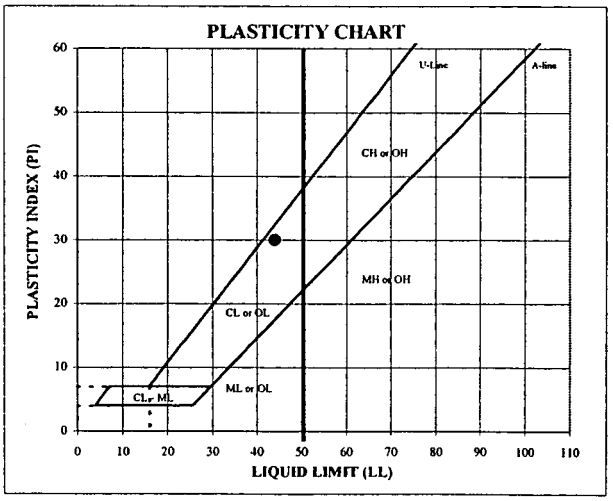
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.11
0.75"	19.0	99.9		
0.375"	9.5	94.3		
#4	4.8	77.5	Fine Gravel	22.36
#10	2.00	65.5	Coarse Sand	12.00
#20	0.85	51.0		
#40	0.43	38.7	Medium Sand	26.86
#60	0.25	30.9		
#100	0.15	25.3		
#200	0.075	20.1	Fine Sand	18.61

Hydrometer Analysis

(mm)	%Finer		
0.036	17.2		
0.023	16.5		
0.013	15.3	Fines	
0.0093	14.9	Silt or Clay	20.07
0.0066	14.5		
0.0032	13.7		
0.0013	12.1		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	44	14	30	--

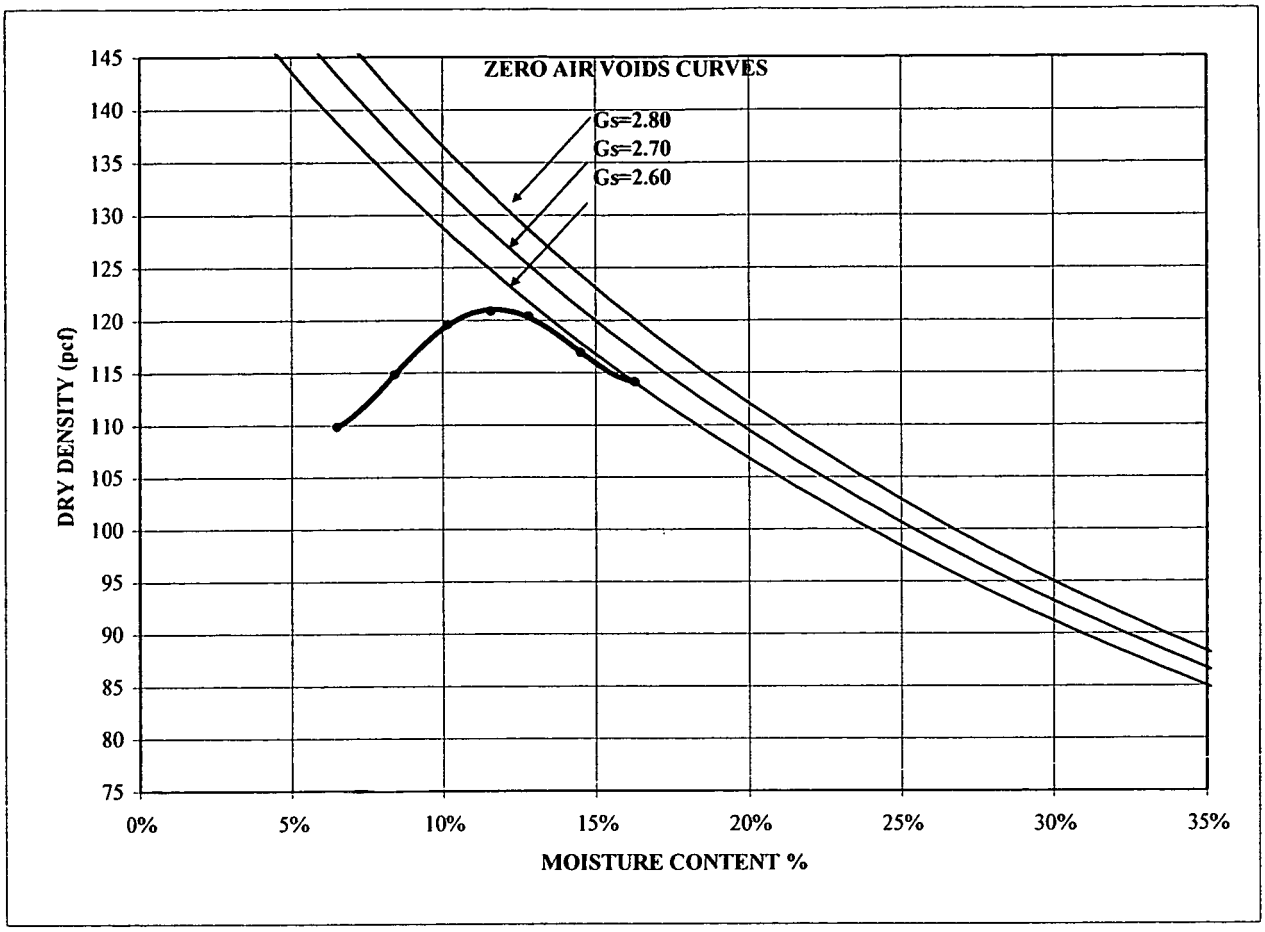
DESCRIPTION: Brownish yellow (10 YR 6/8) clayey sand with grav

USCS: SC

TECH: DT
DATE: 5/24/2005
REVIEW: MB

145

MOISTURE / DRY DENSITY CURVE
D 698 METHOD B



MAXIMUM DRY DENSITY (pcf)	120.8	Corrected Maximum Dry Density (pcf)	122.6
OPTIMUM MOISTURE (%)	11.8	Corrected Optimum Moisture (%)	11.2

SAMPLE ID	LPF-5
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	44
PL	14
PI	30
MC	--

DESCRIPTION	Brownish yellow (10 YR 6/8) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

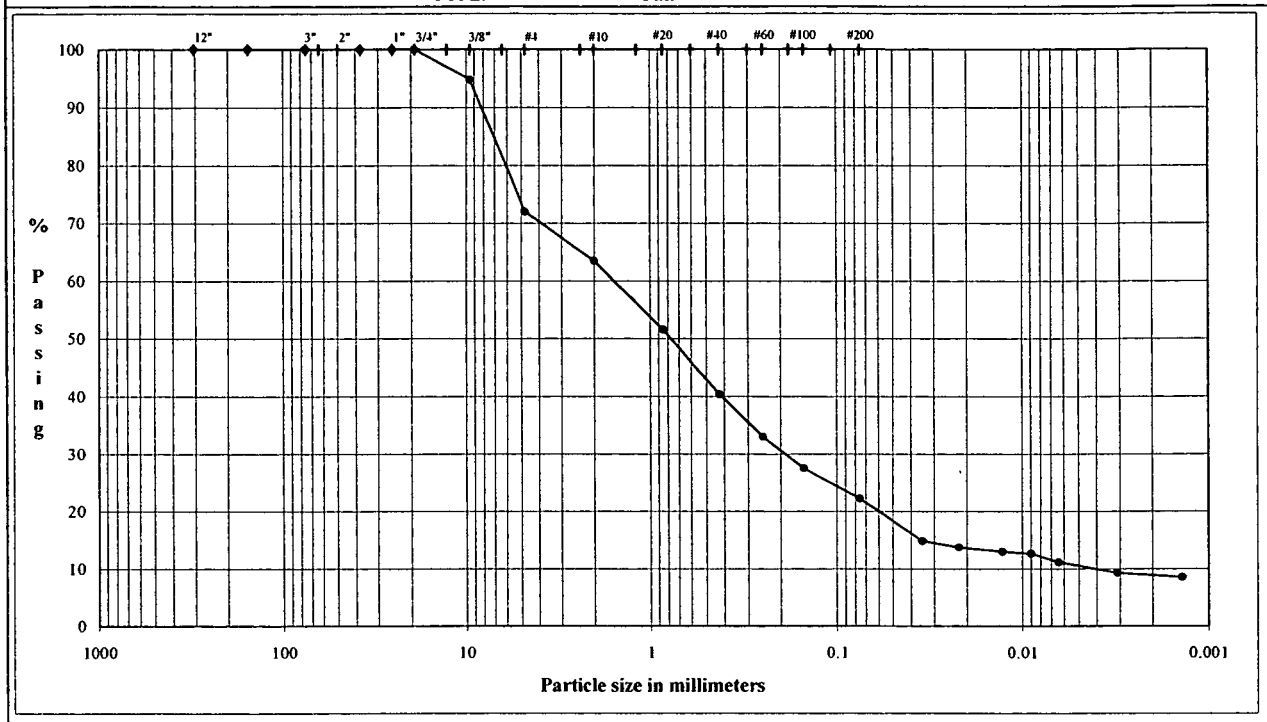
TECH	MKS
DATE	5-25-05
REVIEW	MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-6** Depth (ft): -
TYPE: **Pail**



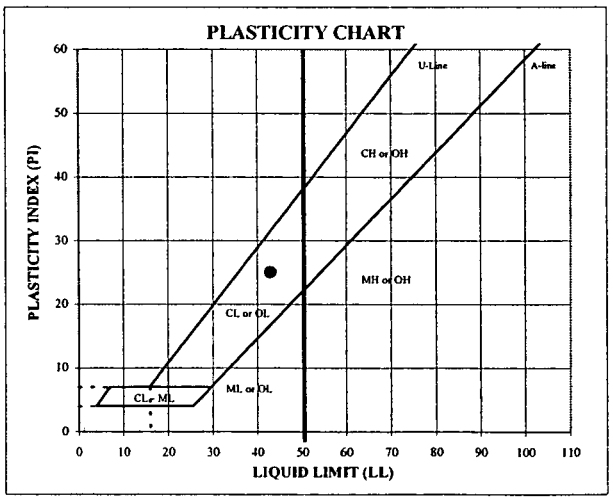
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	94.8		
#4	4.8	72.0	Fine Gravel	28.02
#10	2.00	63.5	Coarse Sand	8.52
#20	0.85	51.6		
#40	0.43	40.3	Medium Sand	23.11
#60	0.25	33.0		
#100	0.15	27.4		
#200	0.075	22.2	Fine Sand	18.16

Hydrometer Analysis

(mm)	%Finer		
0.035	14.8		
0.022	13.7		
0.013	13.0	Fines	
0.0090	12.6	Silt or Clay	22.19
0.0064	11.1		
0.0031	9.3		
0.0014	8.5		



ATTERBERG LIMITS

M.	LL	PL	PI	SpG
--	43	18	25	--

DESCRIPTION: Moderate yellowish brown (10 YR 5/4) clayey sand

USCS: SC

TECH MKS
DATE 5/23/2005
REVIEW MB

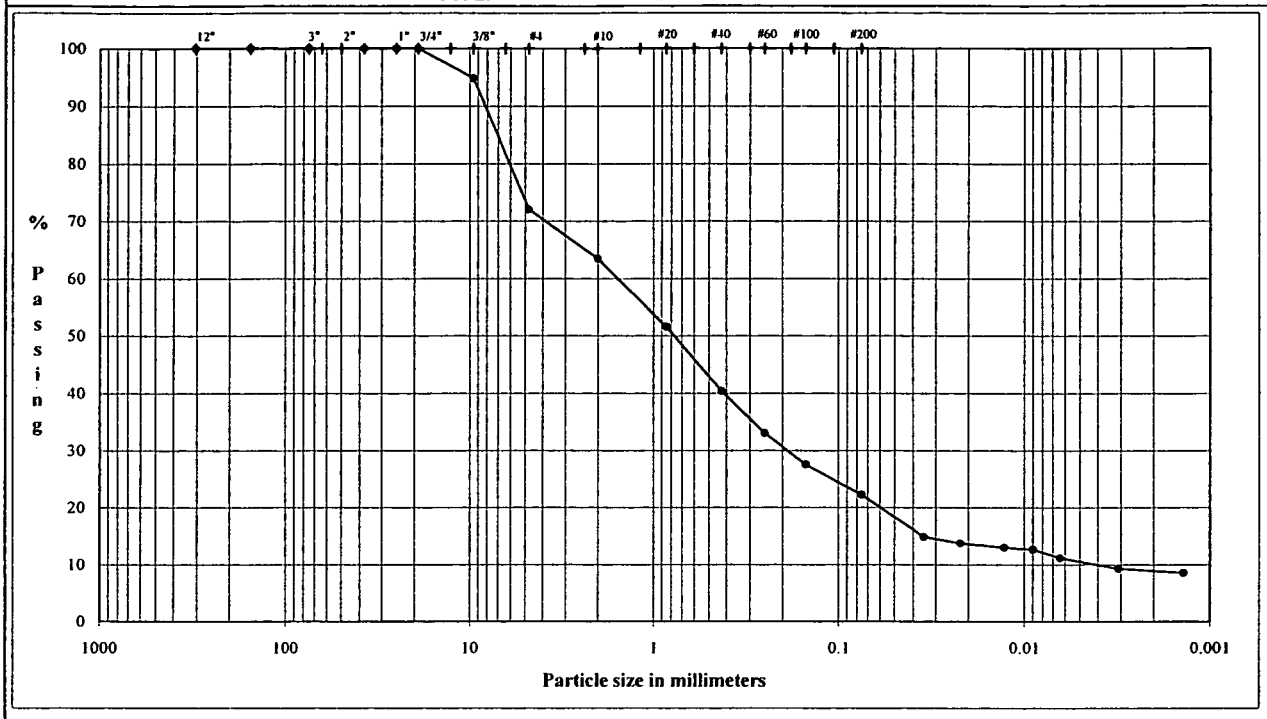
146

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-6** Depth (ft): -
TYPE: **Pail**



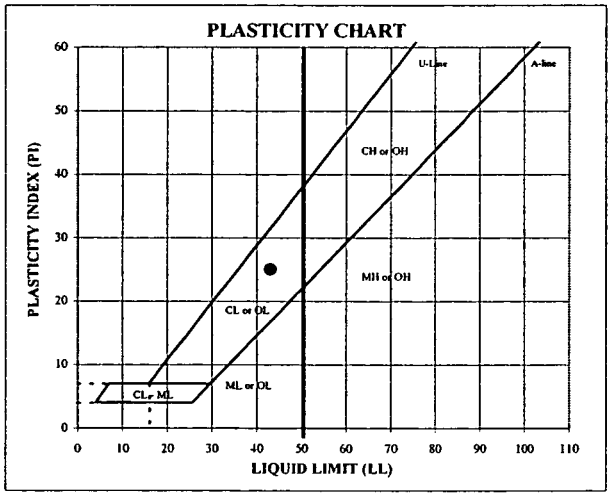
COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	94.8		
#4	4.8	72.0	Fine Gravel	28.02
#10	2.00	63.5	Coarse Sand	8.52
#20	0.85	51.6		
#40	0.43	40.3	Medium Sand	23.11
#60	0.25	33.0		
#100	0.15	27.4		
#200	0.075	22.2	Fine Sand	18.16

Hydrometer Analysis

(mm)	%Finer		
0.035	14.8		
0.022	13.7		
0.013	13.0	Fines	
0.0090	12.6	Silt or Clay	22.19
0.0064	11.1		
0.0031	9.3		
0.0014	8.5		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	43	18	25	--

DESCRIPTION: Moderate yellowish brown (10 YR 5/4) clayey sand

USCS: SC

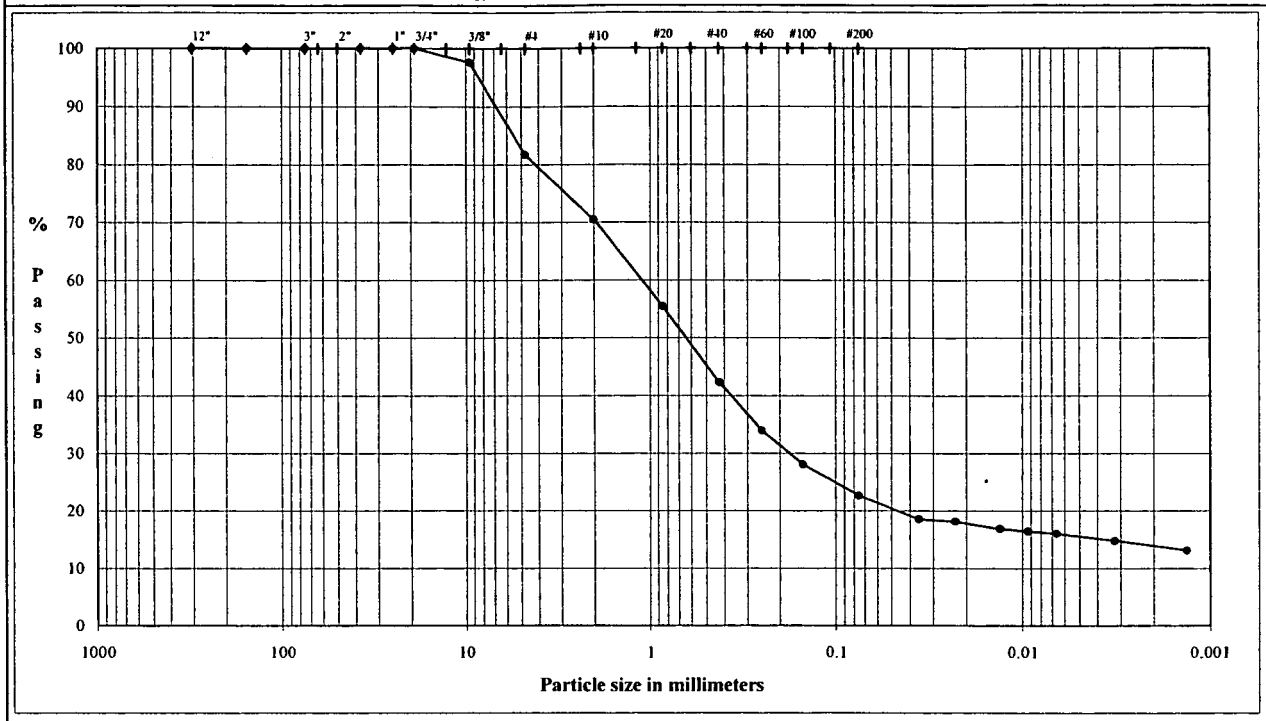
TECH MKS
DATE 5/23/2005
REVIEW MB

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **LPF-7** Depth (ft): -
TYPE: **Pail**



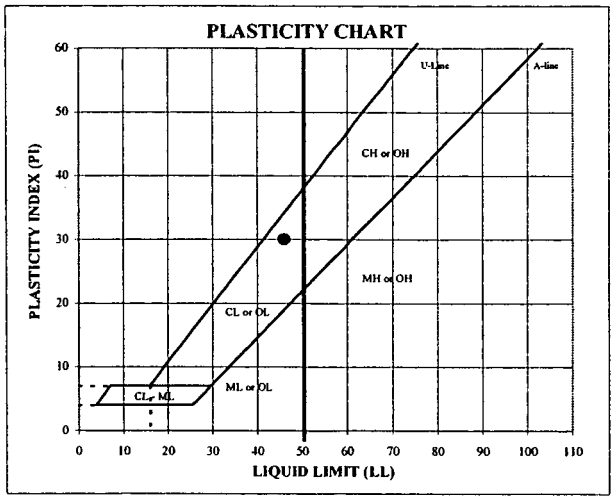
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.6		
#4	4.8	81.8	Fine Gravel	18.24
#10	2.00	70.5	Coarse Sand	11.28
#20	0.85	55.5		
#40	0.43	42.3	Medium Sand	28.22
#60	0.25	33.9		
#100	0.15	28.0		
#200	0.075	22.6	Fine Sand	19.64

Hydrometer Analysis

(mm)	%Finer		
0.036	18.5		
0.023	18.1		
0.013	16.9	Fines	
0.0093	16.4	Silt or Clay	22.63
0.0066	16.0		
0.0032	14.8		
0.0013	13.1		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	46	16	30	--

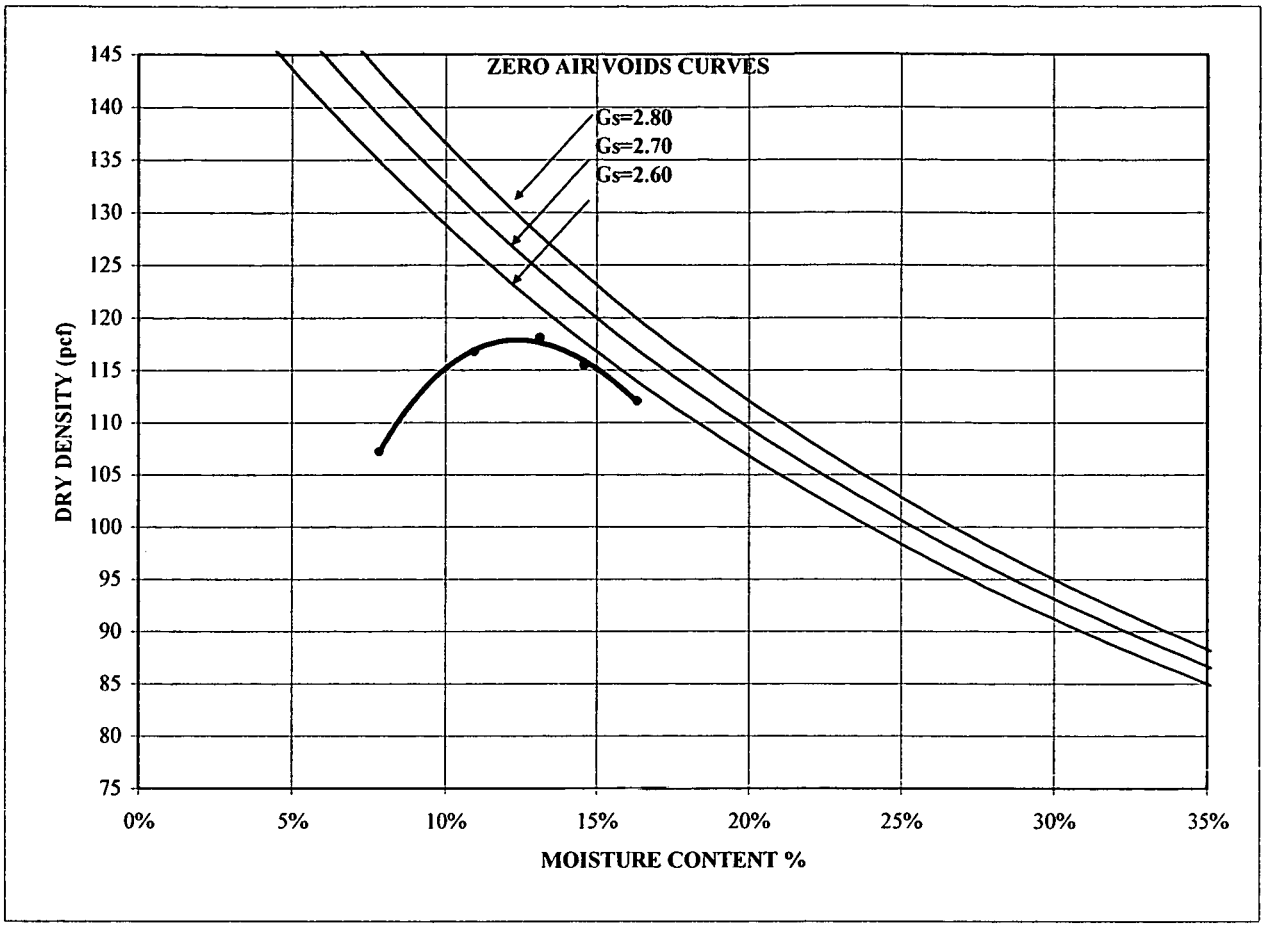
DESCRIPTION: Strong brown (7.5 YR 5/6) clayey sand with gravel

USCS: SC

TECH: LDF
DATE: 5/25/2005
REVIEW: MB

147

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	118.3	Corrected Maximum Dry Density (pcf)	124.6
OPTIMUM MOISTURE (%)	12.8	Corrected Optimum Moisture (%)	10.7

SAMPLE ID	LPF-7
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	46
PL	16
PI	30
MC	--

DESCRIPTION	Strong brown (7.5 YR 5/6) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

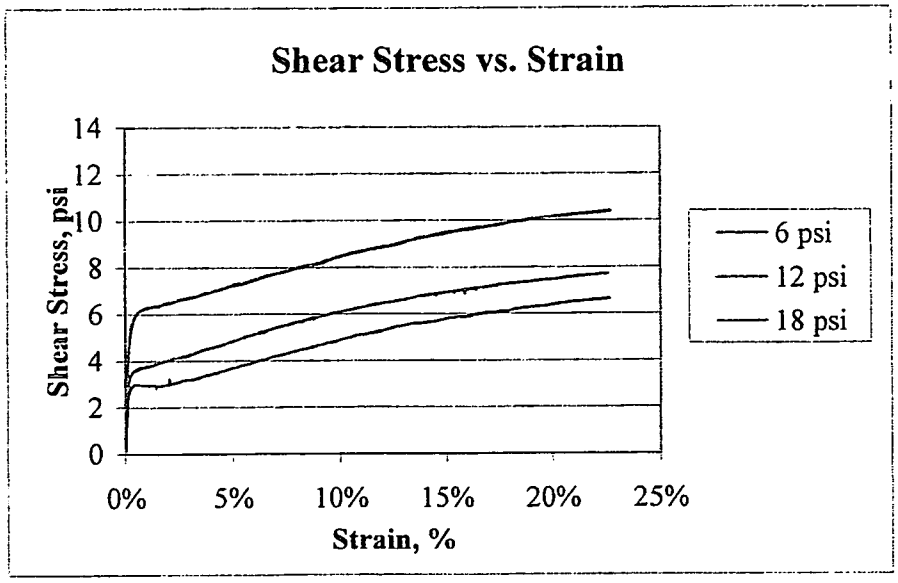
TECH	DT
DATE	5-29-05
REVIEW	MB

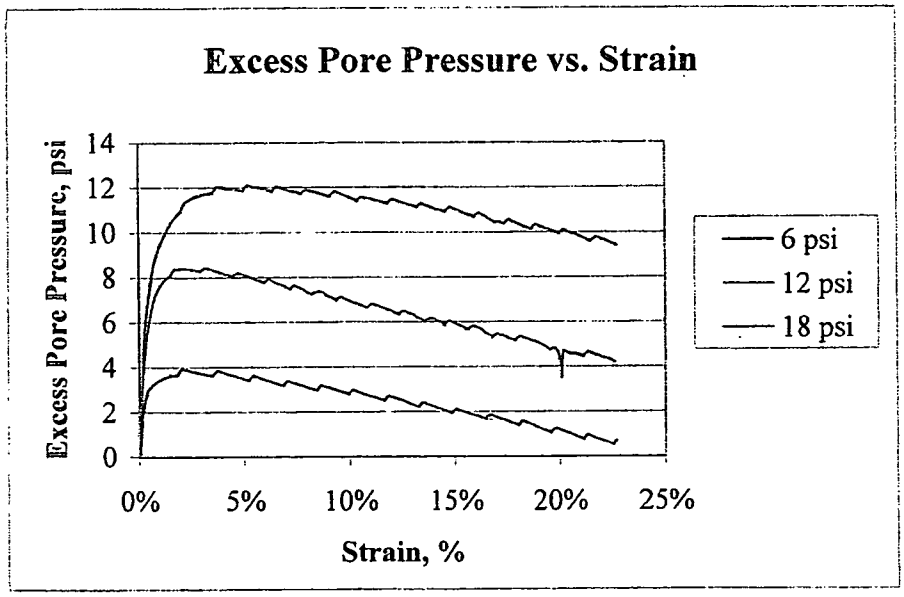
148

Sample # =	LPF 7		Sample # =	LPF 7		Sample # =	LPF 7	
Point # =	1		Point # =	2		Point # =	3	
	Initial			**Initial**			**Initial**	
Length =	14.73	cm	Length =	14.80	cm	Length =	14.75	cm
Diameter =	7.30	cm	Diameter =	7.30	cm	Diameter =	7.30	cm
Wet Weight =	1272.10	g	Wet Weight =	1271.90	g	Wet Weight =	1272.40	g
Area =	41.9	sq.cm	Area =	41.9	sq.cm	Area =	41.9	sq.cm
Sample Area =	6.49	sq. in.	Sample Area =	6.49	sq. in.	Sample Area =	6.49	sq. in.
Volume =	616.5	cc	Volume =	619.4	cc	Volume =	617.3	cc
Moisture Content =	15.0%		Moisture Content =	15.0%		Moisture Content =	15.0%	
Specific Gravity =	na		Specific Gravity =	na		Specific Gravity =	na	
Dry Weight of Solids =	1106.17	g	Dry Weight of Solids =	1106.00	g	Dry Weight of Solids =	1106.43	g
Wet Density =	2.06	g/cc	Wet Density =	2.05	g/cc	Wet Density =	2.06	g/cc
Dry Density =	1.79	g/cc	Dry Density =	1.79	g/cc	Dry Density =	1.79	g/cc
Wet Density =	128.8	pcf	Wet Density =	128.1	pcf	Wet Density =	128.6	pcf
Dry Density =	112.0	pcf	Dry Density =	111.4	pcf	Dry Density =	111.8	pcf
Cell Pressure =	100	psi	Cell Pressure =	100	psi	Cell Pressure =	100	psi
Back Pressure =	94	psi	Back Pressure =	88	psi	Back Pressure =	82	psi
Confining Pressure =	6	psi	Confining Pressure =	12	psi	Confining Pressure =	18	psi

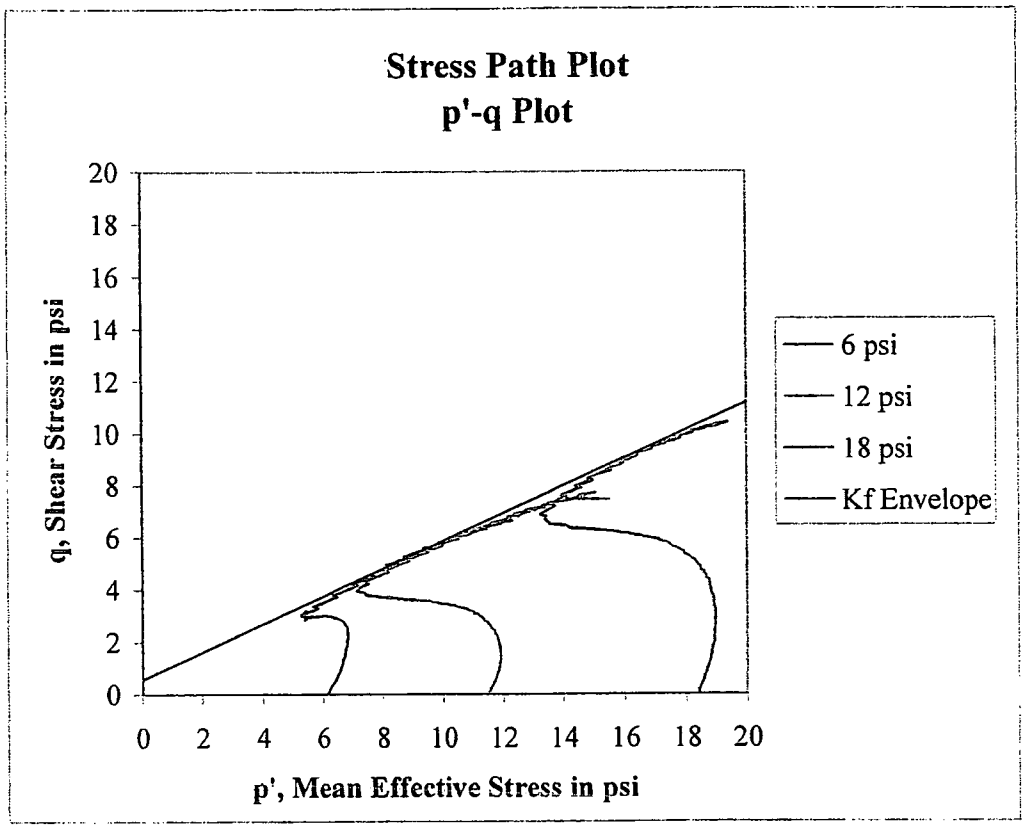
Notes:
1. Samples were remolded to approximately 95% of the maximum dry density and +2% relative to OMC based on ASTM D 698.
2. Specimen visually classified as strong brown (7.5yr 5/6) clayey sand with gravel.

Golder Associates, Inc. **Denver, Colorado**	Title: **TRIAXIAL SHEAR TEST REPORT** **SAMPLE DATA AND CALCULATIONS**			
Job Short Title: Kaiser Hill/Rocky Flats Field And Lab				
Sample No. LPF-7	Reviewed: JEO	Date: 6/20/2005	Job Number: 253-2203-0001	Figure: 1





Golder Associates, Inc. Denver, Colorado	Title: CU TRIAXIAL SHEAR DATA STRESS AND Δ PORE PRESSURE PLOTS			
Job Short Title: Kaiser Hill/Rocky Flats Field And Lab				
Sample No. LPF-7	Reviewed: JEO	Date: 06/20/05	Job Number: 253-2203-0001	Figure: 2

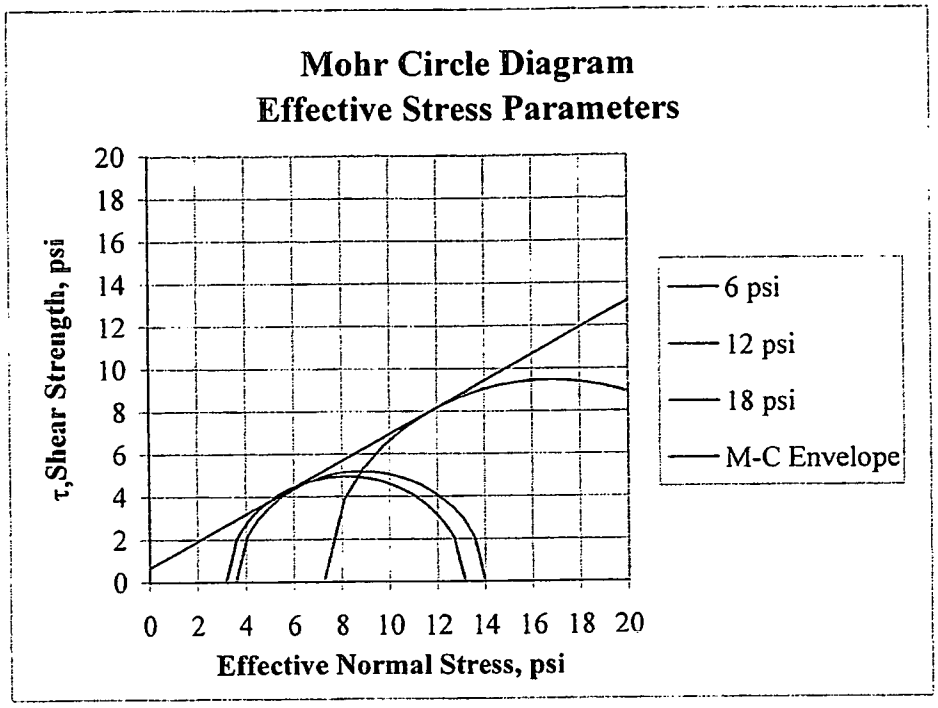


Stress Path Parameters

ψ' = 28.0 degrees
a' = 0.6 psi

Golder Associates, Inc. Denver, Colorado	Title: CU TRIAXIAL SHEAR DATA STRESS PATH PLOT			
Job Short Title: Kaiser Hill/Rocky Flats Field And Lab				
Sample No. LPF-7	Reviewed: JEO	Date: 6/20/2005	Job Number: 253-2203-0001	Figure: 3

149



Mohr-Coulomb Parameters

$\phi' =$ 32.1 degrees
$c' =$ 0.7 psi

Golder Associates, Inc. Denver, Colorado	Title: CU TRIAXIAL SHEAR DATA MOHR CIRCLE DIAGRAM			
Job Short Title: Kaiser Hill/Rocky Flats Field And Lab				
Sample No. LPF-7	Reviewed: JEO	Date: 6/20/2005	Job Number: 253-2203-0001	Figure: 4

150

Consolidated Undrained Triaxial Lab Data
From: GOLDER ASSOCIATES INC.

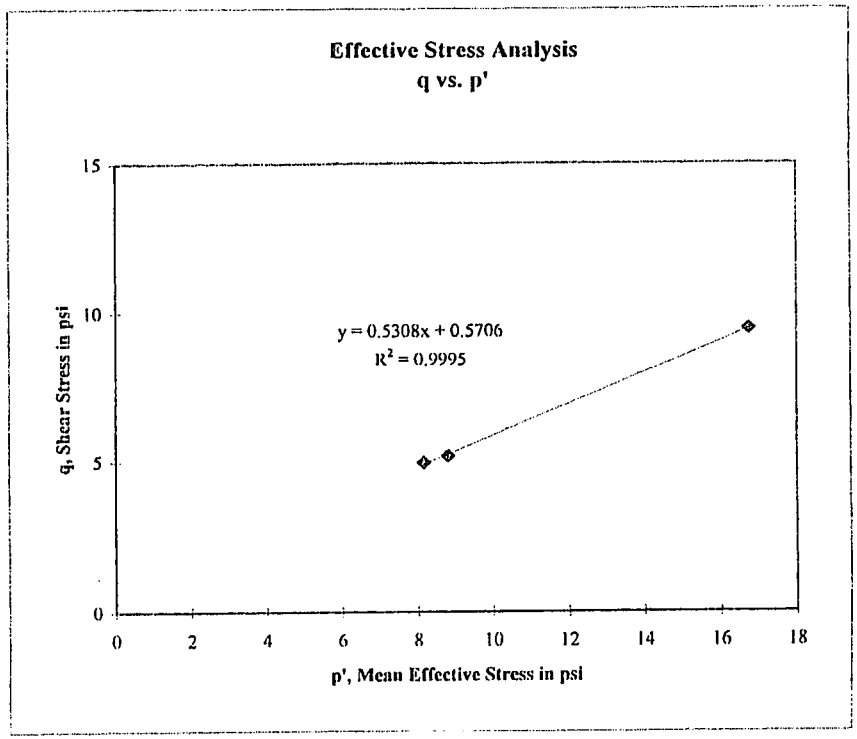
Project: Kaiser Hill/Rocky Flats Field And Lab
Project Number: 253-2203-0001

Sample Number	LPF-7
Depth	
Effective Stress Analysis	

Point Number	p' (psi)	q (psi)
1	8.2	5.0
2	8.8	5.2
3	16.7	9.5

tan(ψ') = 0.5308
a' = 0.5705

ϕ' = 32.1 degrees
c' = 0.7 psi



Consolidated Undrained Triaxial Lab Data
From: GOLDER ASSOCIATES INC.

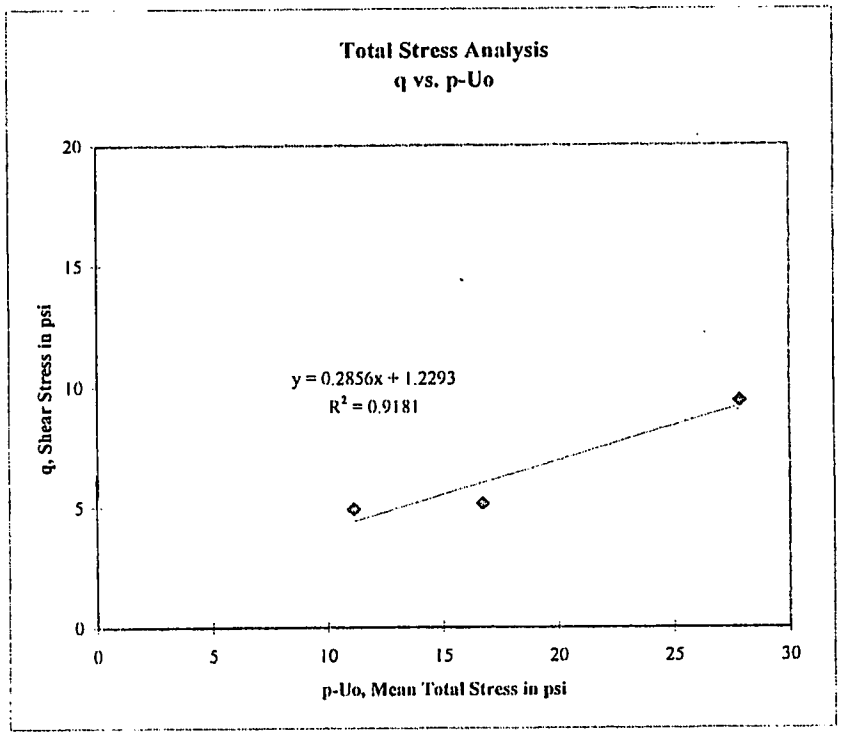
Project: **Kaiser Hill/Rocky Flats Field And Lab**
Project Number: **253-2203-0001**

Sample Number	LPF-7
Depth	
Total Stress Analysis	

Point Number	p-Uo (psi)	q (psi)
1	11.1	5.0
2	16.7	5.2
3	27.9	9.5

$\tan(\psi) =$ 0.2856
a = 1.2293

$\phi =$ 16.6 degrees
c = 1.3 psi



Consolidated Undrained Triaxial Lab Data
From: GOLDER ASSOCIATES INC.
Project: **Kaiser Hill/Rocky Flats Field And Lab**
Project Number: 253-2203-0001
Explanation of Terminology

Mohr-Coulomb Failure Criteria:

$$\tau_{ff} = c' + \sigma_{ff}' \tan \phi'$$
$$\tau_{ff} = c + \sigma_{ff} \tan \phi$$

Where:
c', c = effective and total cohesive intercept
ϕ', ϕ = effective and total friction angle
τ^{ff} = Shear Strength on the failure surface at failure
σ'^{ff}, σ^{ff} = effective and total normal stress on the failure surface at failure

Stress Path Space:

$$q = \frac{\sigma_1 - \sigma_3}{2} \qquad p' = \frac{\sigma_1' + \sigma_3'}{2} \qquad p = \frac{\sigma_1 + \sigma_3}{2}$$

Where:
q = shear stress
p', p = mean effective and total stress
σ'^1, σ^1 = Effective and Total Axial Stress
σ'^3, σ^3 = Effective and Total Confining Stress

$$q = a + p' \tan \psi$$
$$q = a + (p - u_0) \tan \psi$$

Where:
a', a = intercept of the q-axis in effective stress of total stress space
ψ', ψ = angle of the failure line in effective stress of total stress space
p' = mean effective stress
p-Uo = mean total minus the initial pore pressure

with the relationship between ψ and ϕ and a and c are as follows:

$$\tan(\psi) = \sin(\phi)$$

$$a = c * \cos(\phi)$$

151

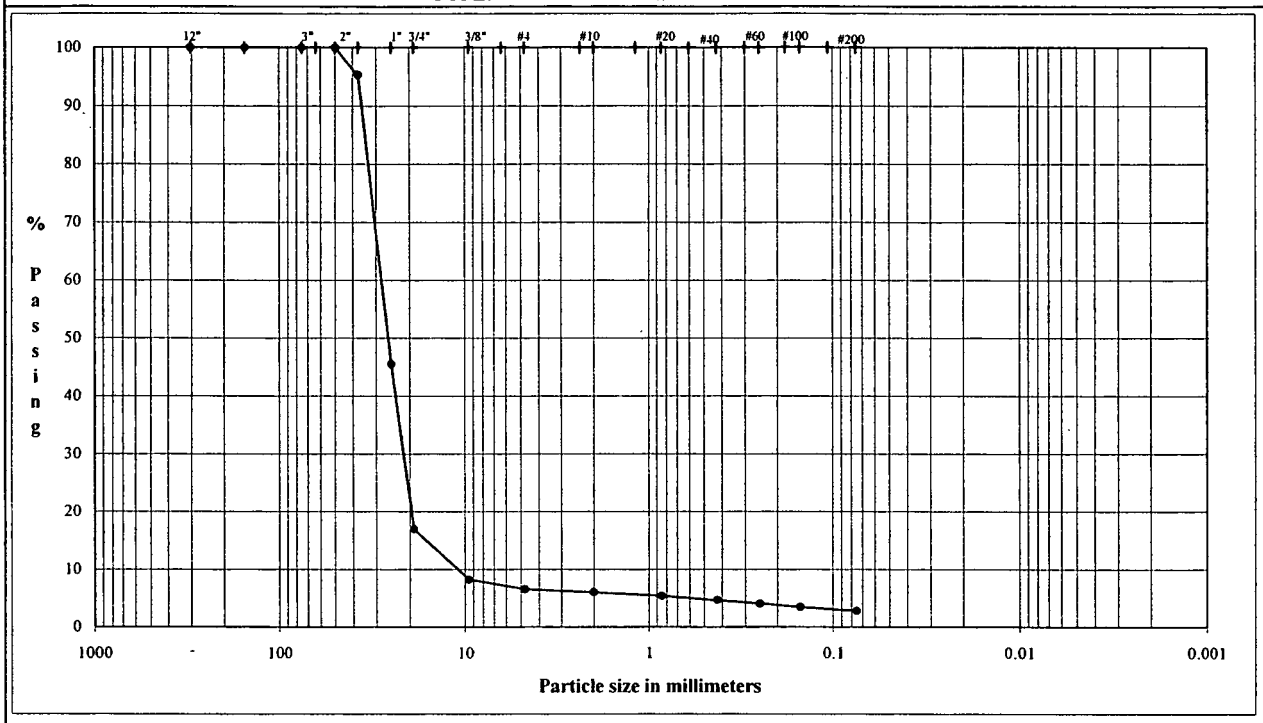
SECTION 2

DRAIN ROCK TESTING RESULTS

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

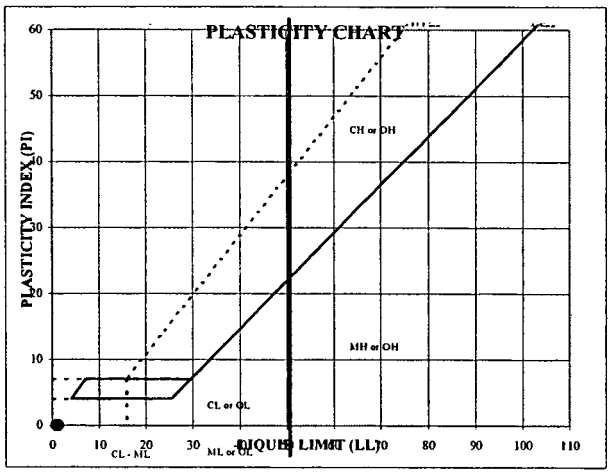
PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **DR-1** Depth (ft): --
TYPE: **Pail**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
3.0"	75.0	100.0		
2.0"	50.0	100.0		
1.5"	37.5	95.3		
1.0"	25.0	45.5		
0.75"	19.0	17.0	Coarse Gravel	83.05
0.375"	9.5	8.2		
#4	4.8	6.5	Fine Gravel	10.41
#10	2.0	6.0	Coarse Sand	0.53
#20	0.9	5.4		
#40	0.4	4.6	Medium Sand	1.37
#60	0.3	4.0		
#100	0.2	3.5		
#200	0.1	2.8	Fine Sand	1.85
			Fines	2.79



ATTERBERG LIMITS

M,	LL	PL	PI	SG
--	--	--	--	--

DESCRIPTION: Reddish brown (5YR 5/4) poorly graded gravel

USCS: GP

TECH	DS
DATE	6/6/05
REVIEW	MB

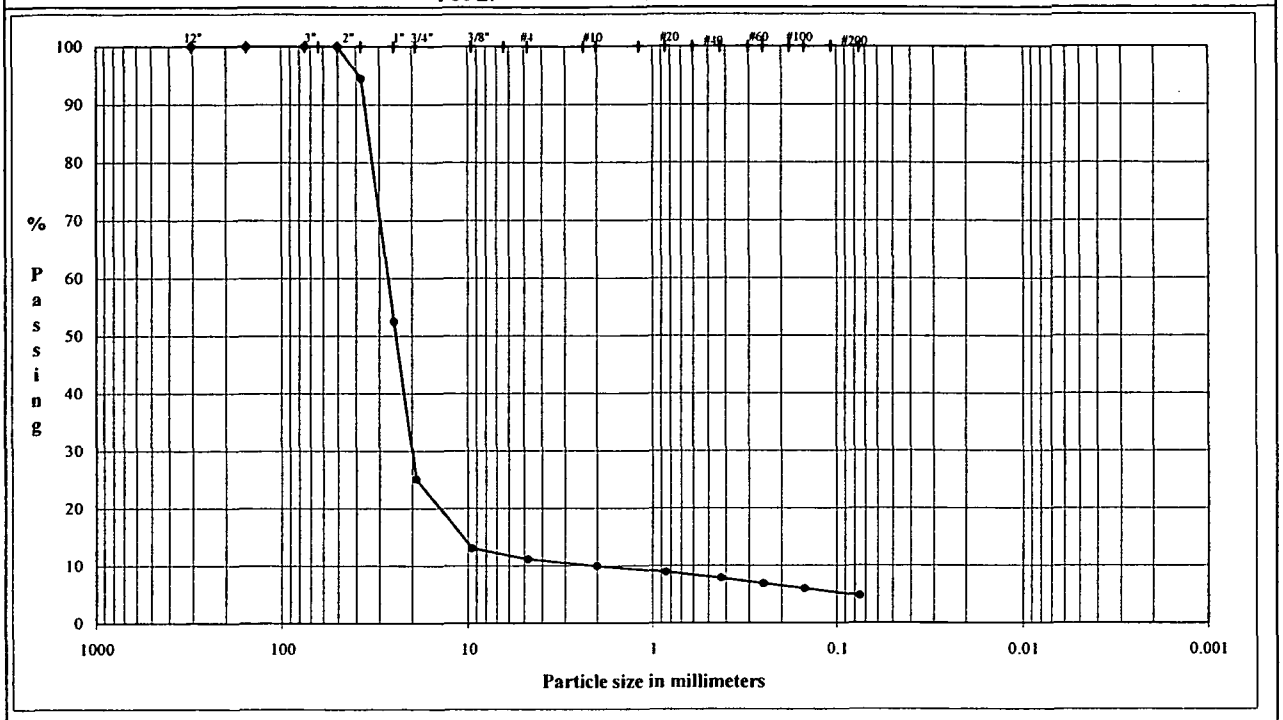
153

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

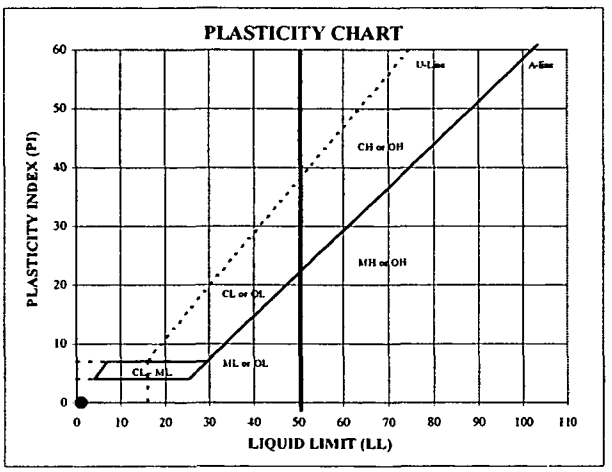
PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **DR-2** Depth (ft): --
TYPE: **Pail**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
3.0"	75.0	100.0		
2.0"	50.0	100.0		
1.5"	37.5	94.5		
1.0"	25.0	52.5		
0.75"	19.0	25.0	Coarse Gravel	74.95
0.375"	9.5	13.0		
#4	4.8	11.1	Fine Gravel	13.97
#10	2.0	9.9	Coarse Sand	1.19
#20	0.9	8.9		
#40	0.4	7.8	Medium Sand	2.09
#60	0.3	6.8		
#100	0.2	5.9		
#200	0.1	4.7	Fine Sand	3.09
			Fines	4.72



ATTERBERG LIMITS

M_c	LL	PL	PI	SG
--	--	--	--	--

DESCRIPTION: Reddish yellow (7.5YR 6/6) poorly graded gravel

USCS: GP

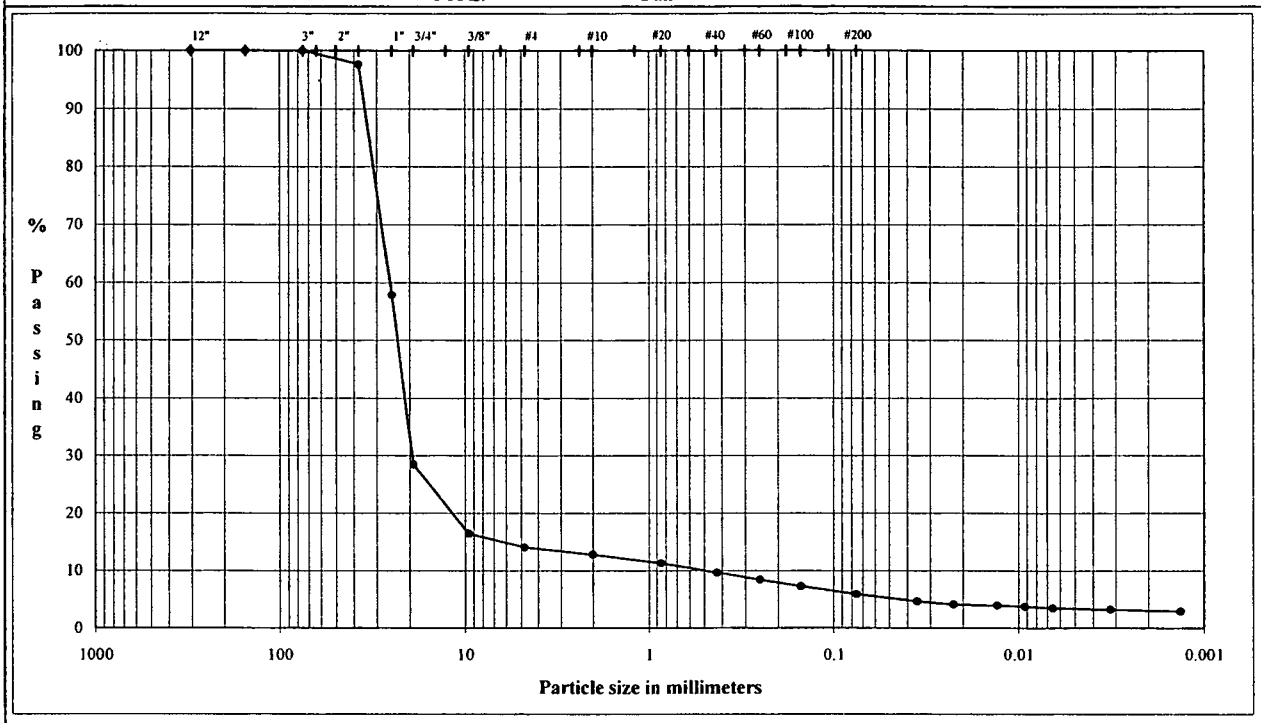
TECH	DS
DATE	6/6/05
REVIEW	MB

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **DR-3** Depth (ft): -
TYPE: **Pail**



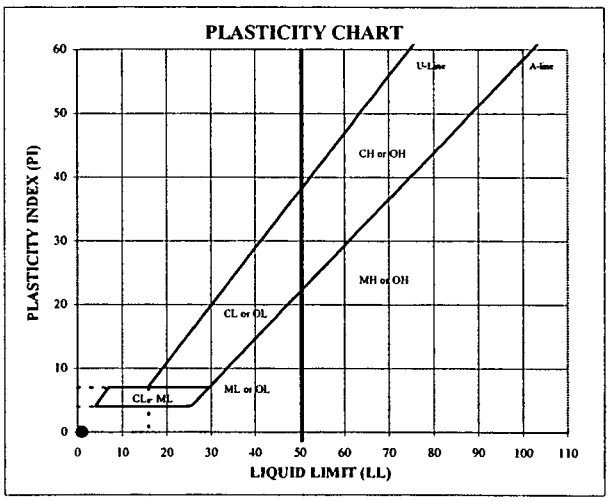
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	97.6		
1.0"	25.0	57.8	Coarse Gravel	71.61
0.75"	19.0	28.4		
0.375"	9.5	16.4		
#4	4.8	14.0	Fine Gravel	14.39
#10	2.00	12.8	Coarse Sand	1.23
#20	0.85	11.2		
#40	0.43	9.6	Medium Sand	3.14
#60	0.25	8.4		
#100	0.15	7.2		
#200	0.075	5.9	Fine Sand	3.75

Hydrometer Analysis

(mm)	%Finer		
0.035	4.6		
0.022	4.1		
0.013	3.9	Fines	
0.0093	3.7	Silt or Clay	5.88
0.0066	3.4		
0.0032	3.2		
0.0013	2.9		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	--	--	--	--

DESCRIPTION: Brownish yellow (10 YR 6/6) poorly graded gravel

USCS: GP

TECH	MKS
DATE	6/13/2005
REVIEW	MB

154

TABLE 1
KAISER HILL/ROCKY FLATS FIELD AND LAB
053-2203-0001
RIGID-WALL COMPRESSION
CONSTANT-HEAD PERMEABILITY
10-INCH DIAMETER CELL

Project Title:	Kaiser Hill/Rocky Flats Field and Lab	**Boring:**	
Project Number:	053-2203-0001	**Sample:**	DR-3
Date Tested:	6/13/05	**Depth:**	--

Sample Setup		**Initial Sample:**	
Initial Sample Height, in	10.6292	**Moisture Determination**	
Mold Diameter, in	10.00	Tare	M93
Sample Area, in^2	78.54	Wet Weight and Tare, g	854.20
Wet Sample Weight, g	21,745.2	Dry Weight and Tare, g	851.50
Wet Sample Weight, lb	47.95	Tare Weight, g	102.20
Dry Sample Weight, g	21,667.1	Moisture Content, %	0.4
Dry Sample Weight, lb	47.78		

Initial Sample Density and Void Ratio		**Final Sample Density and Void Ratio**	
Specific Gravity[1]	2.70	Final Sample Height, in	10.378
Initial Sample Volume, ft^3	0.483	Final Sample Volume, ft^3	0.472
Initial Wet Density, lb/ft^3	99.2	Final Dry Density, lb/ft^3	101.3
Initial Dry Density, lb/ft^3	98.9	Final Void Ratio	0.66
Initial Void Ratio	0.70		

Load (psi)	Height (in)	Dry Density (pcf)	Void Ratio	Flow Rate (ml/sec)	Gradient	Permeability (cm/sec)	Porosity
26	10.378	101.3	0.66	51.48	0.01	8.3E+00	0.40

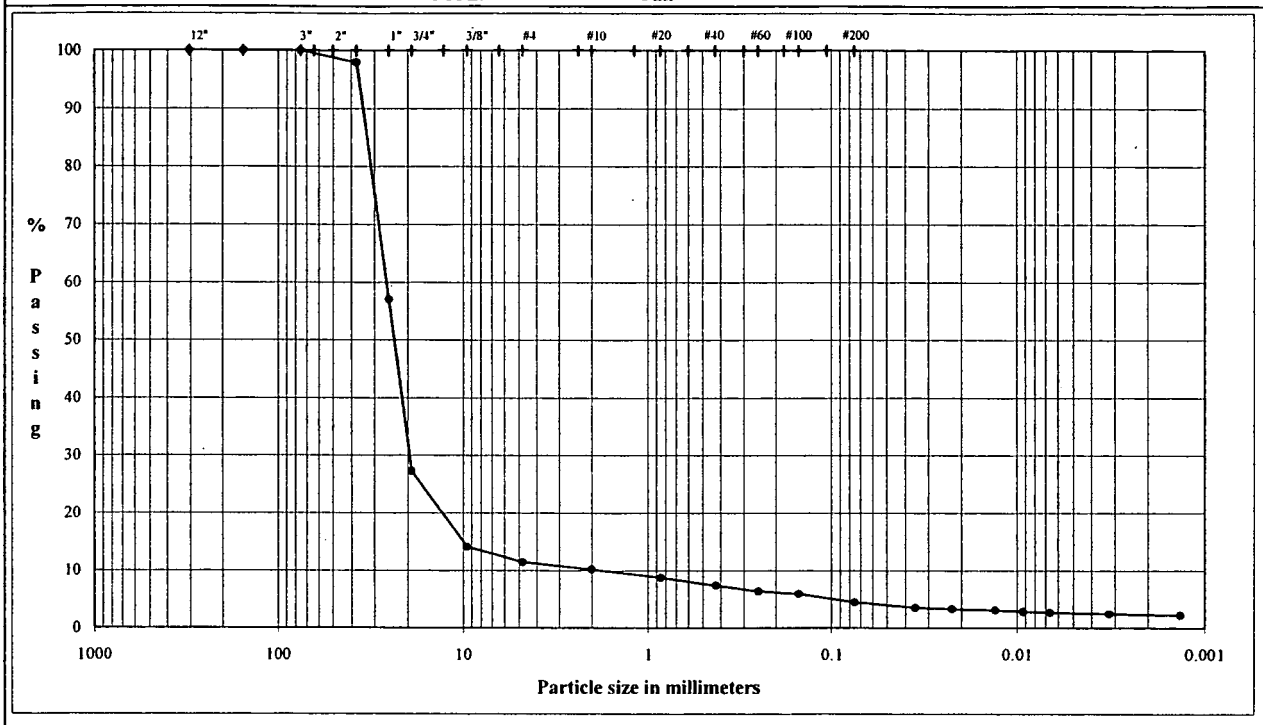
NOTES: [1]Specific Gravity = Assumed Value

May-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **DR-4** Depth (ft): -
TYPE: **Pail**



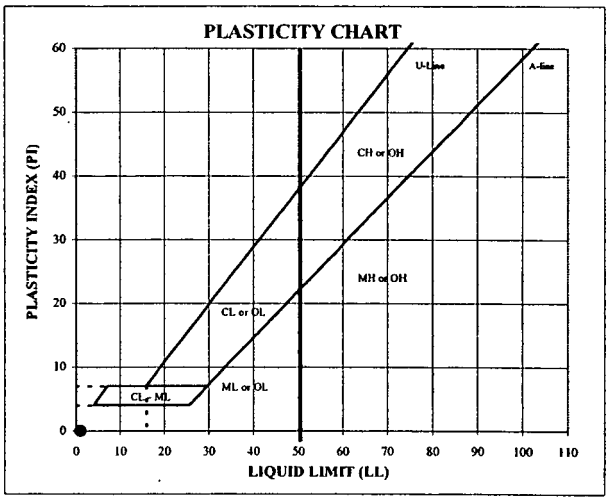
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	97.9		
1.0"	25.0	57.0	Coarse Gravel	72.74
0.75"	19.0	27.3		
0.375"	9.5	14.1		
#4	4.8	11.4	Fine Gravel	15.86
#10	2.00	10.2	Coarse Sand	1.24
#20	0.85	8.7		
#40	0.43	7.4	Medium Sand	2.78
#60	0.25	6.3		
#100	0.15	5.9		
#200	0.075	4.5	Fine Sand	2.91

Hydrometer Analysis

(mm)	%Finer		
0.035	3.5		
0.022	3.3		
0.013	3.1	Fines	
0.0093	2.8	Silt or Clay	4.47
0.0066	2.7		
0.0032	2.4		
0.0013	2.2		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
--	--	--	--	--

DESCRIPTION: Brownish yellow (10 YR 6/6) poorly graded gravel

USCS: GP

TECH MKS
DATE 6/13/2005
REVIEW MB

155

TABLE 2
KAISER HILL/ROCKY FLATS FIELD AND LAB
053-2203-0001
RIGID-WALL COMPRESSION
CONSTANT-HEAD PERMEABILITY
10-INCH DIAMETER CELL

Project Title:	Kaiser Hill/Rocky Flats Field and Lab	**Boring:**	
Project Number:	053-2203-0001	**Sample:**	DR-4
Date Tested:	6/13/05	**Depth:**	--

Sample Setup

Initial Sample Height, in	10.504
Mold Diameter, in	10.00
Sample Area, in^2	78.54
Wet Sample Weight, g	21,147.8
Wet Sample Weight, lb	46.63
Dry Sample Weight, g	21,083.7
Dry Sample Weight, lb	46.49

Initial Sample:

Moisture Determination

Tare	M32
Wet Weight and Tare, g	864.60
Dry Weight and Tare, g	862.30
Tare Weight, g	105.68
Moisture Content, %	0.3

Initial Sample Density and Void Ratio

Specific Gravity[1]	2.70
Initial Sample Volume, ft^3	0.477
Initial Wet Density, lb/ft^3	97.7
Initial Dry Density, lb/ft^3	97.4
Initial Void Ratio	0.73

Final Sample Density and Void Ratio

Final Sample Height, in	10.302
Final Sample Volume, ft^3	0.468
Final Dry Density, lb/ft^3	99.3
Final Void Ratio	0.70

Load (psi)	Height (in)	Dry Density (pcf)	Void Ratio	Flow Rate (ml/sec)	Gradient	Permeability (cm/sec)	Porosity
26	10.302	99.3	0.70	34.62	0.01	5.1E+00	0.41

NOTES: [1]Specific Gravity = Assumed Value

SECTION 3

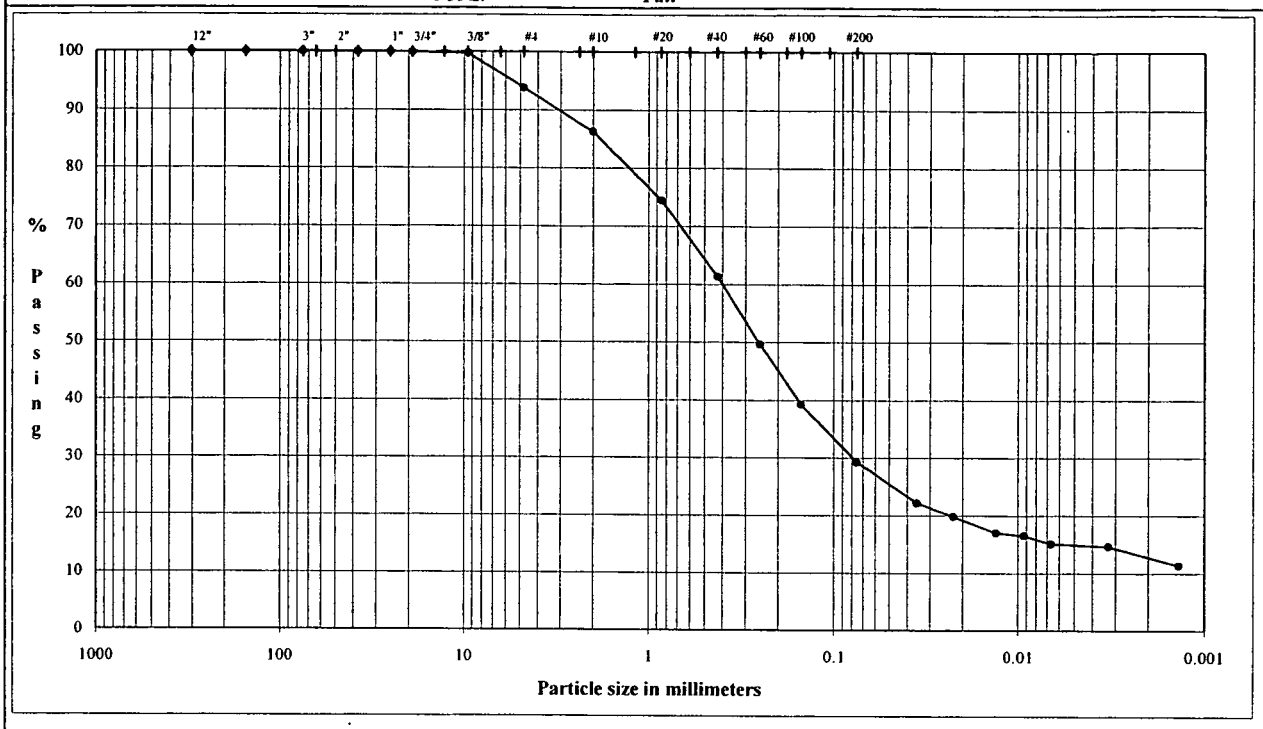
RE-GRADE FILL TESTING RESULTS

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **RF-01** Depth (ft): -
TYPE: **Pail**



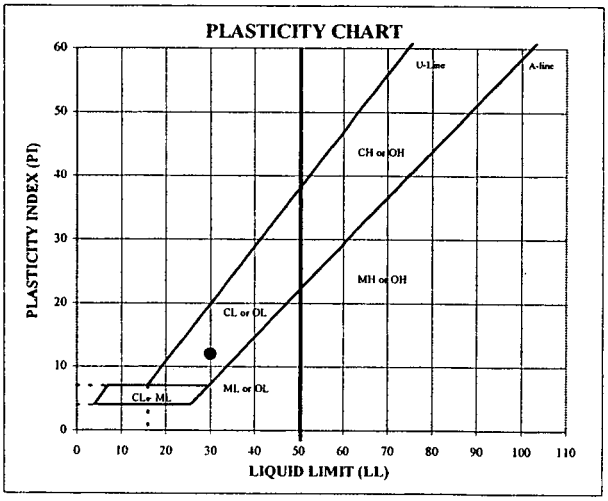
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.07
0.75"	19.0	99.9		
0.375"	9.5	99.8		
#4	4.8	93.8	Fine Gravel	6.16
#10	2.00	86.3	Coarse Sand	7.50
#20	0.85	74.5		
#40	0.43	61.3	Medium Sand	24.94
#60	0.25	49.6		
#100	0.15	39.3		
#200	0.075	29.2	Fine Sand	32.15

Hydrometer Analysis

(mm)	%Finer		
0.035	22.1		
0.023	19.8		
0.013	17.0	Fines	
0.0093	16.5	Silt or Clay	29.18
0.0066	15.1		
0.0033	14.6		
0.0014	11.3		



ATTERBERG LIMITS

M.	LL	PL	PI	SpG
--	30	18	12	--

DESCRIPTION: Reddish yellow (7.5 YR 7/8) clayey sand

USCS: SC

TECH	DS
DATE	6/14/2005
REVIEW	MB

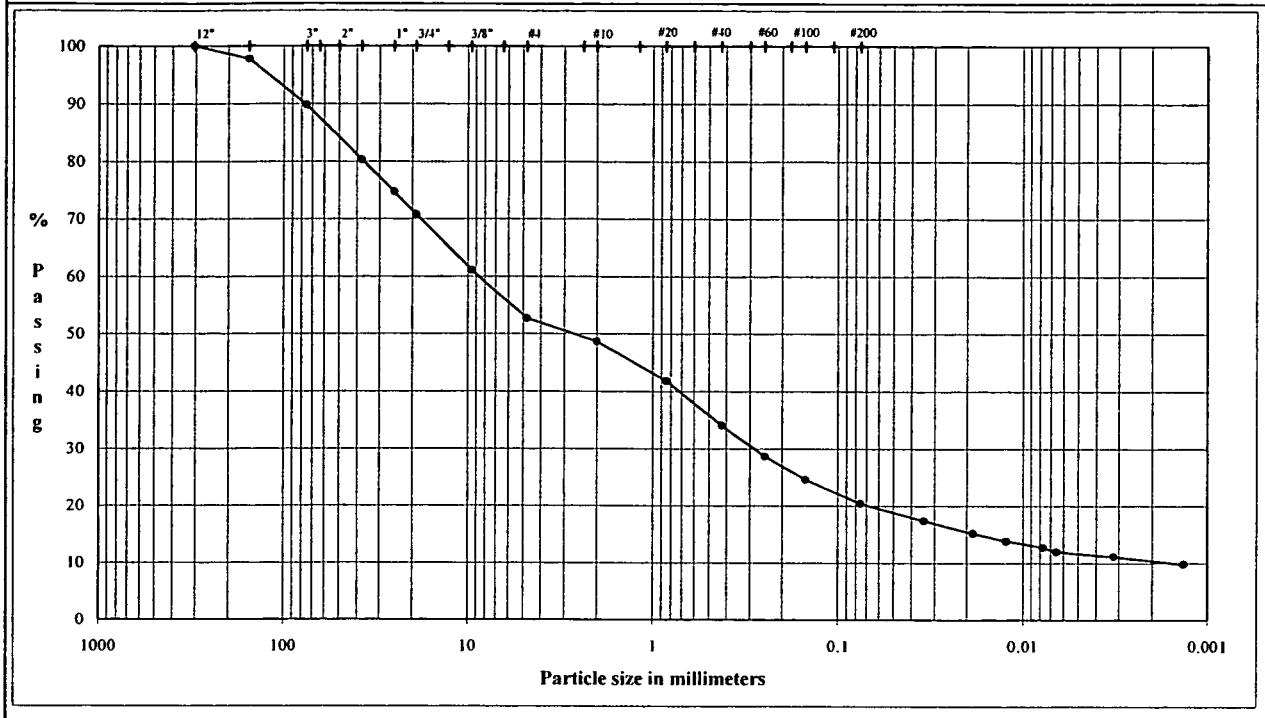
157

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **RF-02** Depth: –
TYPE: **Pail**



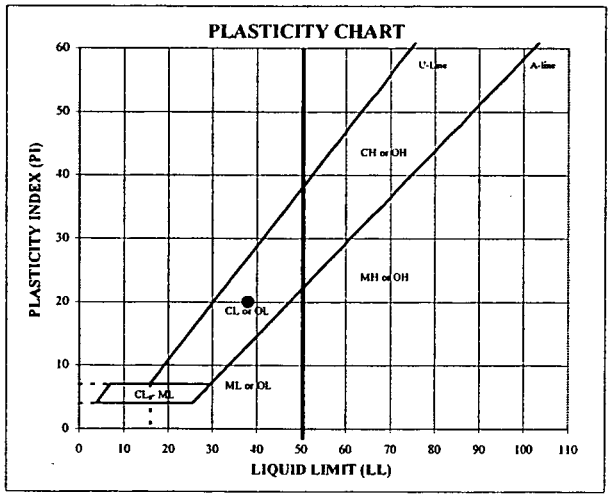
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	10.26
12.0"	304.8	100.0		
6.0"	154.2	97.8		
3.0"	75.0	89.7		
1.5"	37.5	80.3		
1.0"	25.0	74.7	Coarse Gravel	18.94
0.75"	19.0	70.8		
0.375"	9.5	61.1		
#4	4.8	52.7	Fine Gravel	18.12
#10	2.00	48.7	Coarse Sand	4.00
#20	0.85	41.8		
#40	0.43	34.0	Medium Sand	14.63
#60	0.25	28.6		
#100	0.15	24.6		
#200	0.075	20.4	Fine Sand	13.68

Hydrometer Analysis

(mm)	%Finer		
0.034	17.3		
0.019	15.2		
0.012	13.8	Fines	
0.0077	12.7	Silt or Clay	20.36
0.0065	11.9		
0.0032	11.1		
0.0013	9.8		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
10.5	38	18	20	2.70

DESCRIPTION: Yellowish brown (10 YR 5/6) clayey gravel with sand

USCS: GC

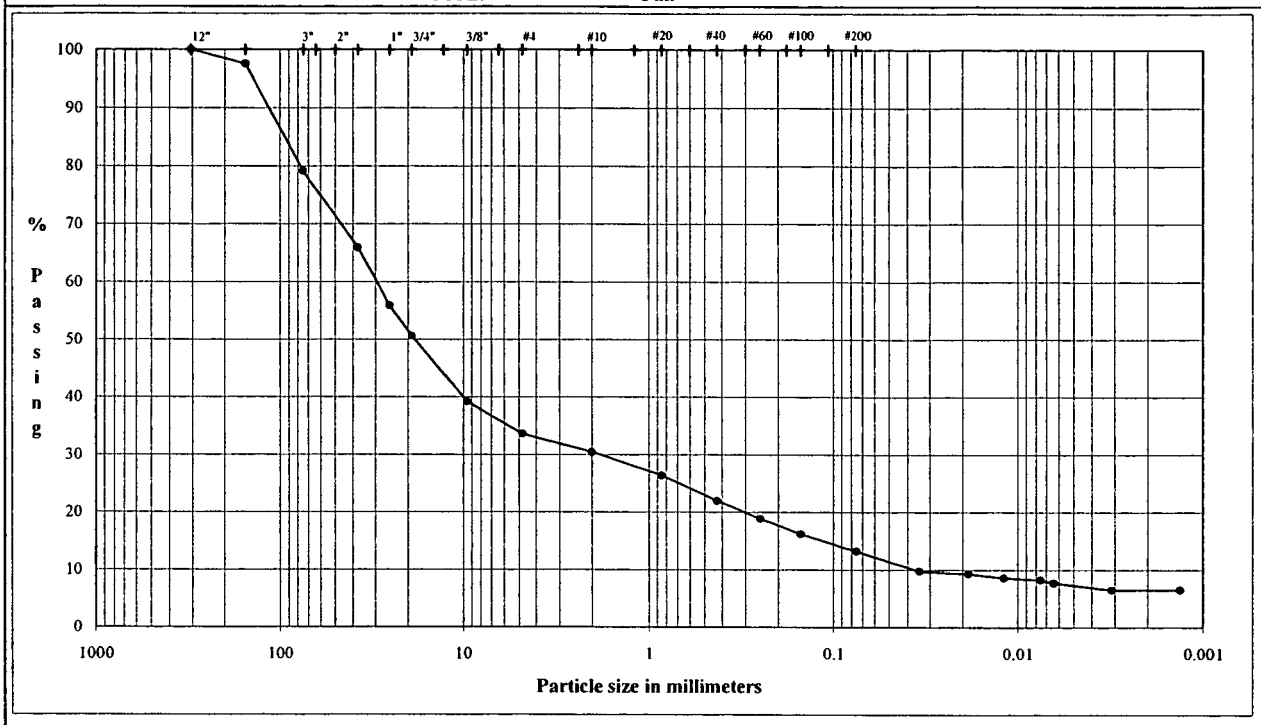
TECH DS/DT
DATE 5/12/2005
REVIEW MB

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **RF-03** Depth: --
TYPE: **Pail**



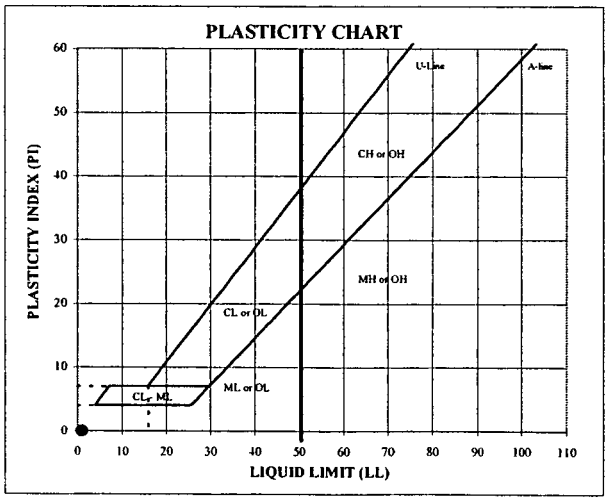
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	20.89
12.0"	304.8	100.0		
6.0"	154.2	97.6		
3.0"	75.0	79.1		
1.5"	37.5	65.9		
1.0"	25.0	55.9	Coarse Gravel	28.55
0.75"	19.0	50.6		
0.375"	9.5	39.2		
#4	4.8	33.6	Fine Gravel	17.00
#10	2.00	30.4	Coarse Sand	3.13
#20	0.85	26.3		
#40	0.43	22.0	Medium Sand	8.46
#60	0.25	18.8		
#100	0.15	16.2		
#200	0.075	13.2	Fine Sand	8.77

Hydrometer Analysis

(mm)	%Finer		
0.034	9.8		
0.018	9.3		
0.012	8.6	Fines	
0.0076	8.2	Silt or Clay	13.19
0.0064	7.7		
0.0031	6.5		
0.0013	6.5		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
12.0	--	--	--	2.70

DESCRIPTION: Brown (7.5 YR 5/4)

USCS: --

TECH	DS
DATE	6/16/2004
REVIEW	MB

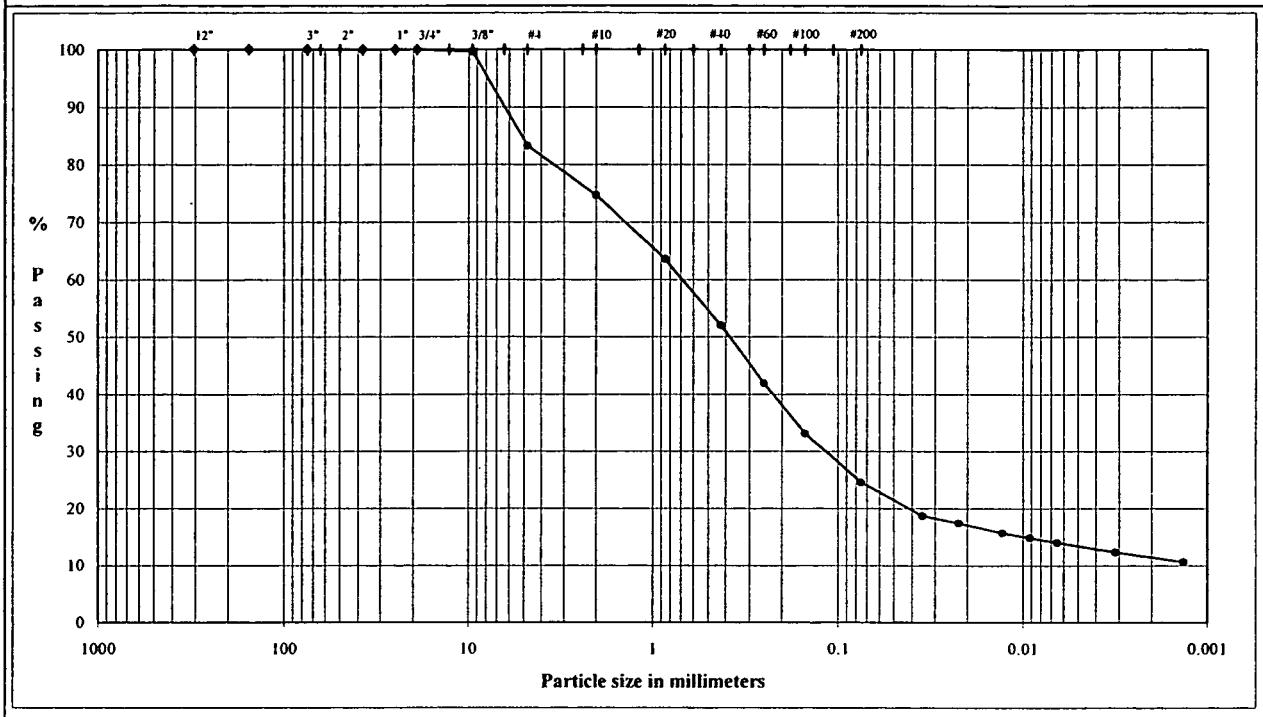
158

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **RF-04** Depth (ft): -
TYPE: **Pail**



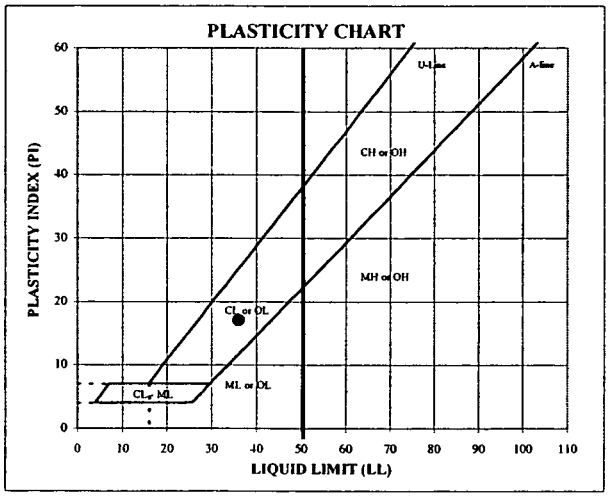
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	99.7		
#4	4.8	83.3	Fine Gravel	16.74
#10	2.00	74.7	Coarse Sand	8.57
#20	0.85	63.5		
#40	0.43	52.0	Medium Sand	22.69
#60	0.25	41.8		
#100	0.15	33.1		
#200	0.075	24.5	Fine Sand	27.45

Hydrometer Analysis

(mm)	%Finer		
0.035	18.6		
0.022	17.4		
0.013	15.7	Fines	
0.0092	14.8	Silt or Clay	24.54
0.0065	14.0		
0.0032	12.3		
0.0013	10.6		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG
12.0	36	19	17	--

DESCRIPTION: Reddish brown (5YR 4/4) clayey sand with gravel

USCS: SC

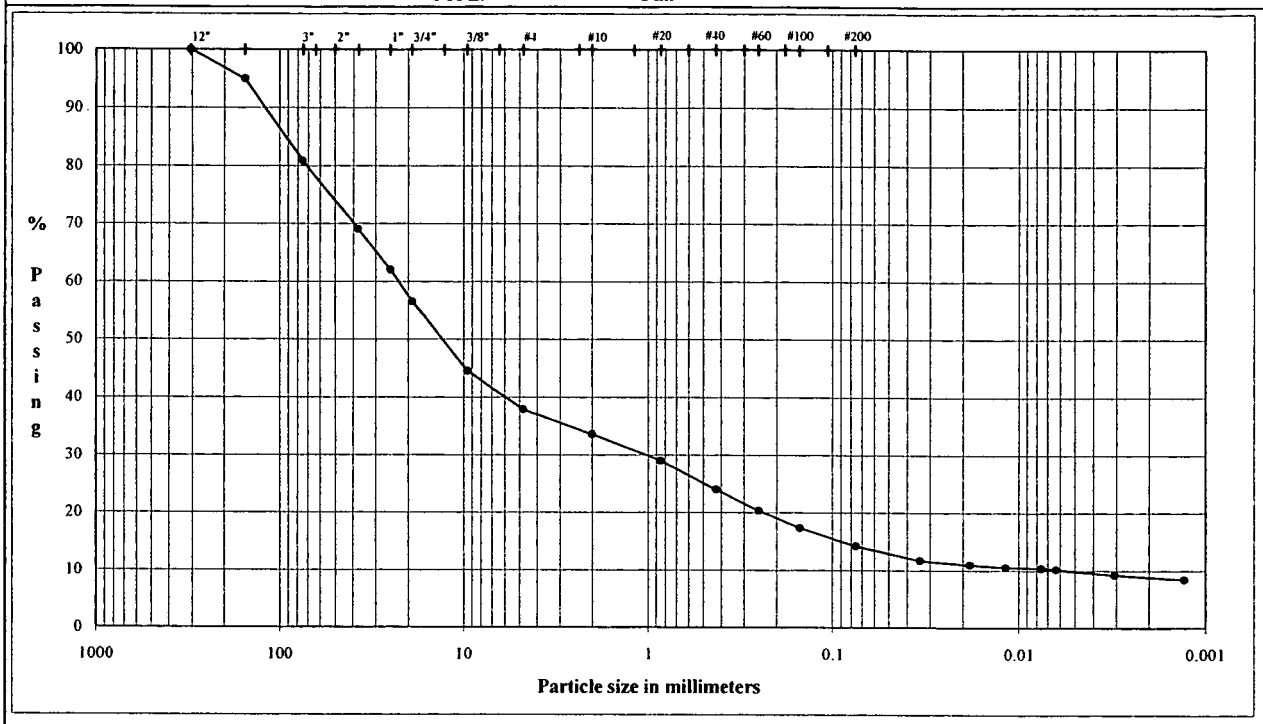
TECH MKS
DATE 6/20/2005
REVIEW MB

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **RF-05** Depth: --
TYPE: **Pail**



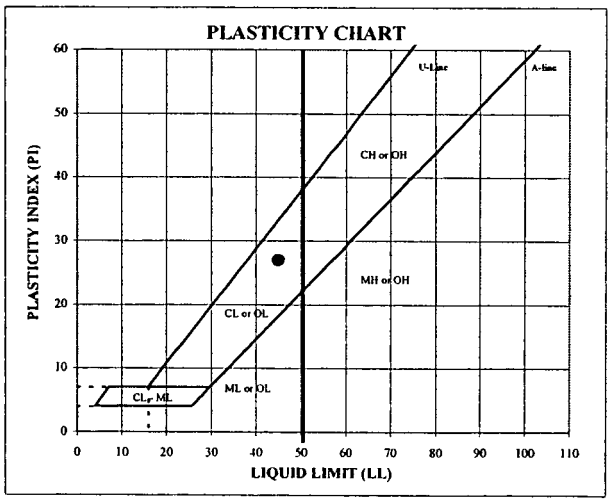
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	19.18
12.0"	304.8	100.0		
6.0"	154.2	95.0		
3.0"	75.0	80.8		
1.5"	37.5	69.1		
1.0"	25.0	62.0	Coarse Gravel	24.23
0.75"	19.0	56.6		
0.375"	9.5	44.5		
#4	4.8	37.8	Fine Gravel	18.76
#10	2.00	33.5	Coarse Sand	4.31
#20	0.85	28.9		
#40	0.43	24.0	Medium Sand	9.53
#60	0.25	20.3		
#100	0.15	17.3		
#200	0.075	14.2	Fine Sand	9.80

Hydrometer Analysis

(mm)	%Finer		
0.034	11.7		
0.018	10.9		
0.012	10.5	Fines	
0.0075	10.4	Silt or Clay	14.18
0.0063	10.2		
0.0031	9.2		
0.0013	8.4		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG (assumed)
5.7	45	18	27	2.70

DESCRIPTION: Strong brown (7.5 YR 5/6) clayey gravel with sand

USCS: GC

TECH: DS
DATE: 6/16/2004
REVIEW: MB

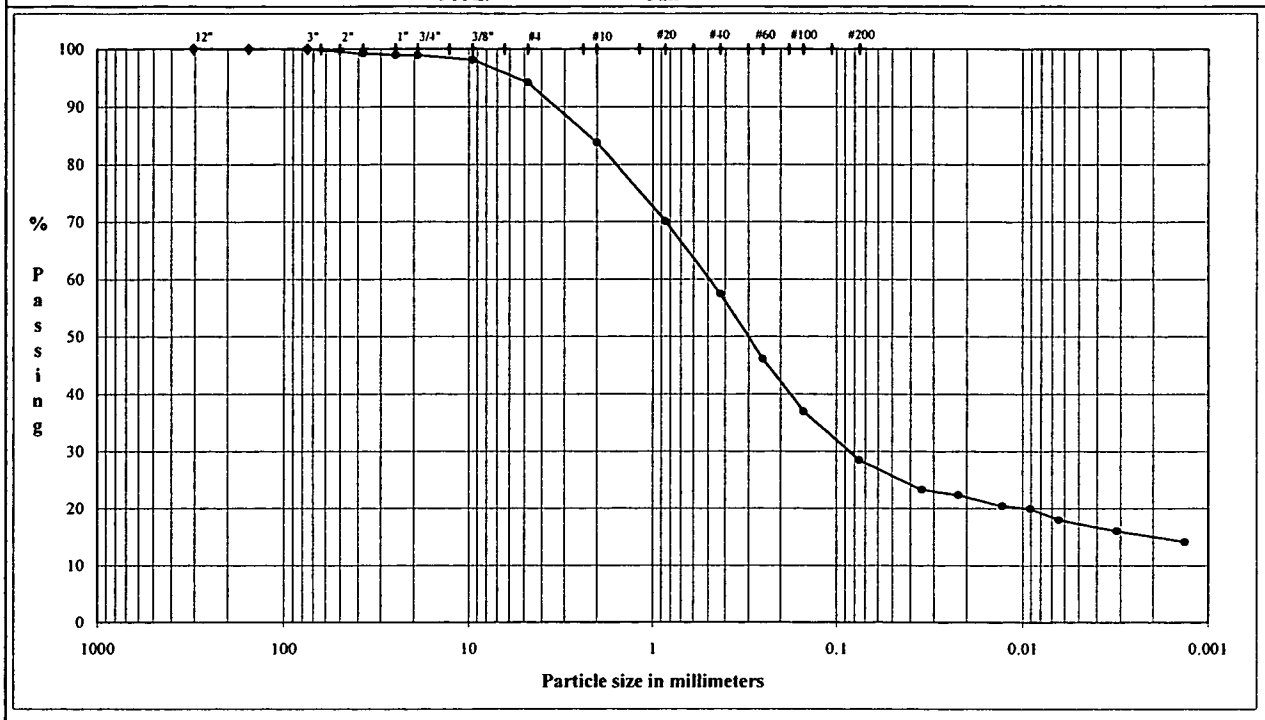
159

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **RF-06** Depth (ft): -
TYPE: **Pail**



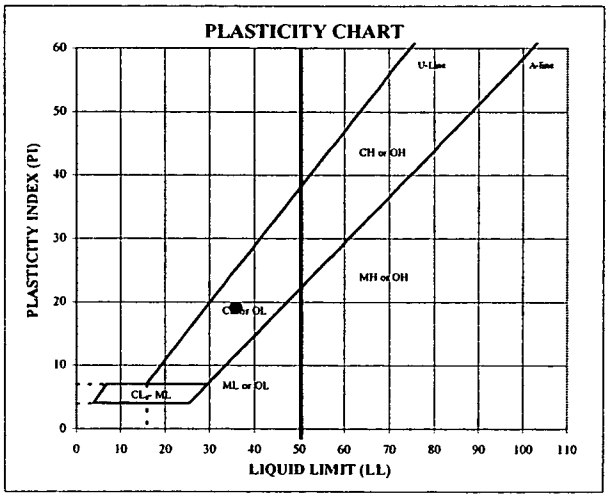
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	99.3		
1.0"	25.0	99.0	Coarse Gravel	1.09
0.75"	19.0	98.9		
0.375"	9.5	98.1		
#4	4.8	94.2	Fine Gravel	4.72
#10	2.00	83.8	Coarse Sand	10.44
#20	0.85	70.1		
#40	0.43	57.4	Medium Sand	26.31
#60	0.25	46.1		
#100	0.15	36.9		
#200	0.075	28.4	Fine Sand	29.07

Hydrometer Analysis

(mm)	%Finer		
0.035	23.3		
0.022	22.3		
0.013	20.4	Fines	
0.0091	19.9	Silt or Clay	28.37
0.0064	17.9		
0.0031	16.0		
0.0013	14.1		



ATTERBERG LIMITS

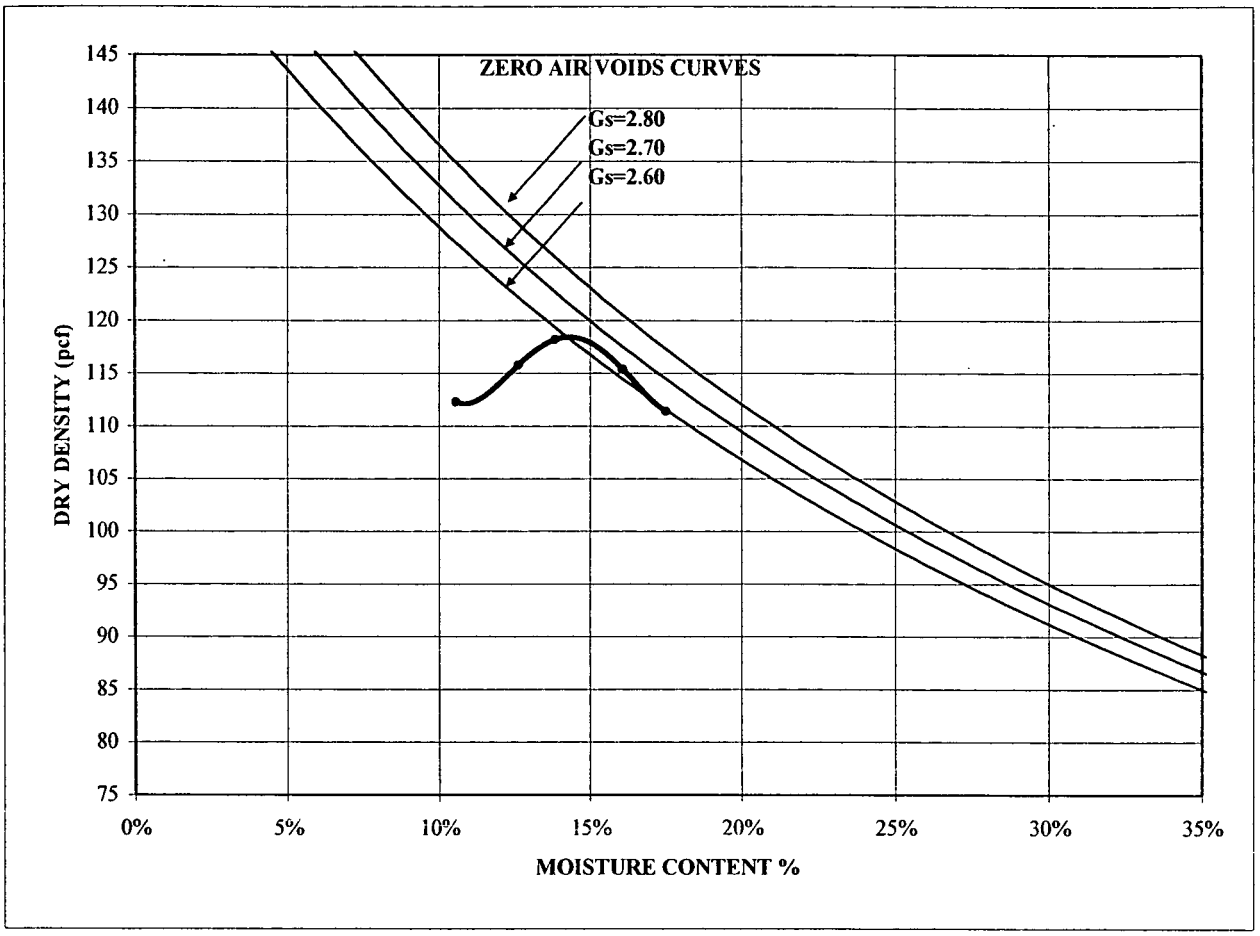
M_c	LL	PL	PI	SpG
11.3	36	17	19	--

DESCRIPTION: Strong brown (7.5 YR 4/4) clayey sand

USCS: SC

TECH MKS
DATE 6/20/2005
REVIEW MB

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	118.5	Corrected Maximum Dry Density (pcf)	120.4
OPTIMUM MOISTURE (%)	14.1	Corrected Optimum Moisture (%)	13.4

SAMPLE ID	RF-06
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	36
PL	17
PI	19
MC	11.3

DESCRIPTION	Strong brown (7.5 YR 4/4) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

TECH	MKS
DATE	6-21-2005
REVIEW	MB

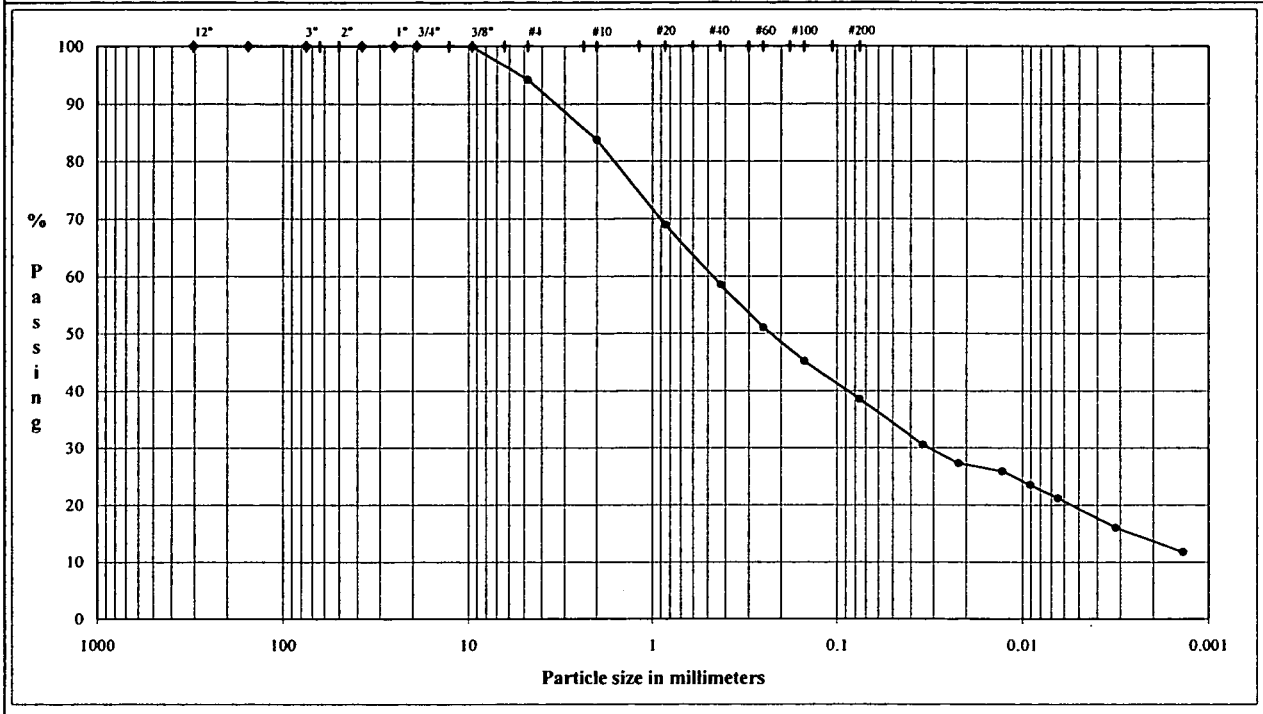
160

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **RF-07** Depth (ft): -
TYPE: **Pail**



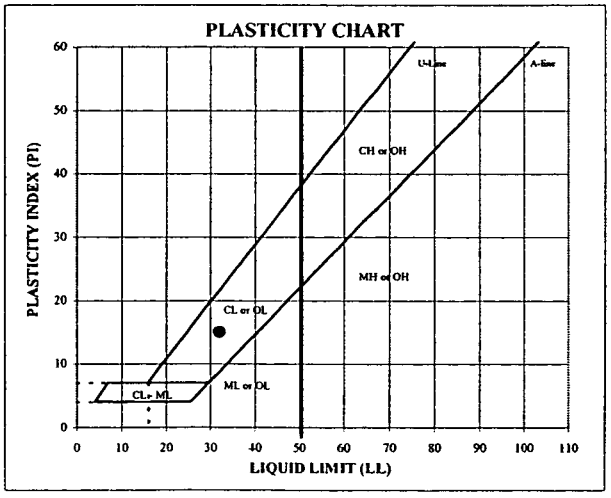
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	99.9		
#4	4.8	94.2	Fine Gravel	5.82
#10	2.00	83.7	Coarse Sand	10.44
#20	0.85	68.9		
#40	0.43	58.5	Medium Sand	25.22
#60	0.25	51.0		
#100	0.15	45.1		
#200	0.075	38.5	Fine Sand	20.04

Hydrometer Analysis

(mm)	%Finer		
0.034	30.5		
0.022	27.2		
0.013	25.8	Fines	
0.0091	23.5	Silt or Clay	38.49
0.0065	21.1		
0.0032	16.0		
0.0014	11.7		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
9.8	32	17	15	--

DESCRIPTION: Dark yellowish (10 YR 4/4) clayey sand

USCS: SC

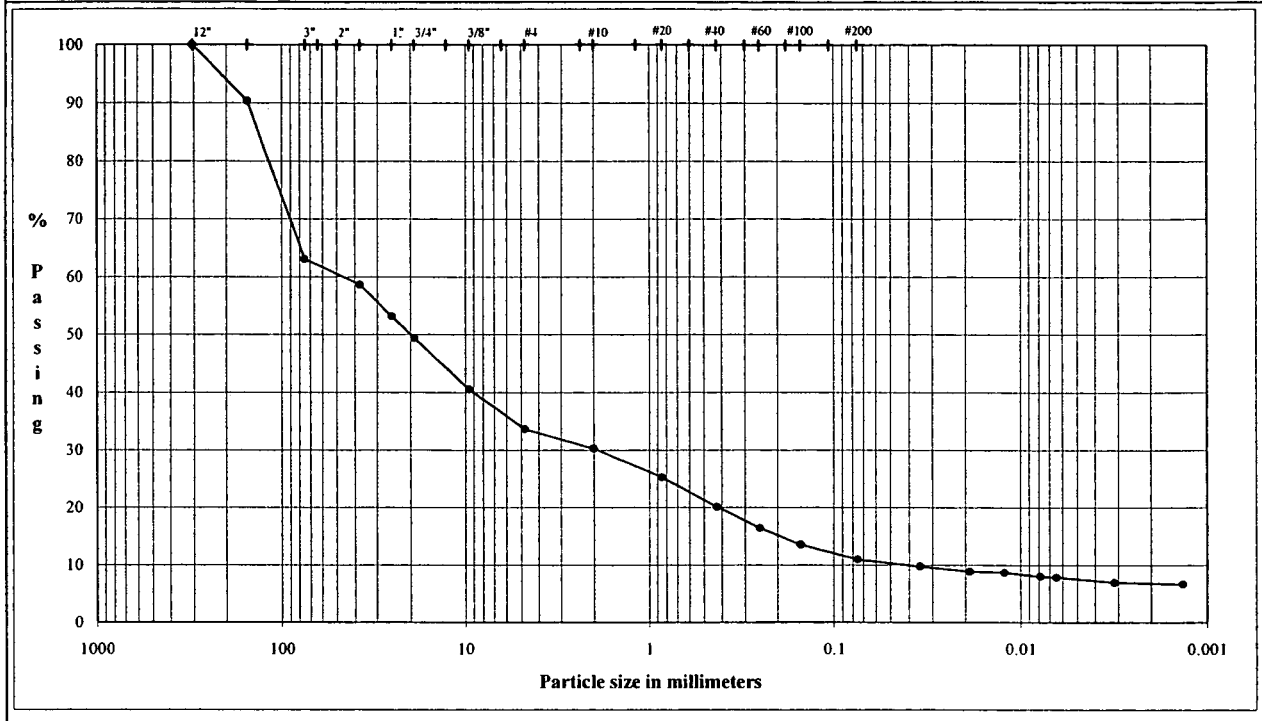
TECH	DS
DATE	6/21/2005
REVIEW	MB

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **RF-08** Depth: --
TYPE: **Pail**



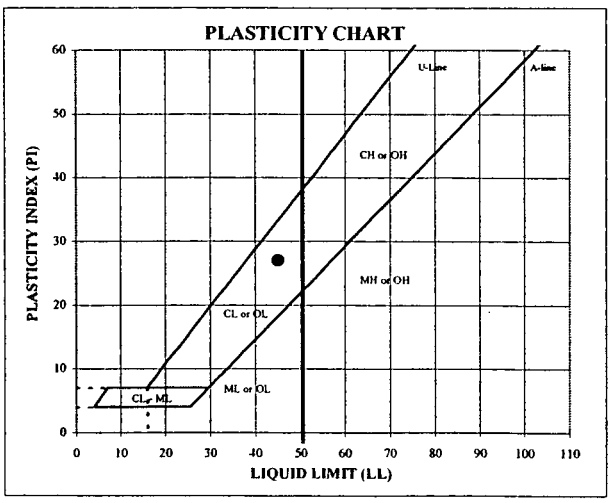
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	36.95
12.0"	304.8	100.0		
6.0"	154.2	90.4		
3.0"	75.0	63.1		
1.5"	37.5	58.7		
1.0"	25.0	53.2	Coarse Gravel	13.67
0.75"	19.0	49.4		
0.375"	9.5	40.5		
#4	4.8	33.6	Fine Gravel	15.77
#10	2.00	30.2	Coarse Sand	3.43
#20	0.85	25.2		
#40	0.43	20.1	Medium Sand	10.10
#60	0.25	16.4		
#100	0.15	13.5		
#200	0.075	10.9	Fine Sand	9.15

Hydrometer Analysis

(mm)	%Finer		
0.035	9.7		
0.019	8.9		
0.012	8.7	Fines	
0.0078	8.0	Silt or Clay	10.94
0.0065	7.8		
0.0031	7.0		
0.0013	6.6		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
16.1	45	18	27	2.70

DESCRIPTION: Dark yellowish brown poorly graded gravel with clay and sand

USCS: GP-GC

TECH MGC
DATE 6/24/2005
REVIEW MB

161

SECTION 4

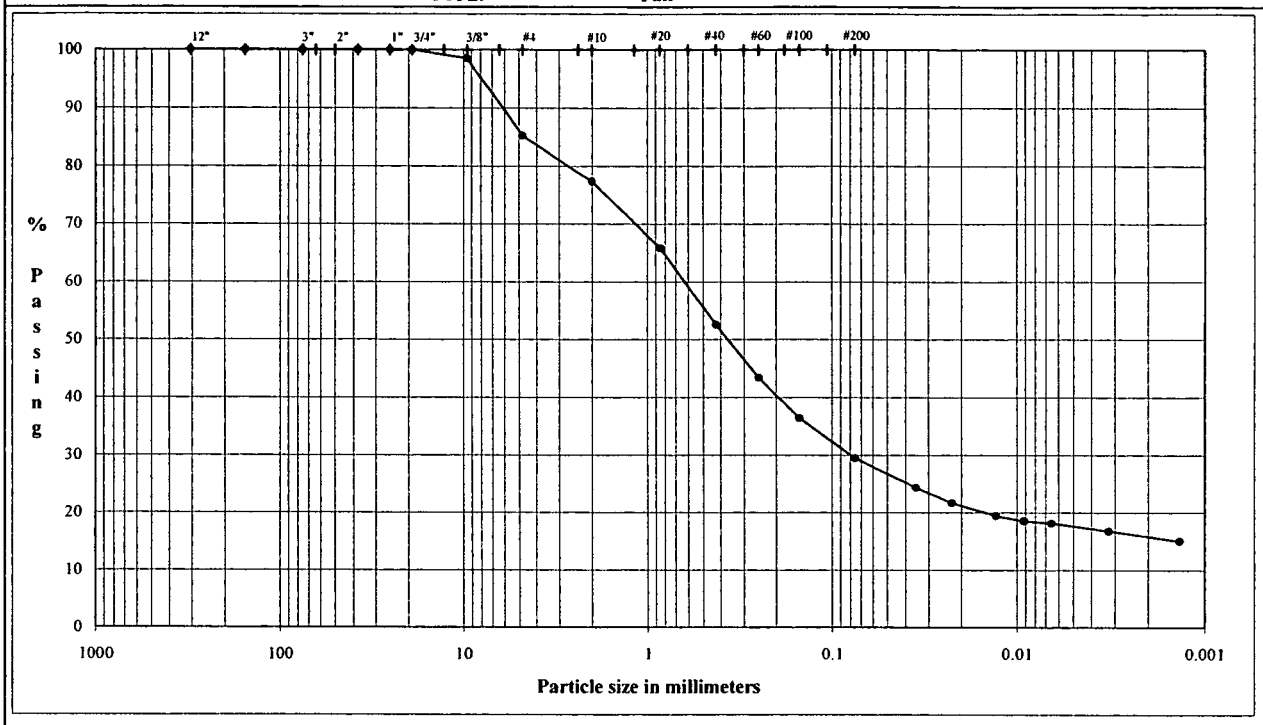
BUTTRESS FILL TESTING RESULTS

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-01** Depth (ft): -
TYPE: **Pail**



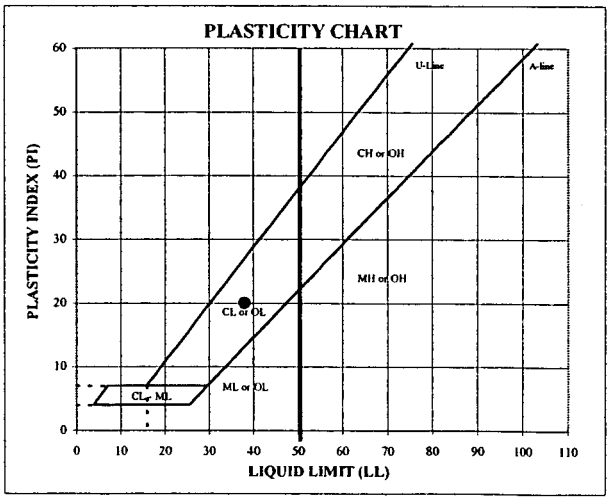
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	98.5		
#4	4.8	85.3	Fine Gravel	14.74
#10	2.00	77.3	Coarse Sand	7.92
#20	0.85	65.8		
#40	0.43	52.6	Medium Sand	24.75
#60	0.25	43.4		
#100	0.15	36.4		
#200	0.075	29.4	Fine Sand	23.16

Hydrometer Analysis

(mm)	%Finer		
0.035	24.3		
0.022	21.6		
0.013	19.4	Fines	
0.0092	18.5	Silt or Clay	29.42
0.0065	18.1		
0.0032	16.8		
0.0014	15.0		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	38	18	20	--

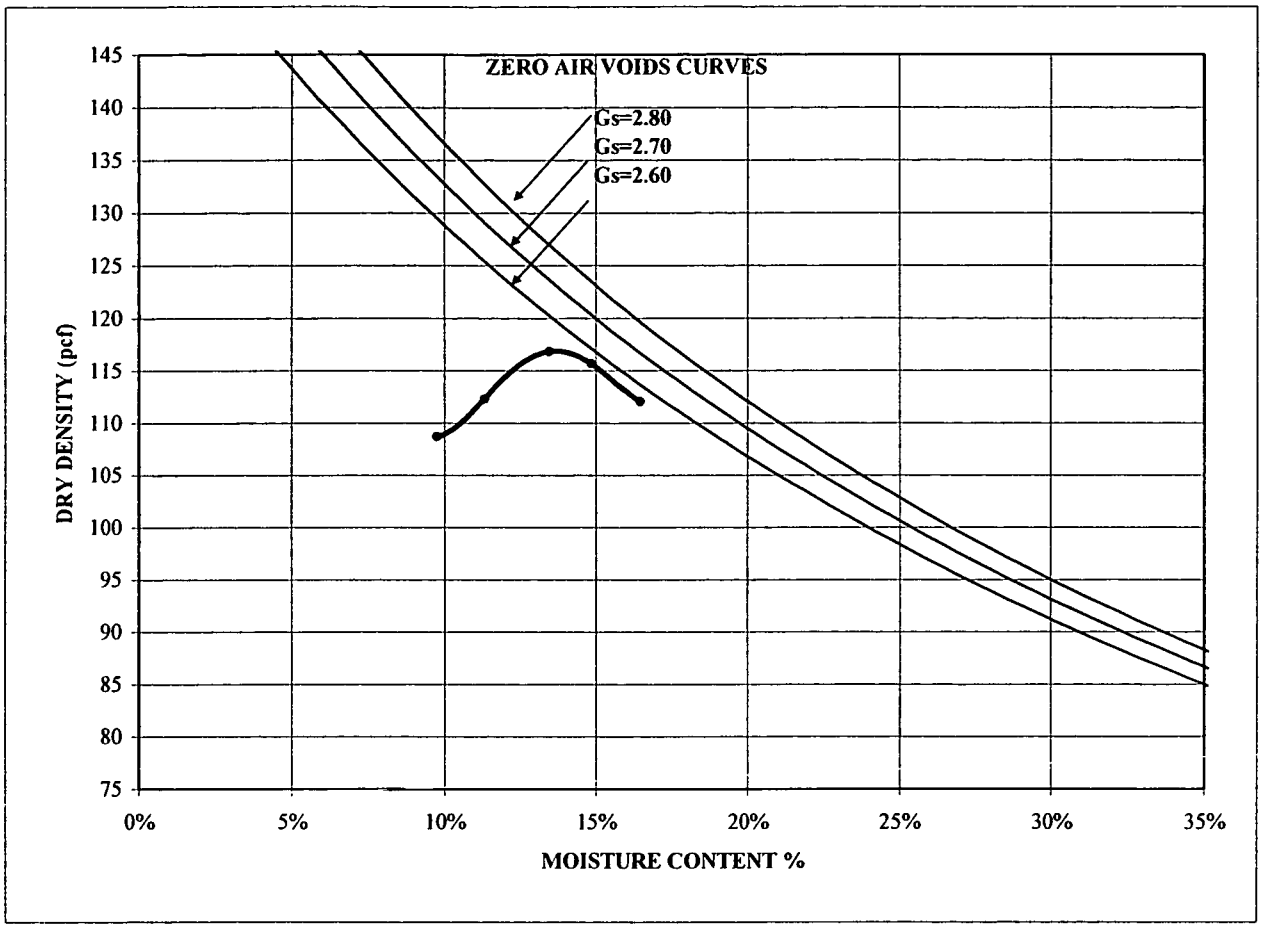
DESCRIPTION: Strong brown (7.5 YR 5/6) clayey sand

USCS: SC

TECH	DS
DATE	6/15/2005
REVIEW	MB

163

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	116.8	Corrected Maximum Dry Density (pcf)	121.9
OPTIMUM MOISTURE (%)	13.6	Corrected Optimum Moisture (%)	11.8

SAMPLE ID	BF-01
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	38
PL	18
PI	20
MC	--

DESCRIPTION	Strong brown (7.5 YR 5/6) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

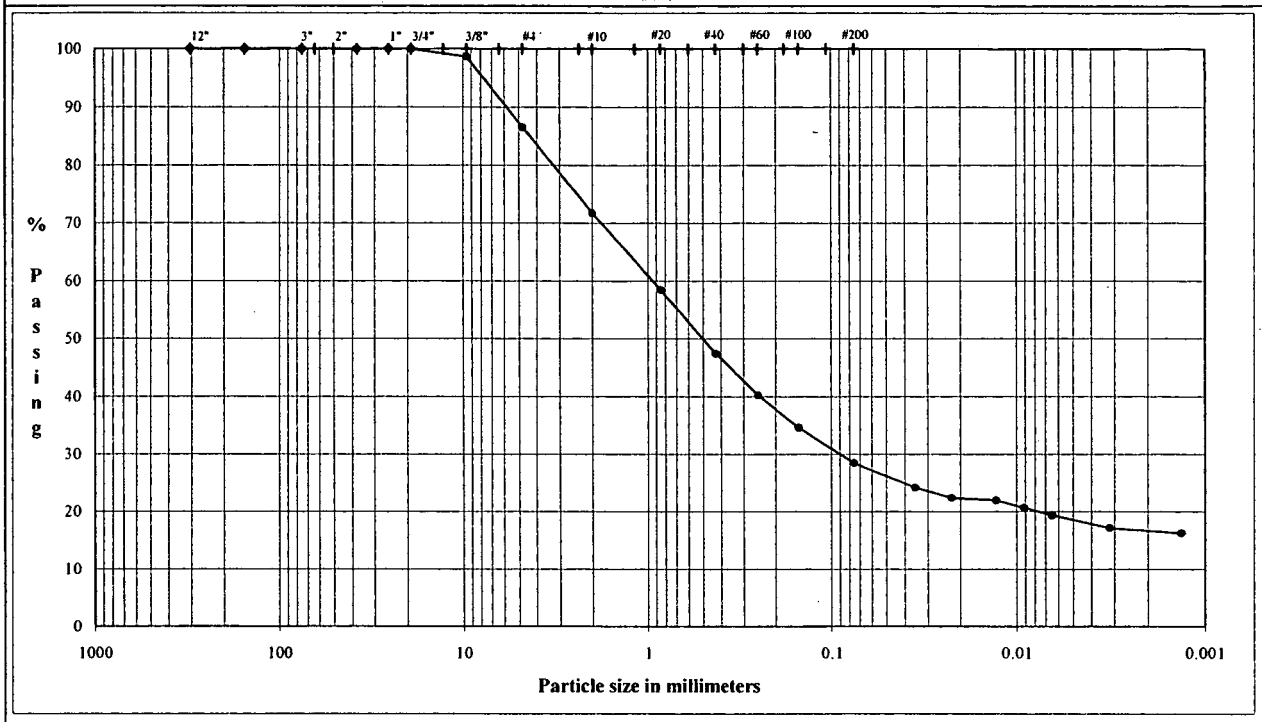
TECH	MKS
DATE	6-16-05
REVIEW	MB

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-02** Depth (ft): -
TYPE: **Pail**



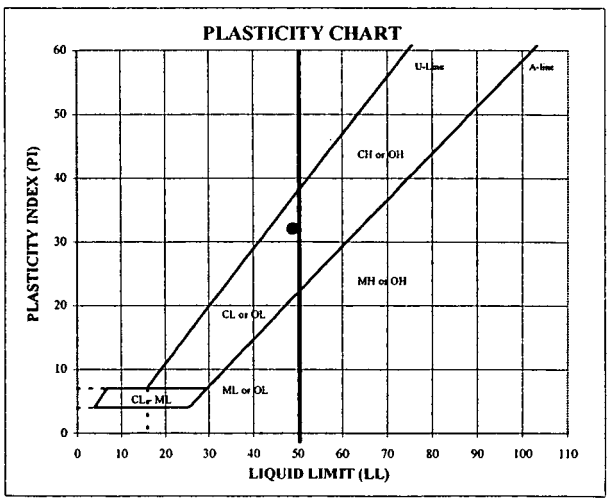
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	98.7		
#4	4.8	86.5	Fine Gravel	13.49
#10	2.00	71.8	Coarse Sand	14.74
#20	0.85	58.4		
#40	0.43	47.4	Medium Sand	24.35
#60	0.25	40.2		
#100	0.15	34.5		
#200	0.075	28.4	Fine Sand	19.03

Hydrometer Analysis

(mm)	%Finer		
0.035	24.1		
0.022	22.4		
0.013	21.9	Fines	
0.0091	20.6	Silt or Clay	28.38
0.0065	19.3		
0.0032	17.1		
0.0013	16.2		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	49	17	32	--

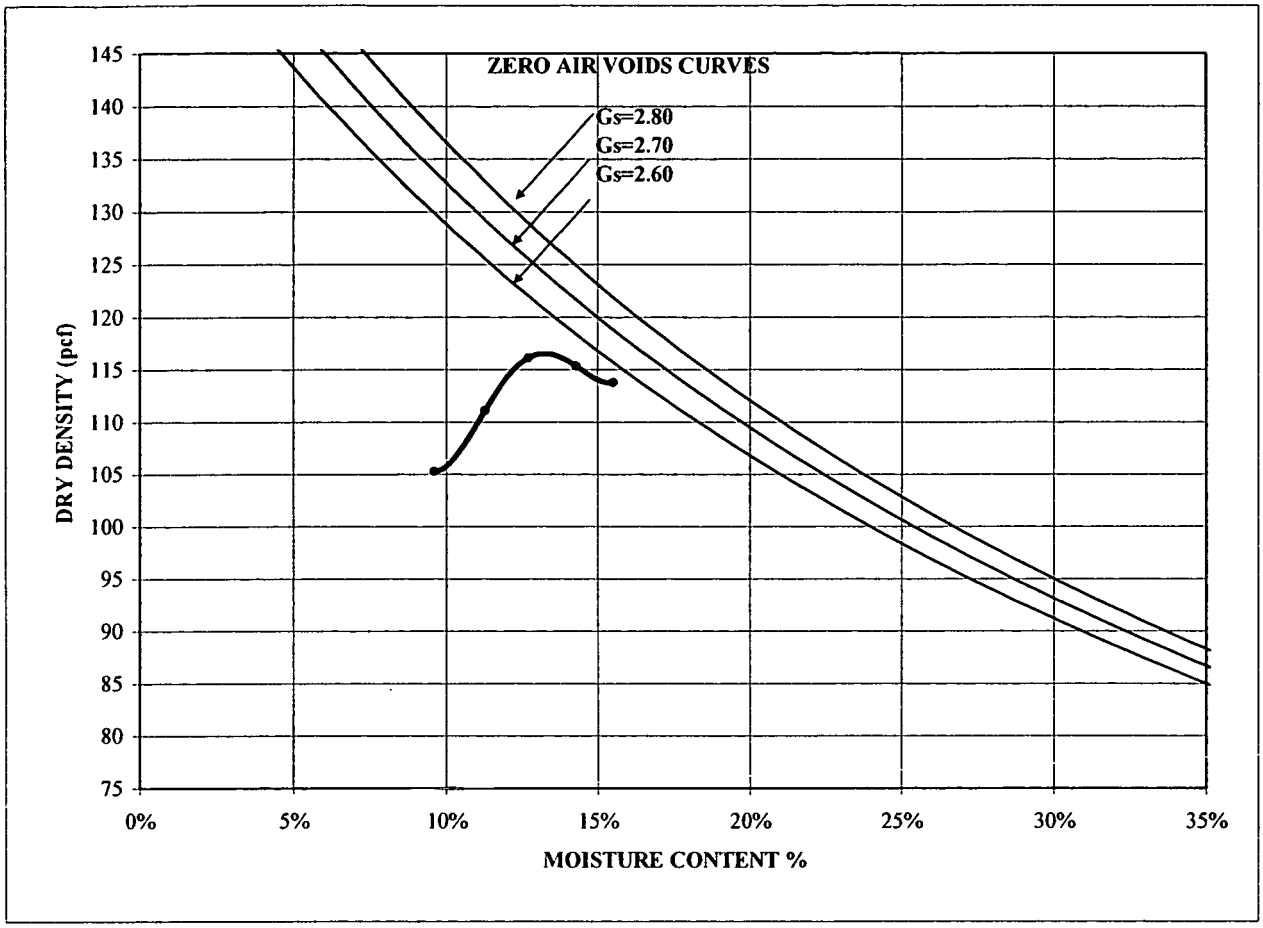
DESCRIPTION: Reddish yellow (7.5 YR 6/6) clayey sand with grave

USCS: SC

TECH	DS
DATE	6/27/2005
REVIEW	MB

164

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	116.8	Corrected Maximum Dry Density (pcf)	121.5
OPTIMUM MOISTURE (%)	13.6	Corrected Optimum Moisture (%)	11.9

SAMPLE ID	BF-02
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	49
PL	17
PI	32
MC	--

DESCRIPTION	Reddish yellow (7.5 YR 6/6) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

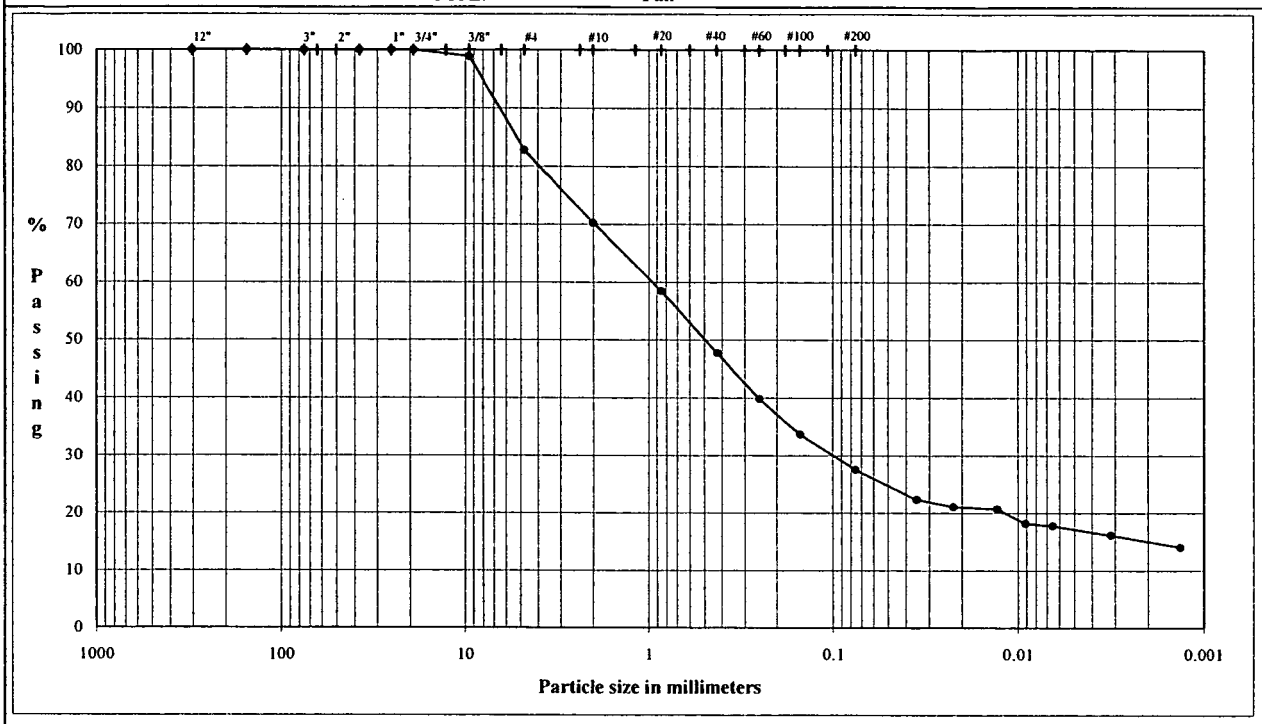
TECH	MKS
DATE	6-16-05
REVIEW	MB

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-03** Depth (ft): -
TYPE: **Pail**



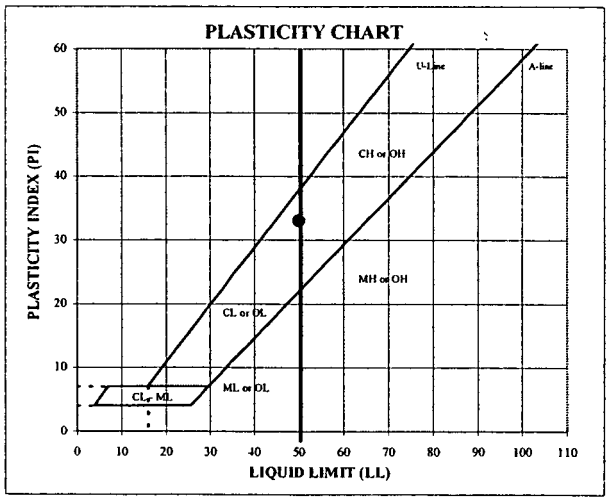
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	98.9		
#4	4.8	82.7	Fine Gravel	17.25
#10	2.00	70.2	Coarse Sand	12.50
#20	0.85	58.5		
#40	0.43	47.8	Medium Sand	22.47
#60	0.25	39.8		
#100	0.15	33.6		
#200	0.075	27.5	Fine Sand	20.30

Hydrometer Analysis

(mm)	%Finer		
0.035	22.3		
0.022	21.1		
0.013	20.6	Fines	
0.0091	18.2	Silt or Clay	27.47
0.0065	17.8		
0.0032	16.1		
0.0013	14.0		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	50	17	33	–

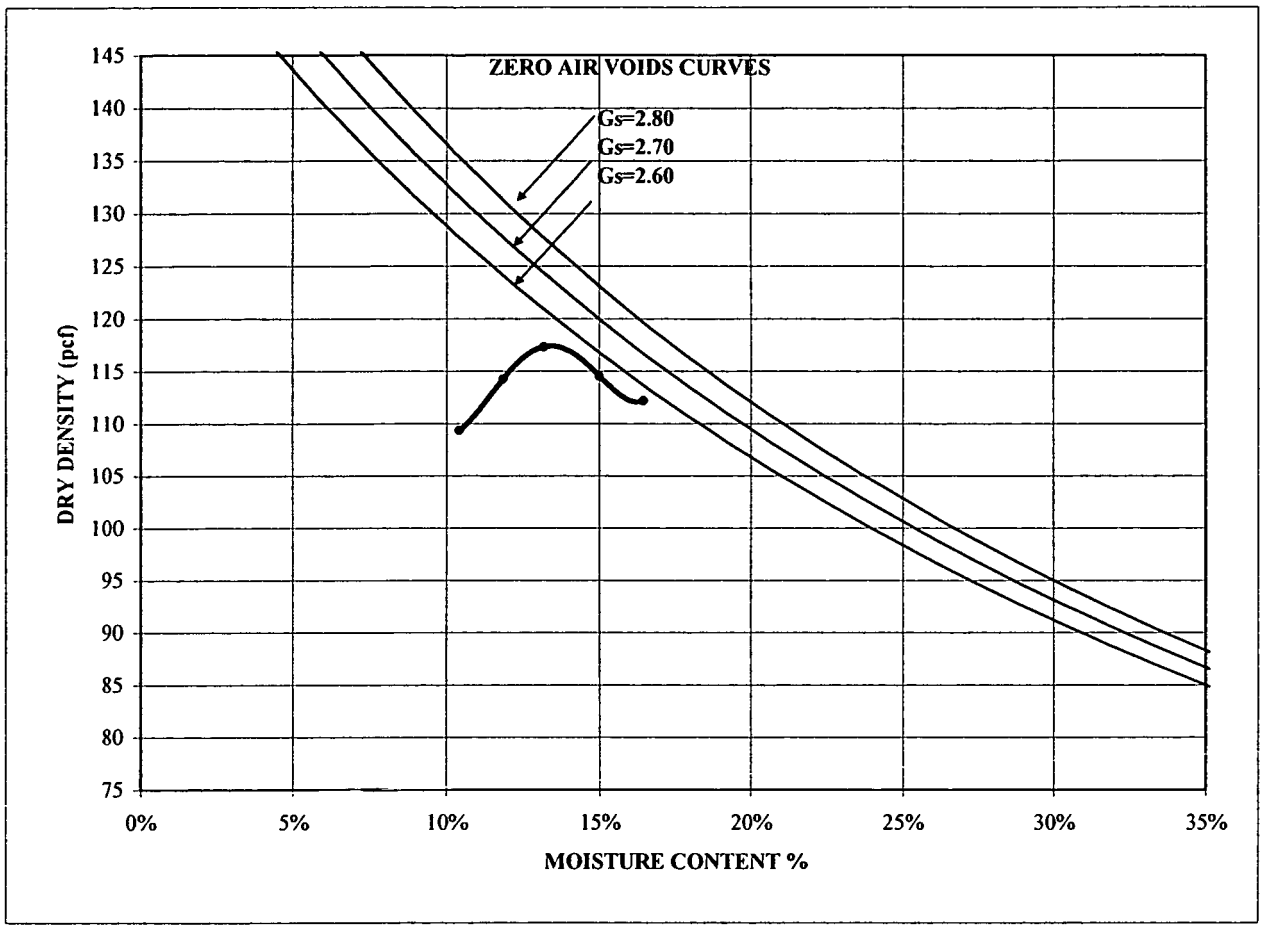
DESCRIPTION: Strong brown (7.5 YR 5/6) clayey sand with gravel

USCS: SC

TECH	DS
DATE	6/27/2005
REVIEW	MB

165

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	117.4	Corrected Maximum Dry Density (pcf)	123.4
OPTIMUM MOISTURE (%)	13.3	Corrected Optimum Moisture (%)	11.2

SAMPLE ID	BF-03
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	50
PL	17
PI	33
MC	--

DESCRIPTION	Strong brown (7.5 YR 5/6) clayey sand with gravel
USCS	SC

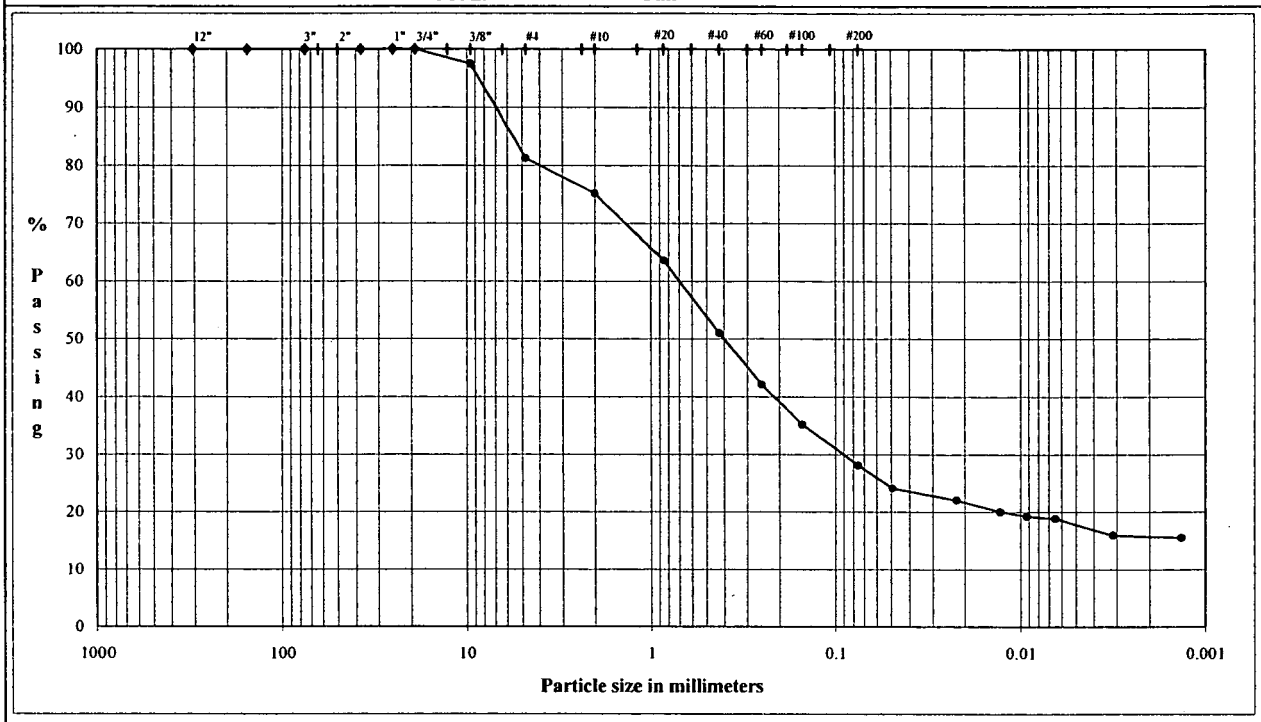
Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

TECH	DS
DATE	6-24-2005
REVIEW	MB

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-04** Depth (ft): -
TYPE: **Pail**



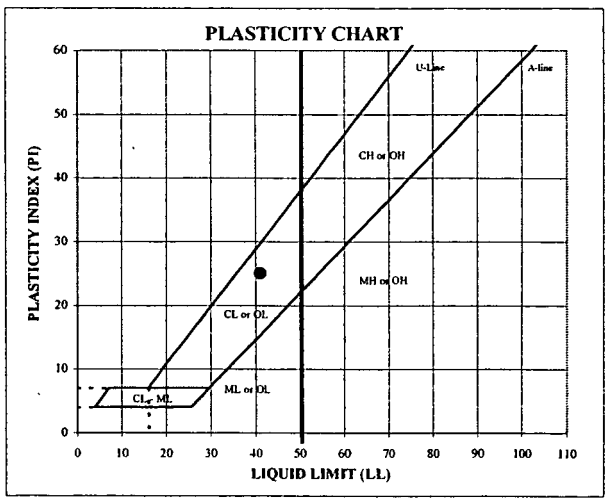
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.5		
#4	4.8	81.2	Fine Gravel	18.80
#10	2.00	75.1	Coarse Sand	6.08
#20	0.85	63.6		
#40	0.43	51.0	Medium Sand	24.09
#60	0.25	42.1		
#100	0.15	35.1		
#200	0.075	28.1	Fine Sand	22.97

Hydrometer Analysis

(mm)	%Finer		
0.049	24.1		
0.022	22.0		
0.013	20.0	Fines	
0.0092	19.2	Silt or Clay	28.06
0.0065	18.8		
0.0032	15.9		
0.0013	15.5		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
10.3	41	16	25	--

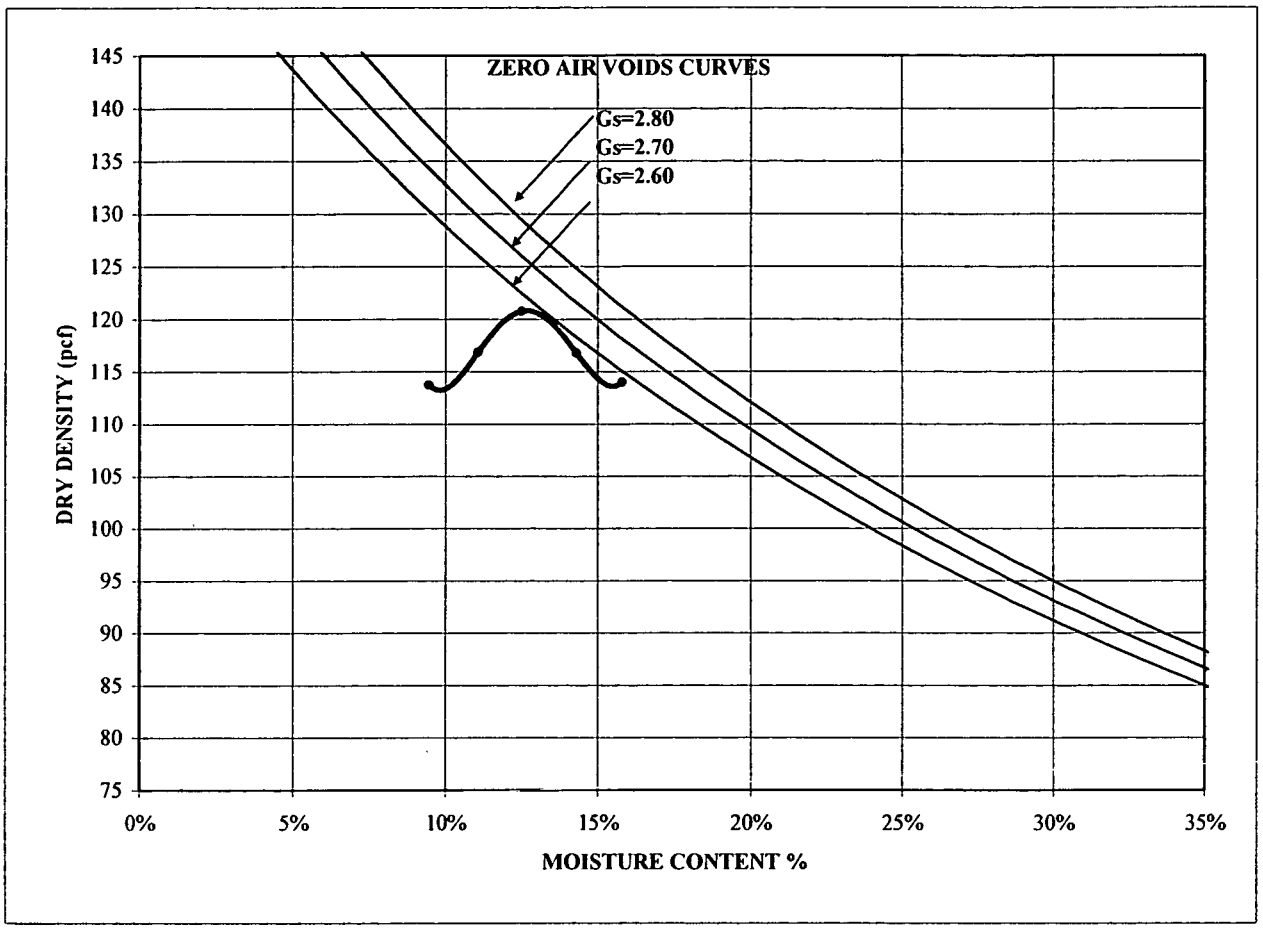
DESCRIPTION: Reddish yellow (7.5 YR 6/6) clayey sand with grave

USCS: SC

TECH	DS
DATE	6/27/2005
REVIEW	MB

166

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	120.7	Corrected Maximum Dry Density (pcf)	126.9
OPTIMUM MOISTURE (%)	12.7	Corrected Optimum Moisture (%)	10.5

SAMPLE ID	BF-04
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	41
PL	16
PI	25
MC	10.3

DESCRIPTION	Reddish yellow (7.5 YR 6/6) clayey sand with gravel
USCS	SC

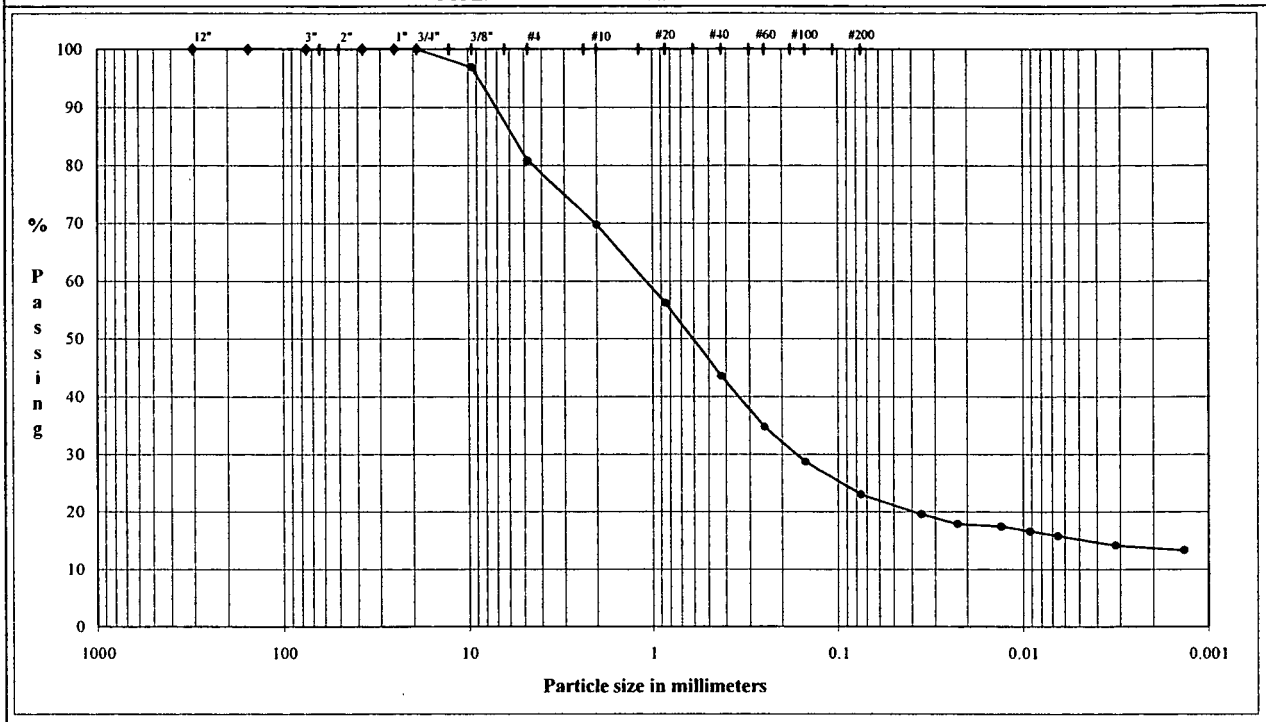
Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

TECH	DS
DATE	6-28-2005
REVIEW	MB

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-05** Depth (ft): -
TYPE: **Pail**



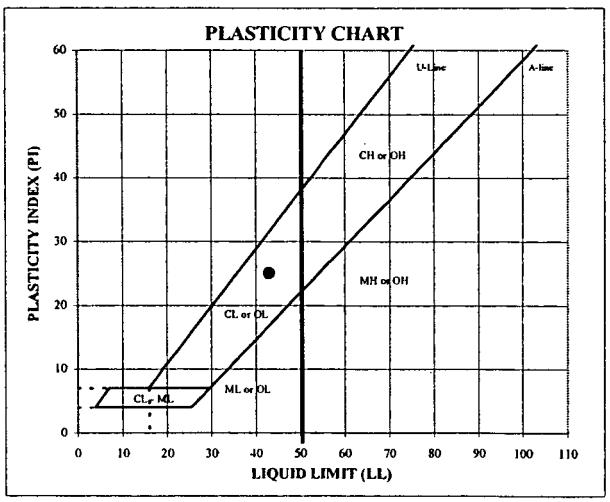
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	96.9		
#4	4.8	80.8	Fine Gravel	19.18
#10	2.00	69.8	Coarse Sand	11.06
#20	0.85	56.2		
#40	0.43	43.5	Medium Sand	26.24
#60	0.25	34.7		
#100	0.15	28.6		
#200	0.075	22.9	Fine Sand	20.57

Hydrometer Analysis

(mm)	%Finer		
0.035	19.5		
0.023	17.8		
0.013	17.4	Fines	
0.0092	16.6	Silt or Clay	22.95
0.0065	15.8		
0.0032	14.1		
0.0014	13.3		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
11.9	43	18	25	--

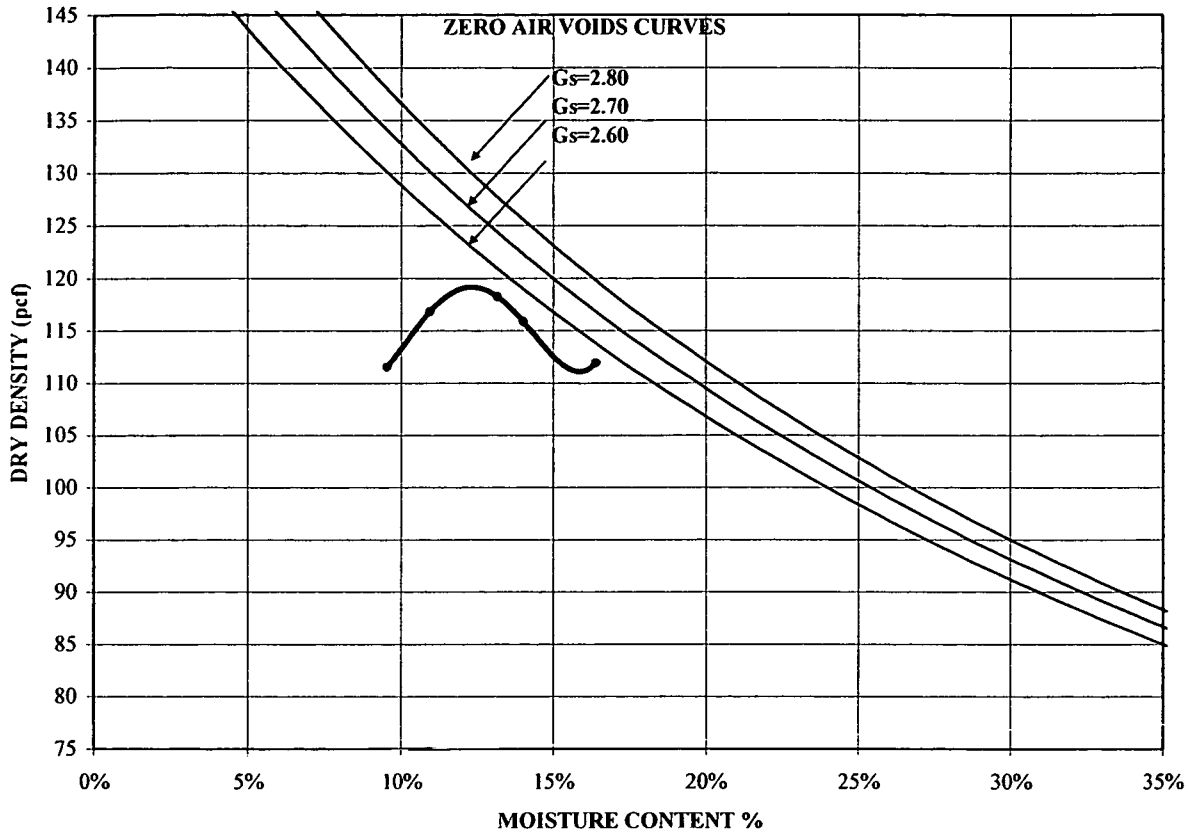
DESCRIPTION: Strong brown (7.5 YR 5/6) clayey sand with gravel

USCS: SC

TECH DS
DATE 6/27/2005
REVIEW MB

167

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	119.0	Corrected Maximum Dry Density (pcf)	125.5
OPTIMUM MOISTURE (%)	12.3	Corrected Optimum Moisture (%)	10.2

SAMPLE ID	BF-05
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	43
PL	18
PI	25
MC	11.9

DESCRIPTION	Strong brown (7.5 YR 5/6) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

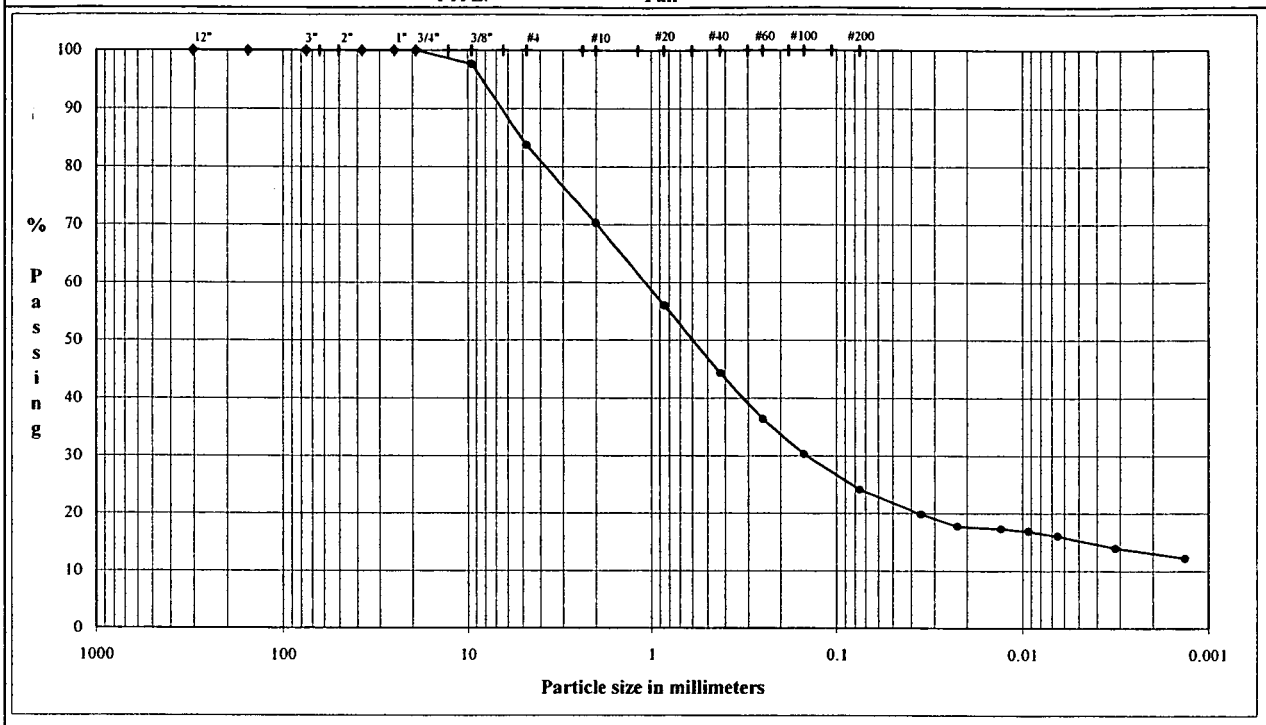
TECH	DS
DATE	6-28-2005
REVIEW	MB

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-06** Depth (ft): -
TYPE: **Pail**



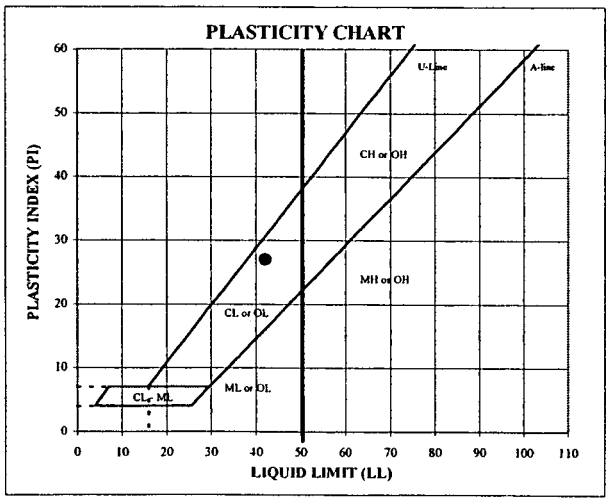
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.6		
#4	4.8	83.7	Fine Gravel	16.30
#10	2.00	70.3	Coarse Sand	13.40
#20	0.85	56.0		
#40	0.43	44.3	Medium Sand	26.01
#60	0.25	36.3		
#100	0.15	30.2		
#200	0.075	24.1	Fine Sand	20.21

Hydrometer Analysis

(mm)	%Finer		
0.035	19.8		
0.023	17.7		
0.013	17.3	Fines	
0.0093	16.9	Silt or Clay	24.08
0.0065	16.0		
0.0032	13.9		
0.0013	12.2		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
--	42	15	27	--

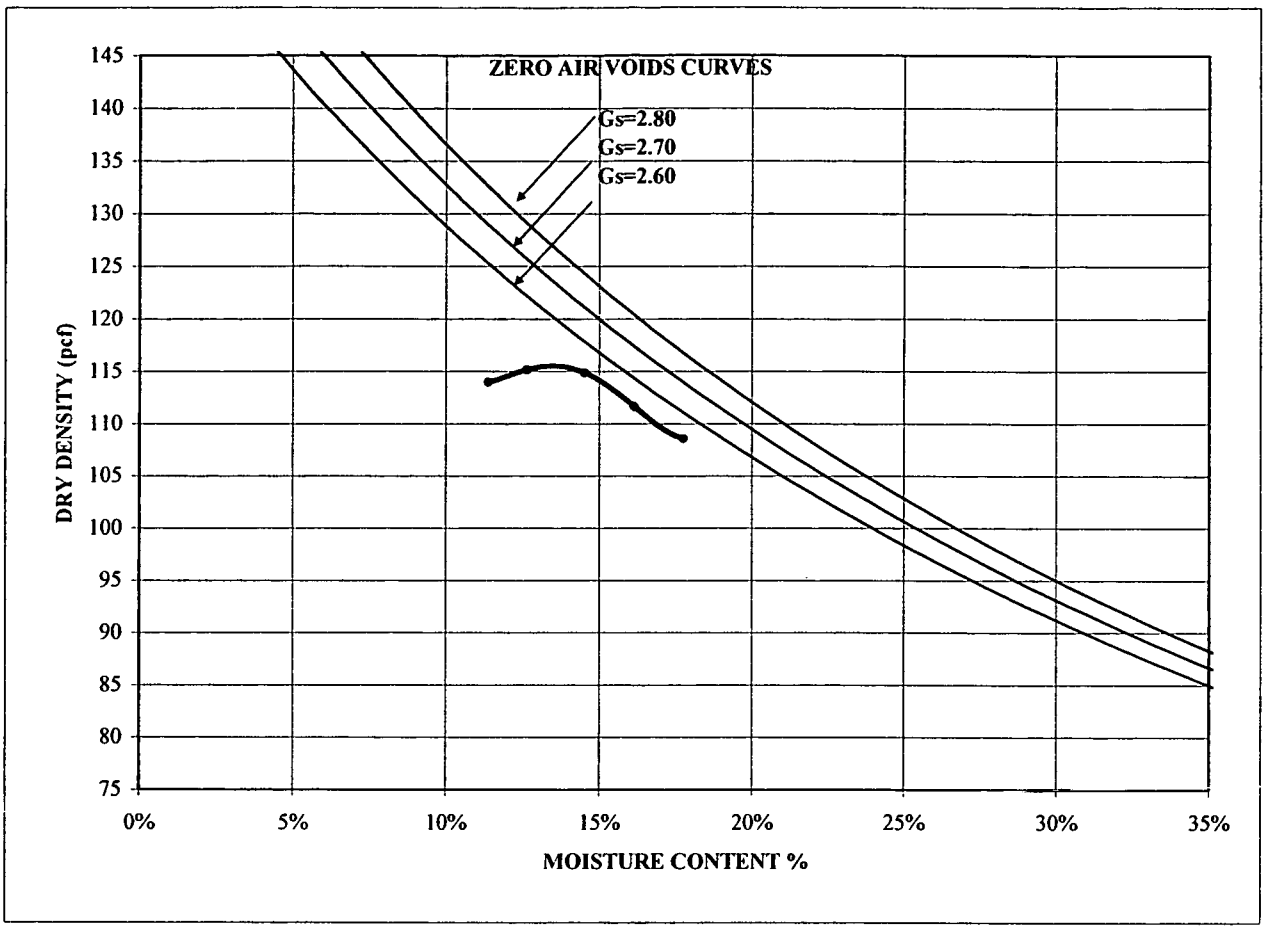
DESCRIPTION: Strong brown (7.5 YR 4/6) clayey sand with gravel

USCS: SC

TECH: DS
DATE: 7/6/2005
REVIEW: MB

168

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	115.5	Corrected Maximum Dry Density (pcf)	121.3
OPTIMUM MOISTURE (%)	13.6	Corrected Optimum Moisture (%)	11.6

SAMPLE ID	BF-06
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	42
PL	15
PI	27
MC	--

DESCRIPTION	Strong brown (7.5 YR 4/6) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

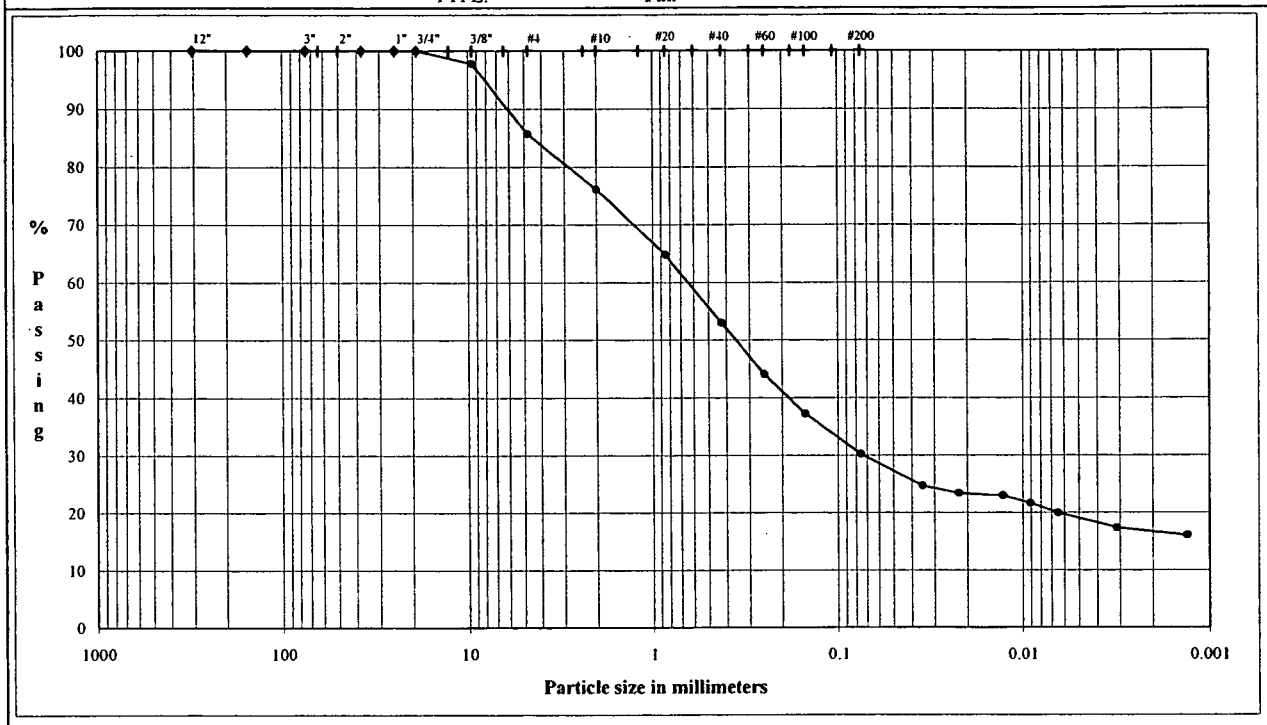
TECH	DS
DATE	7-1-05
REVIEW	MB

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-07** Depth (ft): -
TYPE: **Pail**



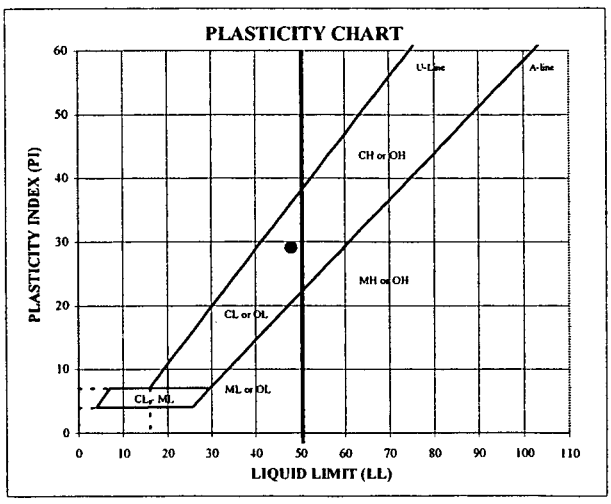
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.8		
#4	4.8	85.7	Fine Gravel	14.32
#10	2.00	76.2	Coarse Sand	9.52
#20	0.85	64.8		
#40	0.43	53.0	Medium Sand	23.17
#60	0.25	44.0		
#100	0.15	37.2		
#200	0.075	30.2	Fine Sand	22.84

Hydrometer Analysis

(mm)	%Finer		
0.035	24.7		
0.022	23.4		
0.013	22.9	Fines	
0.0091	21.6	Silt or Clay	30.15
0.0065	19.9		
0.0031	17.3		
0.0013	16.0		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
9.2	48	19	29	--

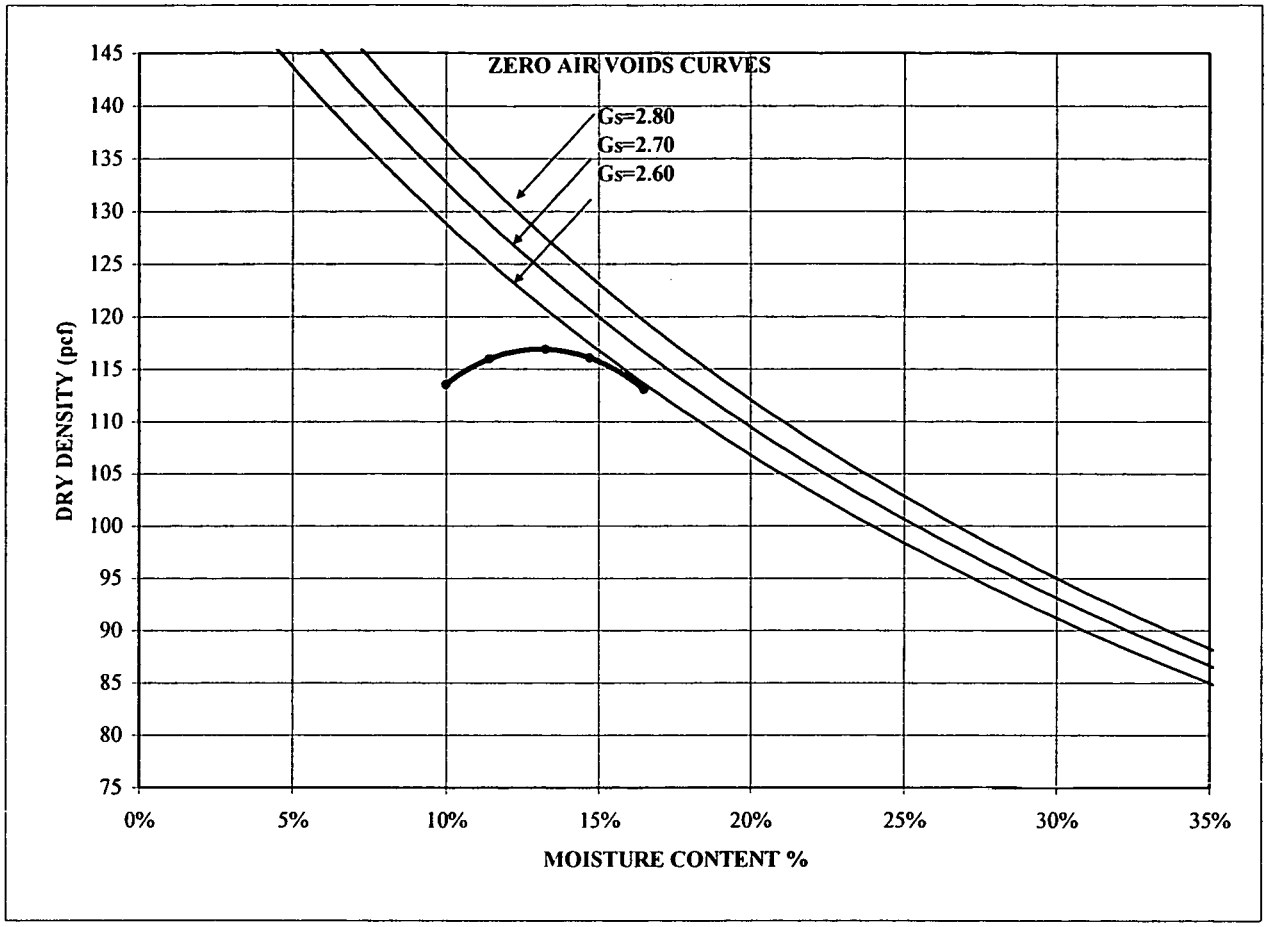
DESCRIPTION: Yellowish brown (10 YR 5/6) clayey sand

USCS: SC

TECH: DS
DATE: 6/27/2005
REVIEW: MB

169

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	116.9	Corrected Maximum Dry Density (pcf)	121.9
OPTIMUM MOISTURE (%)	13.3	Corrected Optimum Moisture (%)	11.6

SAMPLE ID	BF-07
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	48
PL	19
PI	29
MC	9.2

DESCRIPTION	Yellowish brown (10 YR 5/6) clayey sand
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

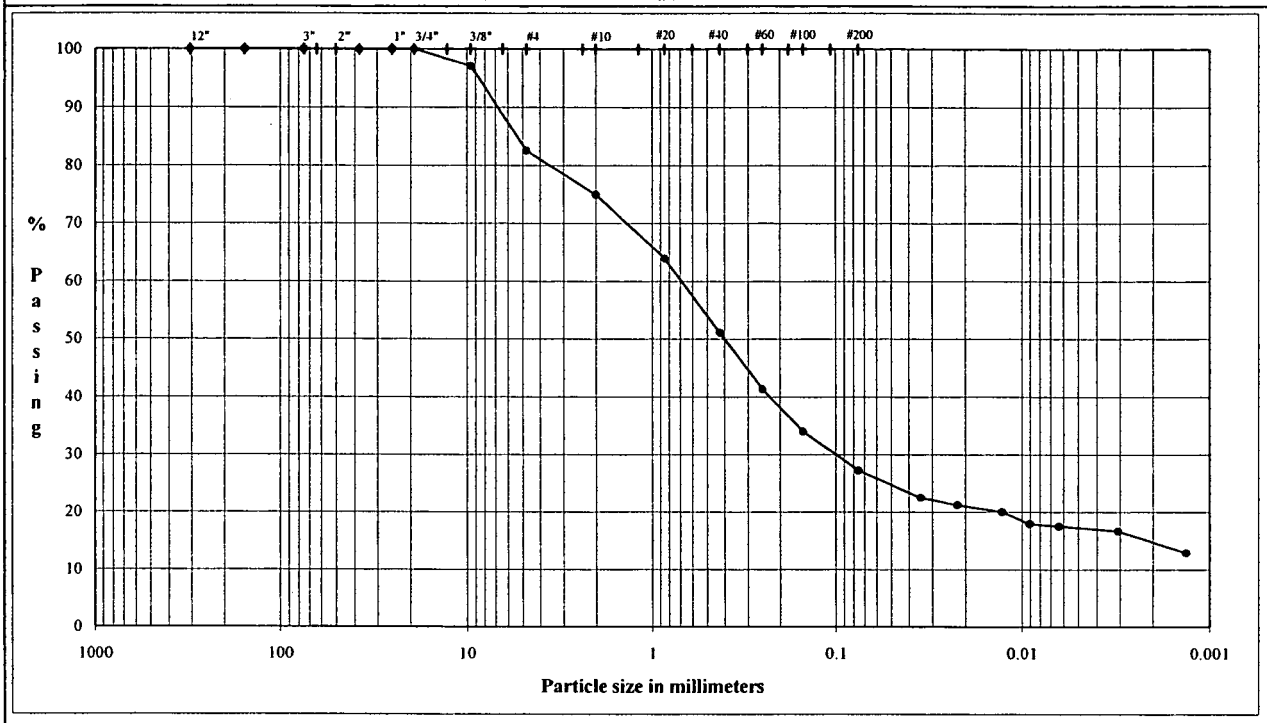
TECH	MGC
DATE	7-4-05
REVIEW	MB

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-08** Depth (ft): -
TYPE: **Pail**



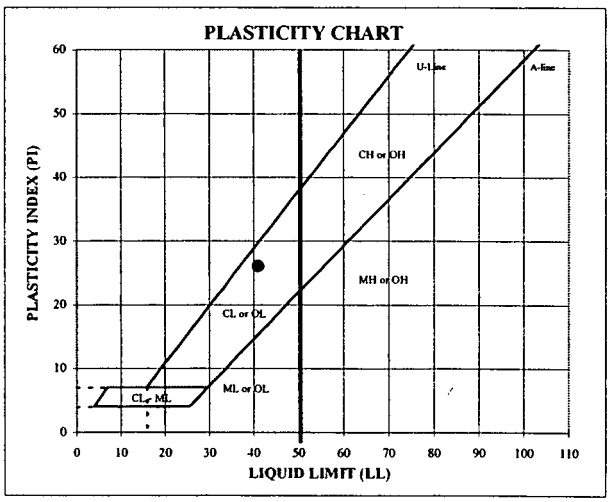
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.00
0.75"	19.0	100.0		
0.375"	9.5	97.0		
#4	4.8	82.5	Fine Gravel	17.50
#10	2.00	75.0	Coarse Sand	7.55
#20	0.85	64.0		
#40	0.43	51.1	Medium Sand	23.83
#60	0.25	41.3		
#100	0.15	34.0		
#200	0.075	27.1	Fine Sand	23.99

Hydrometer Analysis

(mm)	%Finer		
0.035	22.5		
0.022	21.2		
0.013	20.0	Fines	
0.0091	17.9	Silt or Clay	27.13
0.0063	17.5		
0.0031	16.6		
0.0013	12.9		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG
10.3	41	15	26	--

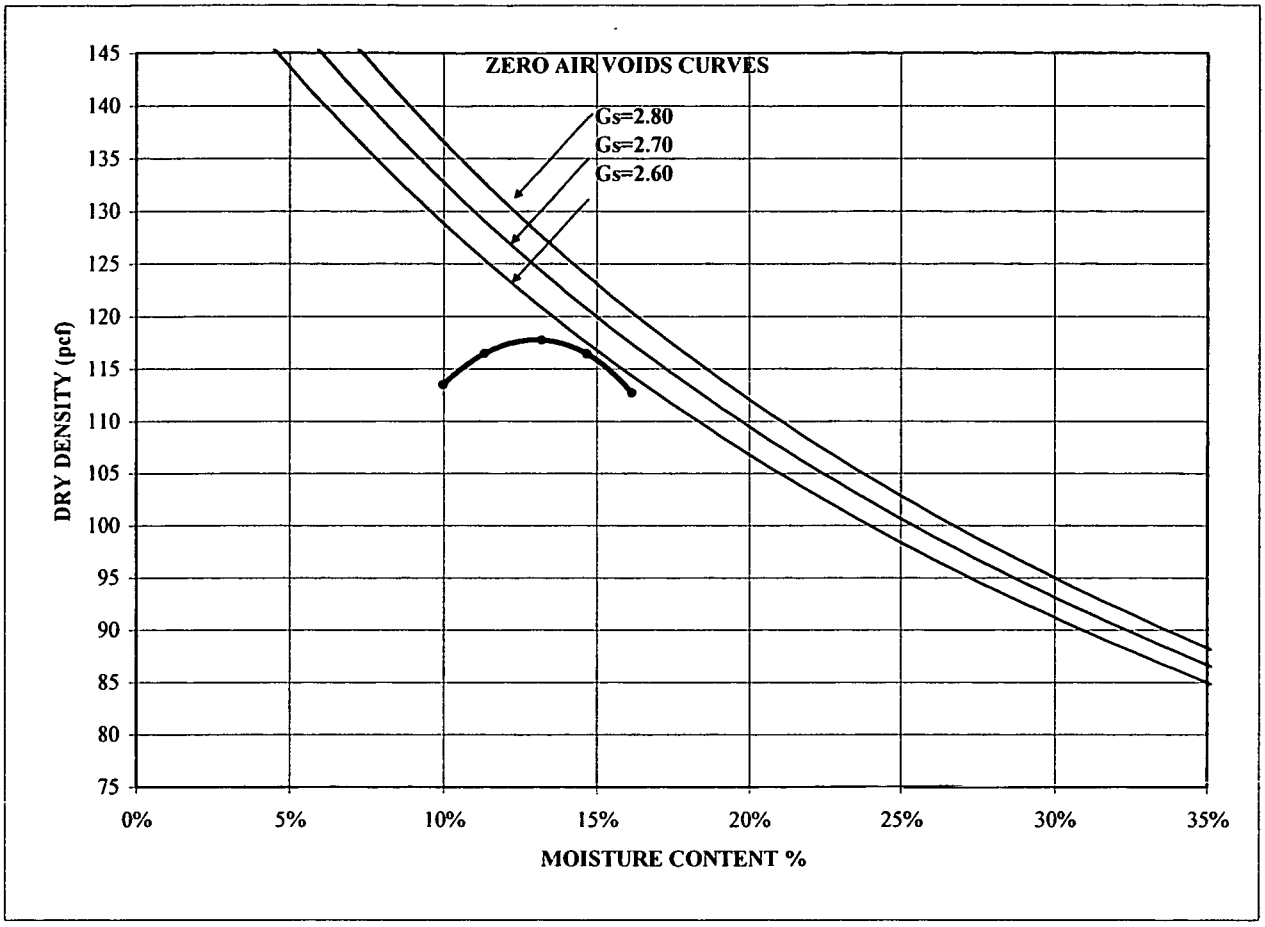
DESCRIPTION: Yellowish brown (10 YR 5/6) clayey sand with grav

USCS: SC

TECH	MGC
DATE	7/5/2005
REVIEW	MB

170

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	117.7	Corrected Maximum Dry Density (pcf)	123.5
OPTIMUM MOISTURE (%)	13.0	Corrected Optimum Moisture (%)	11.0

SAMPLE ID	BF-08
SAMPLE TYPE	Pail
SAMPLE DEPTH	-

LL	41
PL	15
PI	26
MC	10.3

DESCRIPTION	Yellowish brown (10 YR 5/6) clayey sand with gravel
USCS	SC

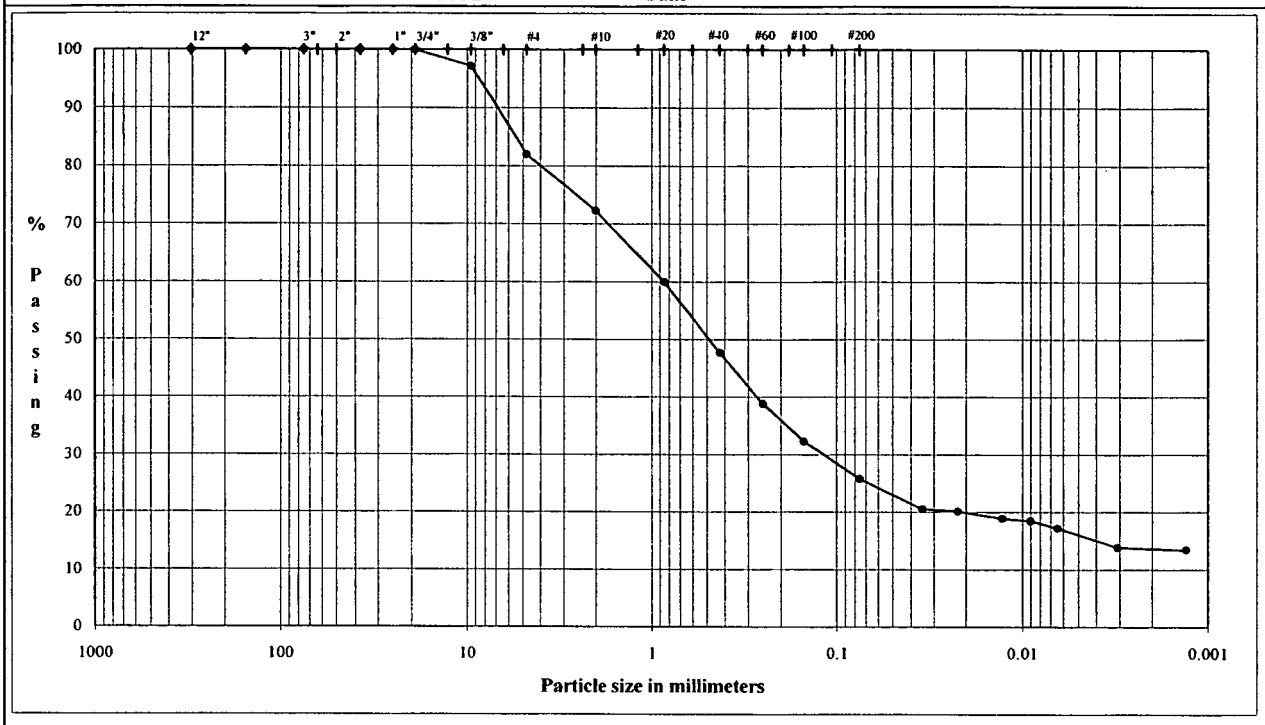
Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

TECH	DS
DATE	7-6-05
REVIEW	MB

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **Kaiser Hill/Rocky Flats Field & Lab**
SAMPLE ID: **BF-09** Depth (ft): -
TYPE: **Bulk**



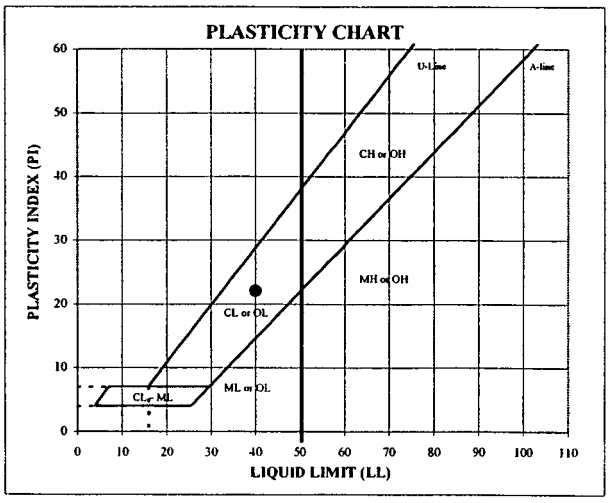
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
6.0"	154.2	100.0	Cobbles	0.00
6.0"	154.2	100.0		
6.0"	154.2	100.0		
3.0"	75.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0	Coarse Gravel	0.04
0.75"	19.0	100.0		
0.375"	9.5	97.2		
#4	4.8	81.9	Fine Gravel	18.02
#10	2.00	72.2	Coarse Sand	9.72
#20	0.85	59.9		
#40	0.43	47.7	Medium Sand	24.55
#60	0.25	38.8		
#100	0.15	32.3		
#200	0.075	25.7	Fine Sand	21.98

Hydrometer Analysis

(mm)	%Finer		
0.035	20.5		
0.022	20.1		
0.013	18.9	Fines	
0.0090	18.4	Silt or Clay	25.70
0.0064	17.2		
0.0031	13.8		
0.0013	13.4		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
7.8	40	18	22	2.70

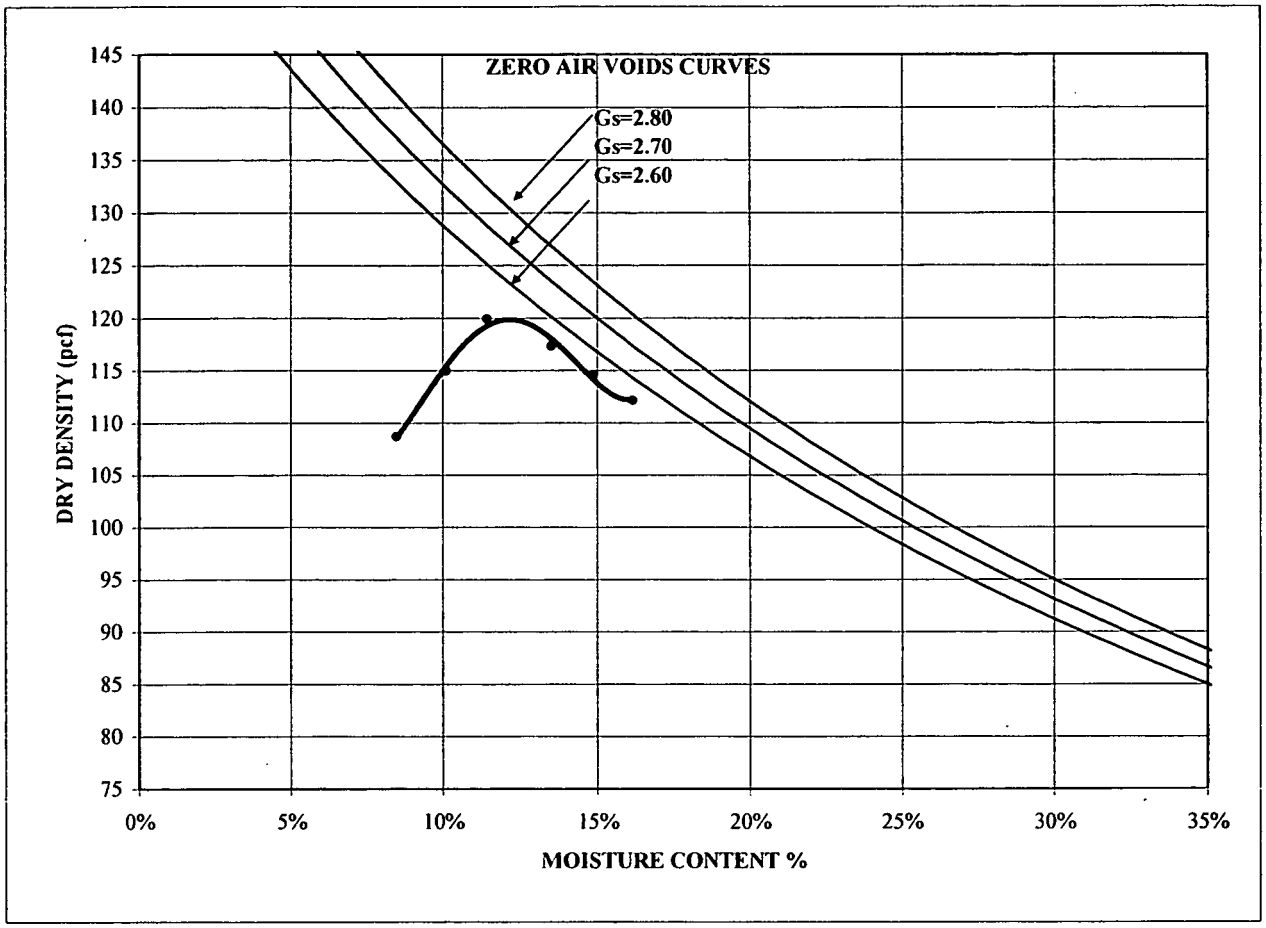
DESCRIPTION: Dark yellowish brown (10 YR 4/6) clayey sand with

USCS: SC

TECH	JR
DATE	7/13/2005
REVIEW	mb

171

MOISTURE / DRY DENSITY CURVE
D 698 METHOD A



MAXIMUM DRY DENSITY (pcf)	119.9	Corrected Maximum Dry Density (pcf)	125.9
OPTIMUM MOISTURE (%)	12.3	Corrected Optimum Moisture (%)	10.3

SAMPLE ID	BF-09
SAMPLE TYPE	Bulk
SAMPLE DEPTH	-

LL	40
PL	18
PI	22
MC	7.8

DESCRIPTION	Dark yellowish brown (10 YR 4/6) clayey sand with gravel
USCS	SC

Kaiser Hill/Rocky Flats Field & Lab
053-2203-0001

TECH	MKS
DATE	7/14/2005
REVIEW	MB

SECTION 5

BUTTRESS FILL SAND CONE TESTING RESULTS

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-01		Date	13-Jun-05

Weight of Wet Material	3611.1	g

Cone and Plate #	DEN 0269	
Bottle ID	B	
Start wt of Bottle and Sand	6137.7	g
Finish wt of Bottle and Sand	1755.04	g

Density of Sand	96.39	lb/ft^3
Soil ID	BF-01	
Optimum Dry Density	121.9	lb/ft^3
Optimum Moisture	11.8	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	13.3	%

Volume Calculation

Wt of Sand Used	4382.6	g
Wt of Sand Used	9.7	lb
Volume of Sand	0.1002	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0610	ft^3

Wet Density	130.6	lb/ft^3
Dry Density	115.2	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	95%	Pass
±2% Moisture Content	1.5	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-02		Date	17-Jun-05

Weight of Wet Material	3193.8	g

Cone and Plate #	DEN 0269	
Bottle ID	B	
Start wt of Bottle and Sand	6128.58	g
Finish wt of Bottle and Sand	2135.54	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-02	
Optimum Dry Density	121.5	lb/ft^3
Optimum Moisture	11.9	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	12.2	%

Volume Calculation

Wt of Sand Used	3993.0	g
Wt of Sand Used	8.8	lb
Volume of Sand	0.0899	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0506	ft^3

Wet Density	139.1	lb/ft^3
Dry Density	123.9	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	102%	Pass
±2% Moisture Content	0.3	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-03		Date	17-Jun-05

Weight of Wet Material	3167.0	g

Cone and Plate #	DEN 0269	
Bottle ID	B	
Start wt of Bottle and Sand	6420.71	g
Finish wt of Bottle and Sand	2513.40	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-03	
Optimum Dry Density	123.4	lb/ft^3
Optimum Moisture	11.2	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	11.6	%

Volume Calculation

Wt of Sand Used	3907.3	g
Wt of Sand Used	8.6	lb
Volume of Sand	0.0880	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0487	ft^3

Wet Density	143.4	lb/ft^3
Dry Density	128.5	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	104%	Pass
±2% Moisture Content	0.4	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-04	Date	21-Jun-05

Weight of Wet Material	3491.4	g

Cone and Plate #	DEN 0269	
Bottle ID	B	
Start wt of Bottle and Sand	6686.52	g
Finish wt of Bottle and Sand	2589.15	g

Density of Sand	96.39	lb/ft^3
Soil ID	BF-04	
Optimum Dry Density	126.9	lb/ft^3
Optimum Moisture	10.5	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	10.1	%

Volume Calculation

Wt of Sand Used	4097.4	g
Wt of Sand Used	9.0	lb
Volume of Sand	0.0937	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0545	ft^3

Wet Density	141.4	lb/ft^3
Dry Density	128.4	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	101%	Pass
±2% Moisture Content	-0.4	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-05	Date	24-Jun-05

Weight of Wet Material	3522.9	g

Cone and Plate #	DEN 0269	
Bottle ID	B	
Start wt of Bottle and Sand	6149.80	g
Finish wt of Bottle and Sand	1882.90	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-04	
Optimum Dry Density	126.9	lb/ft^3
Optimum Moisture	10.5	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	10.2	%

Volume Calculation

Wt of Sand Used	4266.9	g
Wt of Sand Used	9.4	lb
Volume of Sand	0.0961	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0568	ft^3

Wet Density	136.7	lb/ft^3
Dry Density	124.1	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	98%	Pass
±2% Moisture Content	-0.3	Pass

Tech	RPD
Reviewed by	

175

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-06		Date	28-Jun-05

Weight of Wet Material	3484.6	g

Cone and Plate #	DEN 0269	
Bottle ID	B	
Start wt of Bottle and Sand	6421.62	g
Finish wt of Bottle and Sand	2220.37	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-07	
Optimum Dry Density		lb/ft^3
Optimum Moisture		%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	10.9	%

Volume Calculation

Wt of Sand Used	4201.2	g
Wt of Sand Used	9.3	lb
Volume of Sand	0.0946	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0553	ft^3

Wet Density	138.9	lb/ft^3
Dry Density	125.2	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	#DIV/0!	Pass
±2% Moisture Content	10.9	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-07		Date	30-Jun-05

Weight of Wet Material	3220.1	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6698.76	g
Finish wt of Bottle and Sand	2727.04	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-04	
Optimum Dry Density	126.9	lb/ft^3
Optimum Moisture	10.5	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	10.4	%

Volume Calculation

Wt of Sand Used	3971.7	g
Wt of Sand Used	8.8	lb
Volume of Sand	0.0894	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0502	ft^3

Wet Density	141.6	lb/ft^3
Dry Density	128.2	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	101%	Pass
±2% Moisture Content	-0.1	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-08	Date	1-Jul-05

Weight of Wet Material	2485.3	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	5365.63	g
Finish wt of Bottle and Sand	1838.44	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-04	
Optimum Dry Density	126.9	lb/ft^3
Optimum Moisture	10.5	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	11.5	%

Volume Calculation

Wt of Sand Used	3527.2	g
Wt of Sand Used	7.8	lb
Volume of Sand	0.0794	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0401	ft^3

Wet Density	136.5	lb/ft^3
Dry Density	122.4	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	96%	Pass
±2% Moisture Content	1.0	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-09		Date	5-Jul-05

Weight of Wet Material	2665.8	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6422.07	g
Finish wt of Bottle and Sand	2811.41	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-05	
Optimum Dry Density	125.5	lb/ft^3
Optimum Moisture	10.2	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	8.8	%

Volume Calculation

Wt of Sand Used	3610.7	g
Wt of Sand Used	8.0	lb
Volume of Sand	0.0813	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0420	ft^3

Wet Density	139.9	lb/ft^3
Dry Density	128.5	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	102%	Pass
±2% Moisture Content	-1.4	Pass

Tech	RPD
Reviewed by	

177

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-10		Date	6-Jul-05

Weight of Wet Material	2807.8	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6820.78	g
Finish wt of Bottle and Sand	3121.68	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-05	
Optimum Dry Density	125.5	lb/ft^3
Optimum Moisture	10.2	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	11.0	%

Volume Calculation

Wt of Sand Used	3699.1	g
Wt of Sand Used	8.2	lb
Volume of Sand	0.0833	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0440	ft^3

Wet Density	140.6	lb/ft^3
Dry Density	126.7	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	101%	Pass
±2% Moisture Content	0.8	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-11		Date	7-Jul-05

Weight of Wet Material	2732.0	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6646.60	g
Finish wt of Bottle and Sand	3011.90	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-04	
Optimum Dry Density	126.9	lb/ft^3
Optimum Moisture	10.5	%

Moisture Content

Tare Wt.		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	10.7	%

Volume Calculation

Wt of Sand Used	3634.7	g
Wt of Sand Used	8.0	lb
Volume of Sand	0.0818	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0426	ft^3

Wet Density	141.5	lb/ft^3
Dry Density	127.8	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	101%	Pass
±2% Moisture Content	0.2	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-12		Date	8-Jul-05

Weight of Wet Material	2550.1	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6324.09	g
Finish wt of Bottle and Sand	2889.89	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-04	
Optimum Dry Density	126.9	lb/ft^3
Optimum Moisture	10.5	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	10.9	%

Volume Calculation

Wt of Sand Used	3434.2	g
Wt of Sand Used	7.6	lb
Volume of Sand	0.0773	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0381	ft^3

Wet Density	147.8	lb/ft^3
Dry Density	133.2	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	105%	Pass
±2% Moisture Content	0.4	Pass

Tech	RPD
Reviewed by	

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-13	Date	11-Jul-05

Weight of Wet Material	2682.1	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6676.99	g
Finish wt of Bottle and Sand	3069.96	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-08	
Optimum Dry Density	123.5	lb/ft^3
Optimum Moisture	11.0	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	12.8	%

Volume Calculation

Wt of Sand Used	3607.0	g
Wt of Sand Used	8.0	lb
Volume of Sand	0.0812	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0419	ft^3

Wet Density	141.0	lb/ft^3
Dry Density	125.0	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	101%	Pass
±2% Moisture Content	1.8	Pass

Tech	RPD
Reviewed by	

179

SAND CONE DENSITY TEST
Golder Associates

Test #	QC-BF-SC-14		Date	12-Jul-05

Weight of Wet Material	2535.2	g

Cone and Plate #	DEN 0269	
Bottle ID	E	
Start wt of Bottle and Sand	6024.26	g
Finish wt of Bottle and Sand	2568.28	g

Density of Sand	97.93	lb/ft^3
Soil ID	BF-09	
Optimum Dry Density	125.9	lb/ft^3
Optimum Moisture	10.3	%

Moisture Content

Tare Wt		g
Tare + Wet Soil		g
Tare + Dry Soil		g
Dry Soil		g
Moisture		g
% Moisture	9.6	%

Volume Calculation

Wt of Sand Used	3456.0	g
Wt of Sand Used	7.6	lb
Volume of Sand	0.0778	ft^3
Volume of Cone & Plate	0.0393	ft^3
Sand Volume Minus Cone & Plate	0.0385	ft^3

Wet Density	145.0	lb/ft^3
Dry Density	132.3	lb/ft^3

Specifications

		Pass/Fail
95% of Standard Proctor	105%	Pass
±2% Moisture Content	-0.7	Pass

Tech	RPD
Reviewed by	

SECTION 6

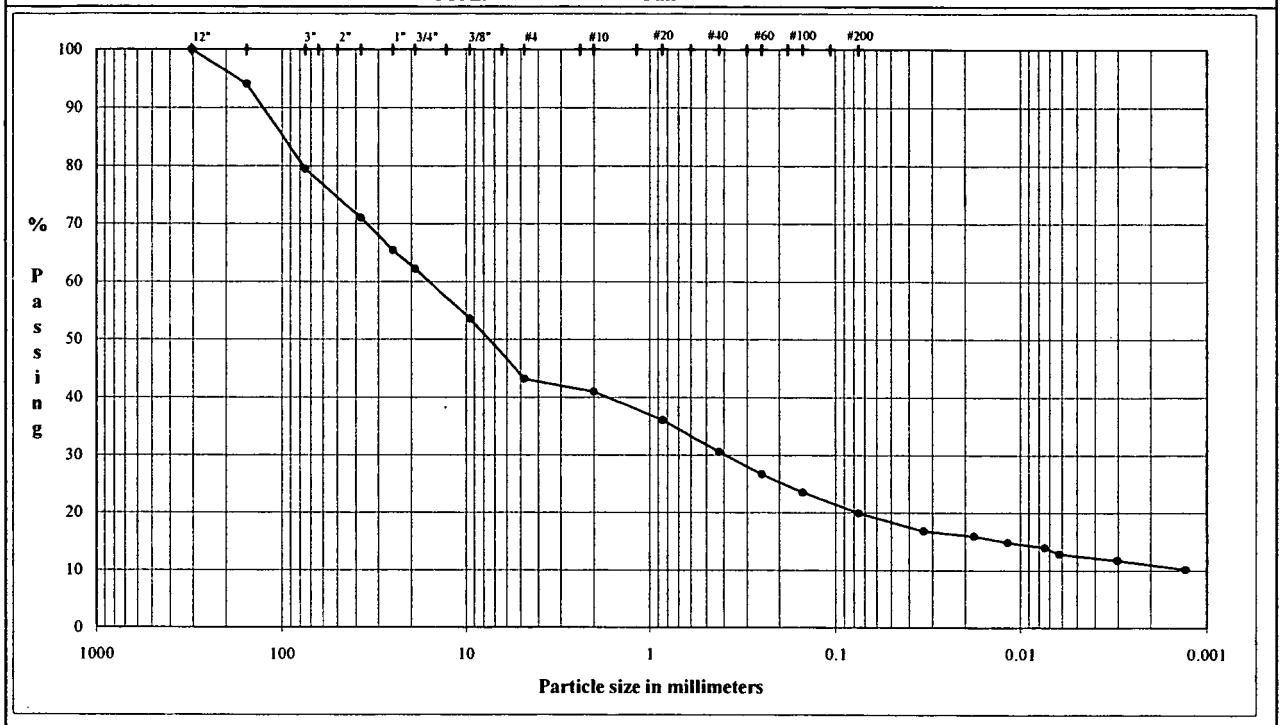
COVER FILL TESTING RESULTS

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-01** Depth: --
TYPE: **Pail**



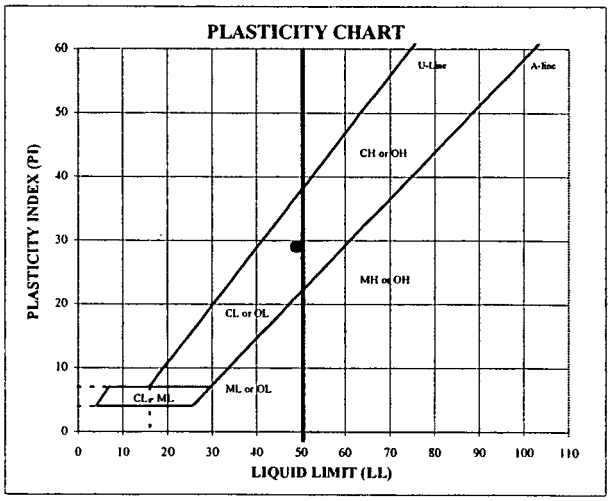
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	20.55
12.0"	304.8	100.0		
6.0"	154.2	94.1		
3.0"	75.0	79.5		
1.5"	37.5	71.0		
1.0"	25.0	65.4	Coarse Gravel	17.24
0.75"	19.0	62.2		
0.375"	9.5	53.6		
#4	4.8	43.2	Fine Gravel	19.03
#10	2.00	40.9	Coarse Sand	2.27
#20	0.85	36.0		
#40	0.43	30.5	Medium Sand	10.40
#60	0.25	26.7		
#100	0.15	23.5		
#200	0.075	19.9	Fine Sand	10.61

Hydrometer Analysis

(mm)	%Finer		
0.033	16.8		
0.018	15.9		
0.012	14.8	Fines	
0.0074	13.9	Silt or Clay	19.91
0.0062	12.8		
0.0030	11.7		
0.0013	10.2		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
--	49	20	29	2.70

DESCRIPTION: Dark yellowish brown (10 YR 4/4) clayey gravel with sand

USCS: GC

TECH MGC
DATE 7/5/2005
REVIEW MB

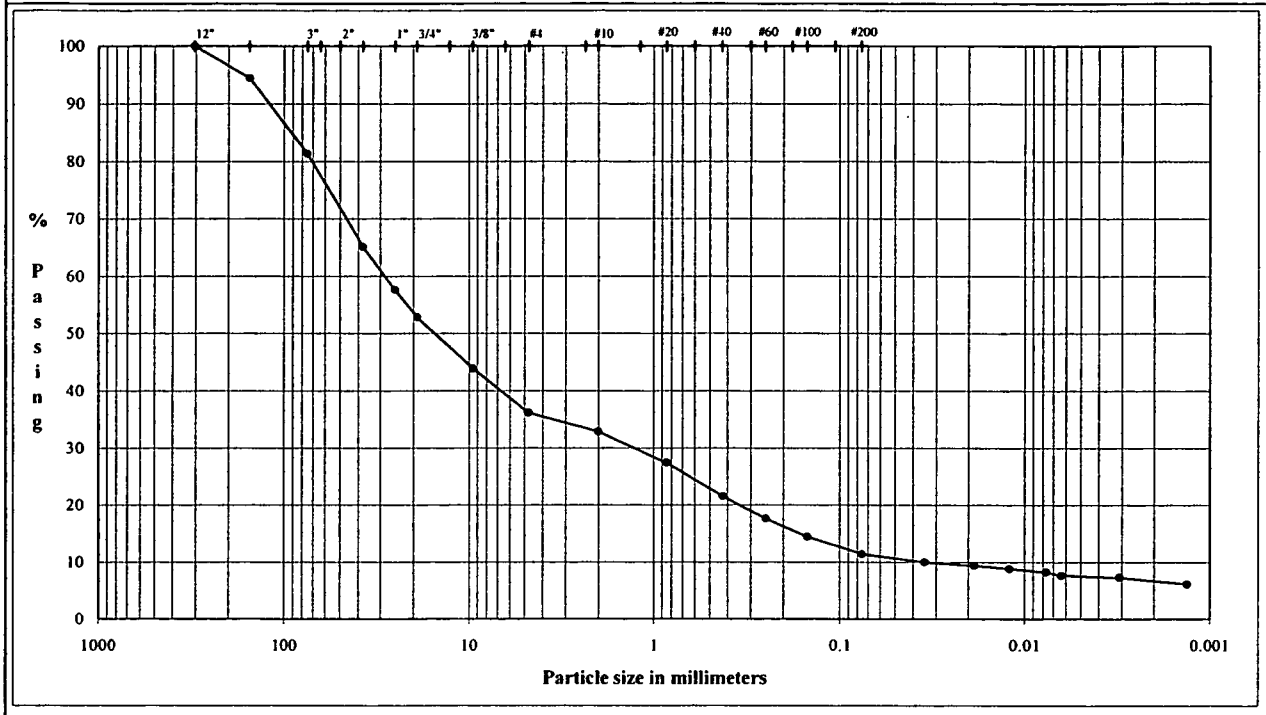
181

June-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-02** Depth: –
TYPE: **Pail**



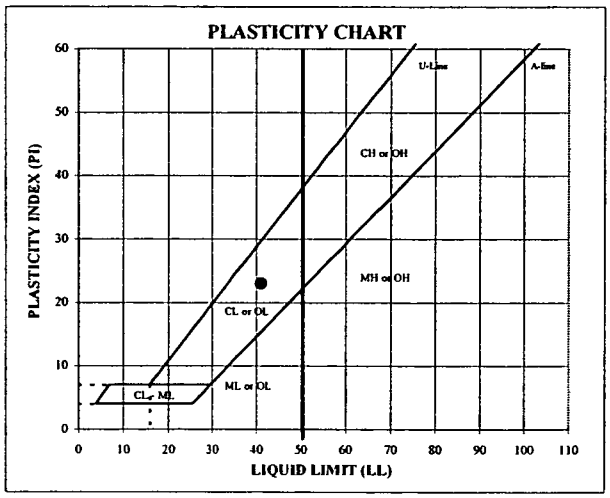
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	18.66
12.0"	304.8	100.0		
6.0"	154.2	94.4		
3.0"	75.0	81.3		
1.5"	37.5	65.1		
1.0"	25.0	57.6	Coarse Gravel	28.50
0.75"	19.0	52.8		
0.375"	9.5	43.8		
#4	4.8	36.1	Fine Gravel	16.75
#10	2.00	32.8	Coarse Sand	3.28
#20	0.85	27.3		
#40	0.43	21.5	Medium Sand	11.28
#60	0.25	17.6		
#100	0.15	14.4		
#200	0.075	11.3	Fine Sand	10.17

Hydrometer Analysis

(mm)	%Finer		
0.035	9.9		
0.019	9.4		
0.012	8.8	Fines	
0.0077	8.2	Silt or Clay	11.35
0.0063	7.6		
0.0031	7.3		
0.0013	6.1		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
8.0	41	18	23	2.70

DESCRIPTION: Yellowish brown well-graded gravel with clay and sand

USCS: GP-GC

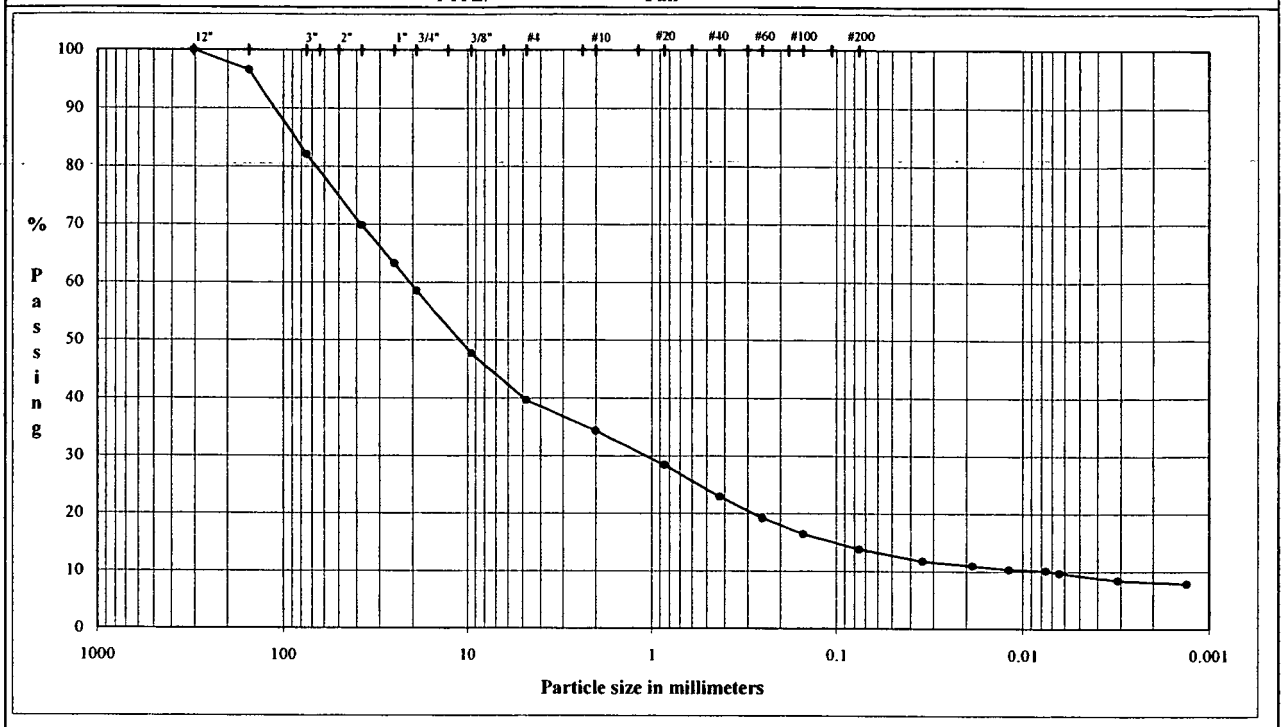
TECH MGC
DATE 7/5/2005
REVIEW MB

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-03** Depth: --
TYPE: **Pail**



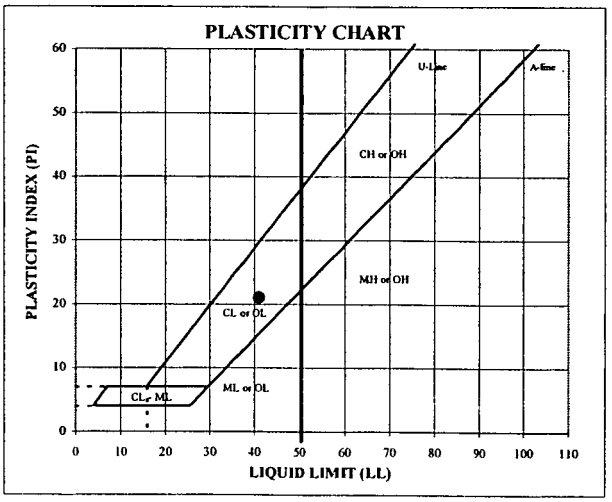
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	17.92
12.0"	304.8	100.0		
6.0"	154.2	96.5		
3.0"	75.0	82.1		
1.5"	37.5	69.8		
1.0"	25.0	63.3	Coarse Gravel	23.52
0.75"	19.0	58.6		
0.375"	9.5	47.7		
#4	4.8	39.6	Fine Gravel	18.92
#10	2.00	34.3	Coarse Sand	5.36
#20	0.85	28.4		
#40	0.43	22.9	Medium Sand	11.39
#60	0.25	19.1		
#100	0.15	16.4		
#200	0.075	13.8	Fine Sand	9.12

Hydrometer Analysis

(mm)	%Finer		
0.034	11.7		
0.018	10.9		
0.012	10.3	Fines	
0.0076	10.1	Silt or Clay	13.77
0.0064	9.7		
0.0031	8.4		
0.0013	7.8		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
5.1	41	20	21	2.70

DESCRIPTION: Reddish yellow (7.5 YR 6/8) clayey gravel with sand

USCS: GC

TECH MKS/DS
DATE 7/11/2005
REVIEW MB

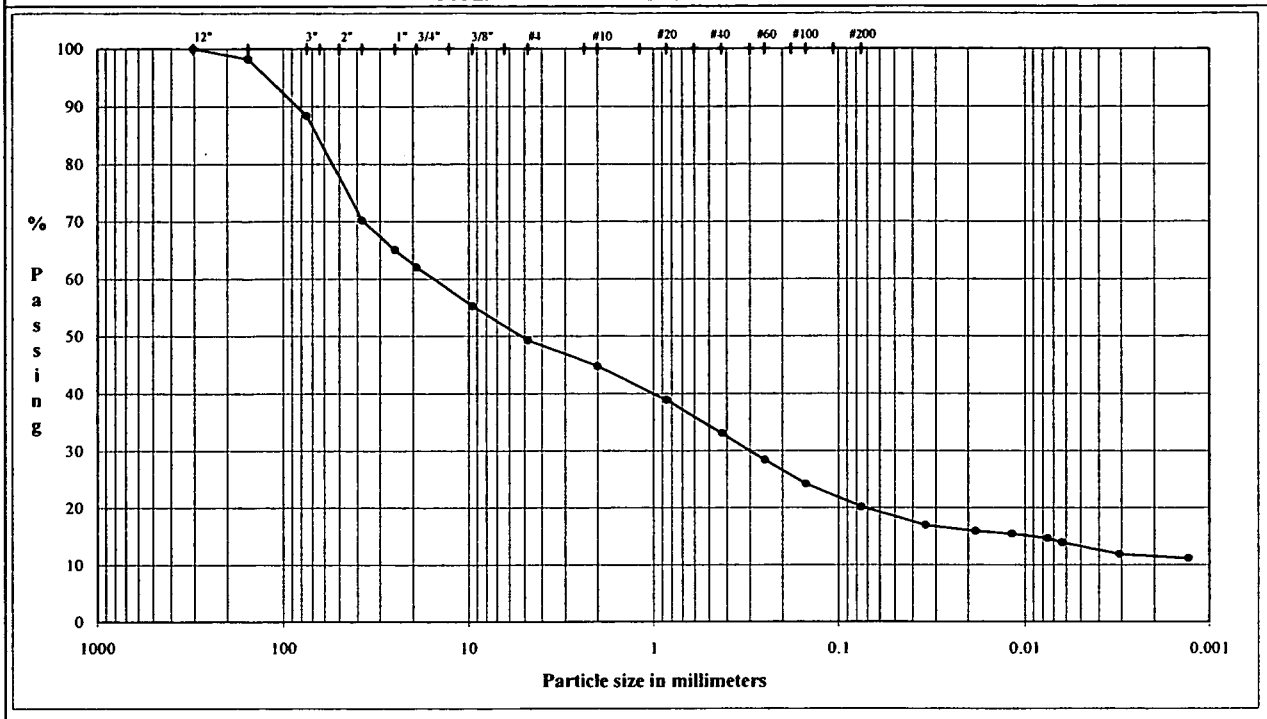
182

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-04** Depth: --
TYPE: **Pail**



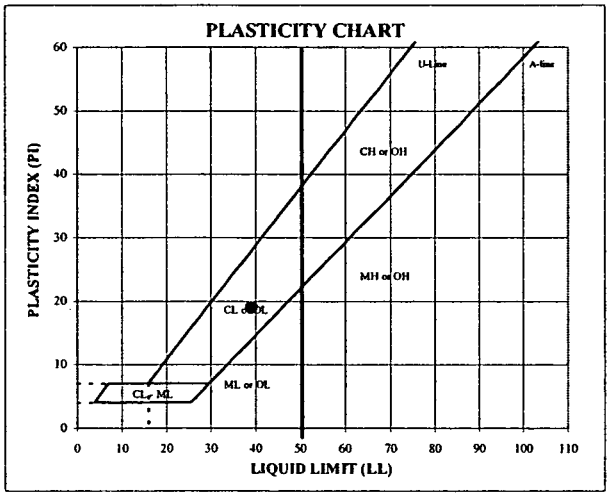
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	11.64
12.0"	304.8	100.0		
6.0"	154.2	98.2		
3.0"	75.0	88.4		
1.5"	37.5	70.2		
1.0"	25.0	65.0	Coarse Gravel	26.29
0.75"	19.0	62.1		
0.375"	9.5	55.2		
#4	4.8	49.3	Fine Gravel	12.76
#10	2.00	44.8	Coarse Sand	4.55
#20	0.85	38.8		
#40	0.43	33.0	Medium Sand	11.78
#60	0.25	28.3		
#100	0.15	24.1		
#200	0.075	20.1	Fine Sand	12.90

Hydrometer Analysis

(mm)	%Finer		
0.034	16.9		
0.018	15.9		
0.012	15.4	Fines	
0.0075	14.6	Silt or Clay	20.07
0.0063	13.9		
0.0031	11.8		
0.0013	11.1		



ATTERBERG LIMITS

M,	LL	PL	PI	SpG (assumed)
4.1	39	20	19	2.70

DESCRIPTION: Yellowish brown (10 YR 5/8) clayey gravel with sand

USCS: GC

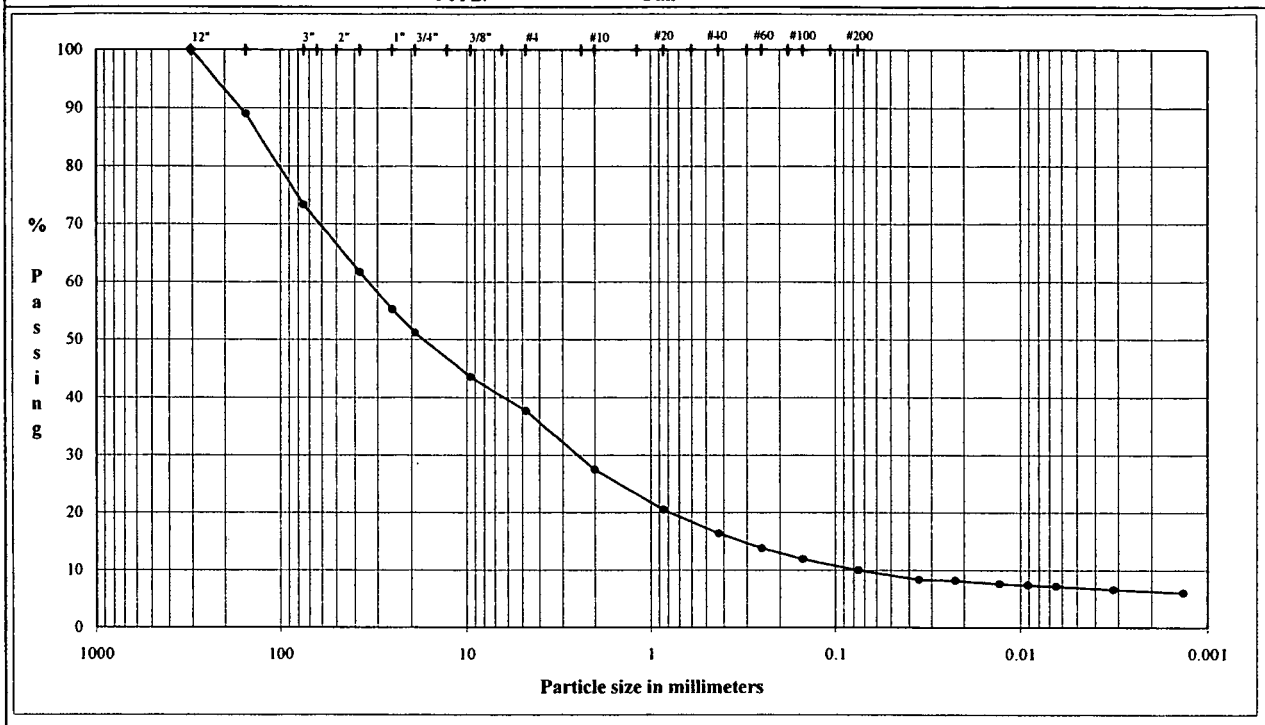
TECH MKS/DS
DATE 7/12/2005
REVIEW MB

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-05** Depth: --
TYPE: **Pail**



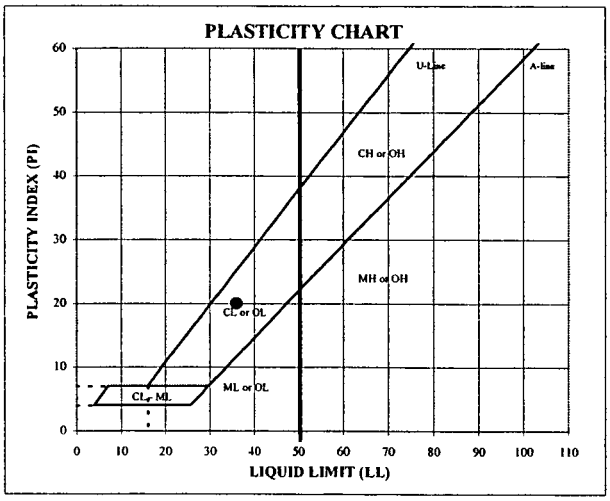
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	26.67
12.0"	304.8	100.0		
6.0"	154.2	89.0		
3.0"	75.0	73.3		
1.5"	37.5	61.7		
1.0"	25.0	55.3	Coarse Gravel	22.17
0.75"	19.0	51.2		
0.375"	9.5	43.5		
#4	4.8	37.6	Fine Gravel	13.54
#10	2.00	27.4	Coarse Sand	10.21
#20	0.85	20.4		
#40	0.43	16.3	Medium Sand	11.10
#60	0.25	13.8		
#100	0.15	11.9		
#200	0.075	10.0	Fine Sand	6.35

Hydrometer Analysis

(mm)	%Finer		
0.035	8.3		
0.022	8.1		
0.013	7.6	Fines	
0.0091	7.4	Silt or Clay	9.96
0.0064	7.2		
0.0032	6.6		
0.0013	6.0		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
7.6	36	16	20	2.70

DESCRIPTION: Yellowish brown (10 YR 5/6) well-graded gravel with clay and sand

USCS: GW-GC

TECH JR
DATE 7/25/2005
REVIEW MB

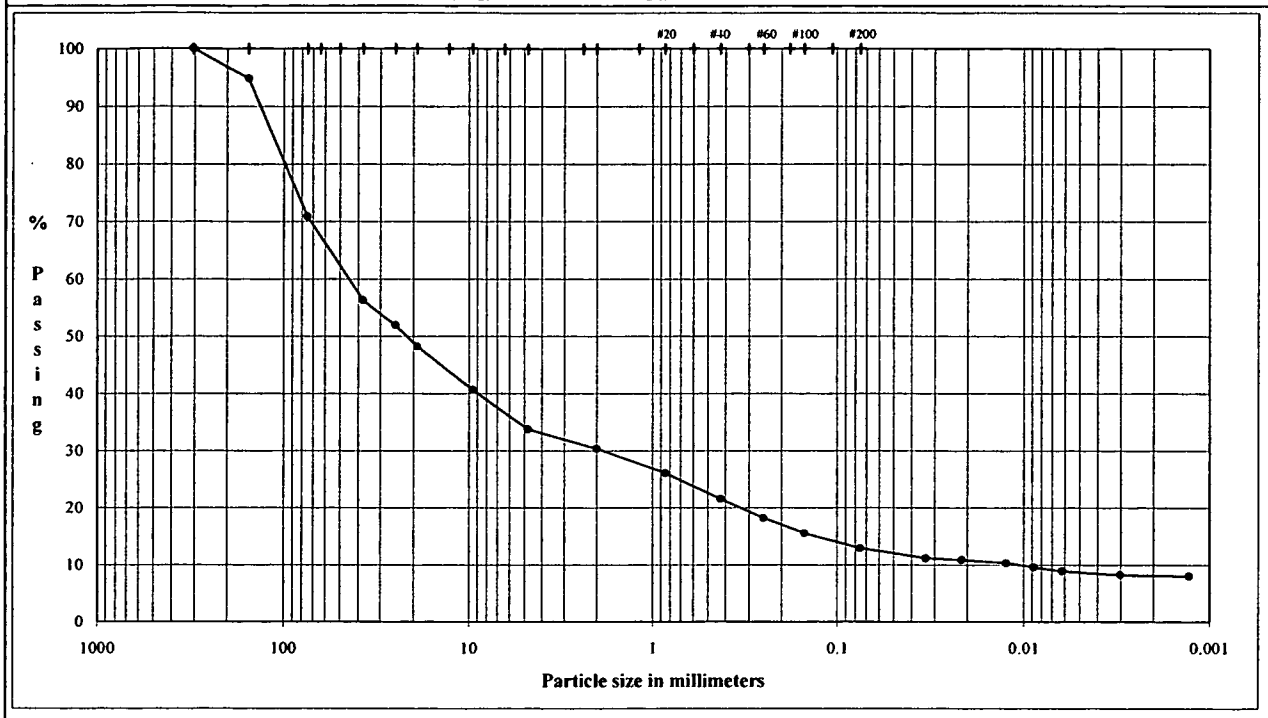
183

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-06** Depth: –
TYPE: **Pail**



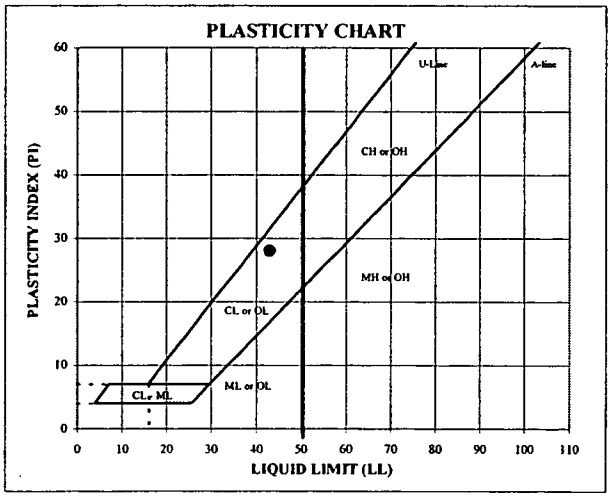
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	29.17
12.0"	304.8	100.0		
6.0"	154.2	94.8		
3.0"	75.0	70.8		
1.5"	37.5	56.3		
1.0"	25.0	51.9	Coarse Gravel	22.60
0.75"	19.0	48.2		
0.375"	9.5	40.7		
#4	4.8	33.7	Fine Gravel	14.51
#10	2.00	30.3	Coarse Sand	3.38
#20	0.85	26.1		
#40	0.43	21.5	Medium Sand	8.82
#60	0.25	18.1		
#100	0.15	15.5		
#200	0.075	12.9	Fine Sand	8.66

Hydrometer Analysis

(mm)	%Finer		
0.034	11.2		
0.021	10.8		
0.012	10.3	Fines	
0.0088	9.6	Silt or Clay	12.86
0.0062	8.9		
0.0030	8.2		
0.0013	8.0		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
3.9	43	15	28	2.70

DESCRIPTION: Yellowish brown (10 YR 5/8) clayey gravel with sand

USCS: GC

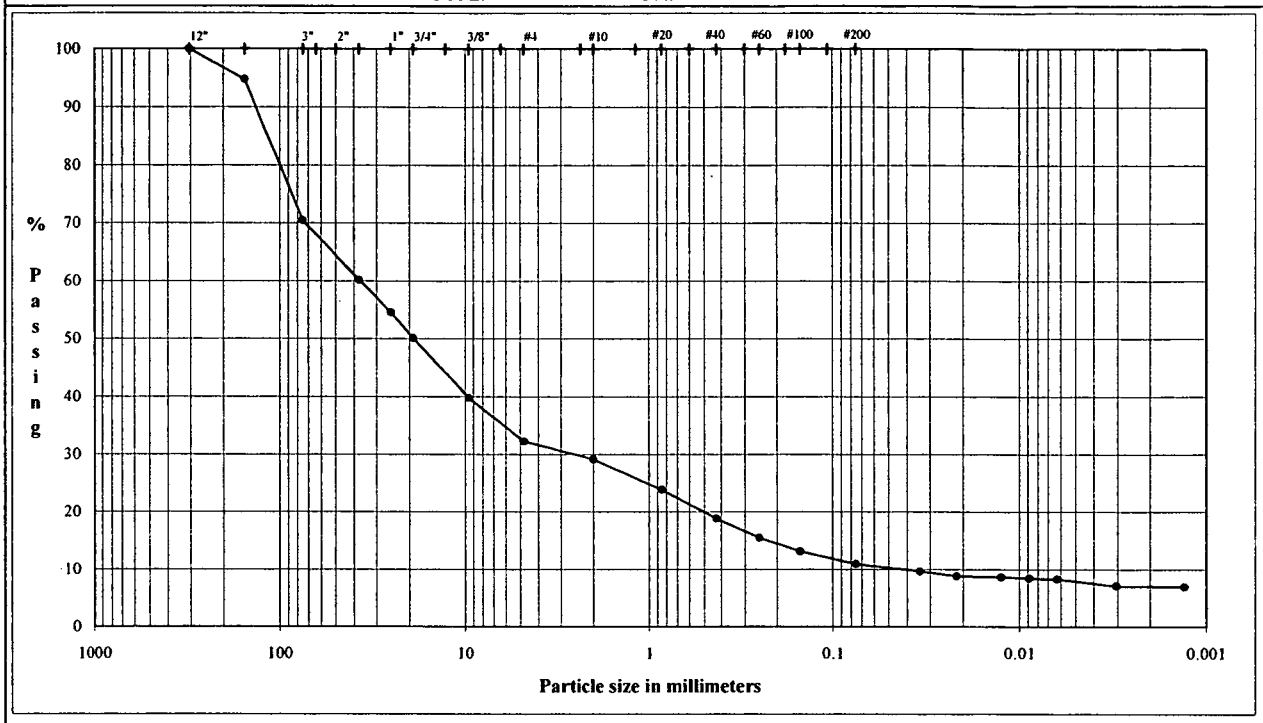
TECH SW
DATE 7/27/2005
REVIEW MB

July-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-07** Depth: --
TYPE: **Pail**



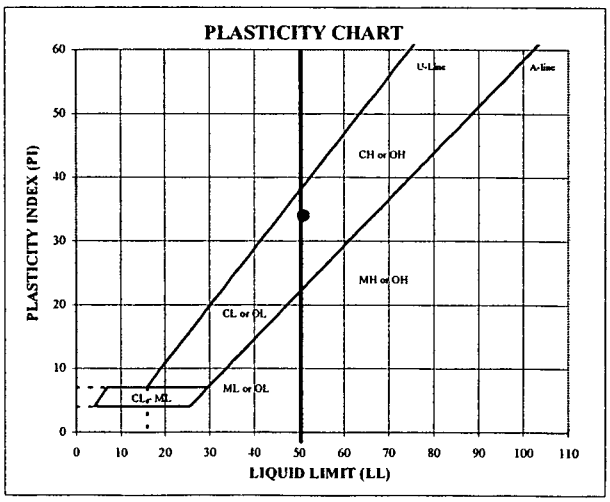
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	29.55
12.0"	304.8	100.0		
6.0"	154.2	94.8		
3.0"	75.0	70.5		
1.5"	37.5	60.2		
1.0"	25.0	54.6	Coarse Gravel	20.33
0.75"	19.0	50.1		
0.375"	9.5	39.7		
#4	4.8	32.2	Fine Gravel	17.96
#10	2.00	29.1	Coarse Sand	3.09
#20	0.85	23.8		
#40	0.43	18.8	Medium Sand	10.27
#60	0.25	15.5		
#100	0.15	13.1		
#200	0.075	10.9	Fine Sand	7.90

Hydrometer Analysis

(mm)	%Finer		
0.034	9.6		
0.022	8.8		
0.012	8.6	Fines	
0.0089	8.4	Silt or Clay	10.90
0.0063	8.3		
0.0030	7.1		
0.0013	7.0		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
8.0	51	17	34	2.70

DESCRIPTION: Yellowish brown (10 YR 5/6) poorly graded gravel with clay and sand

USCS: GP-GC

TECH	JR
DATE	7/31/2005
REVIEW	MB

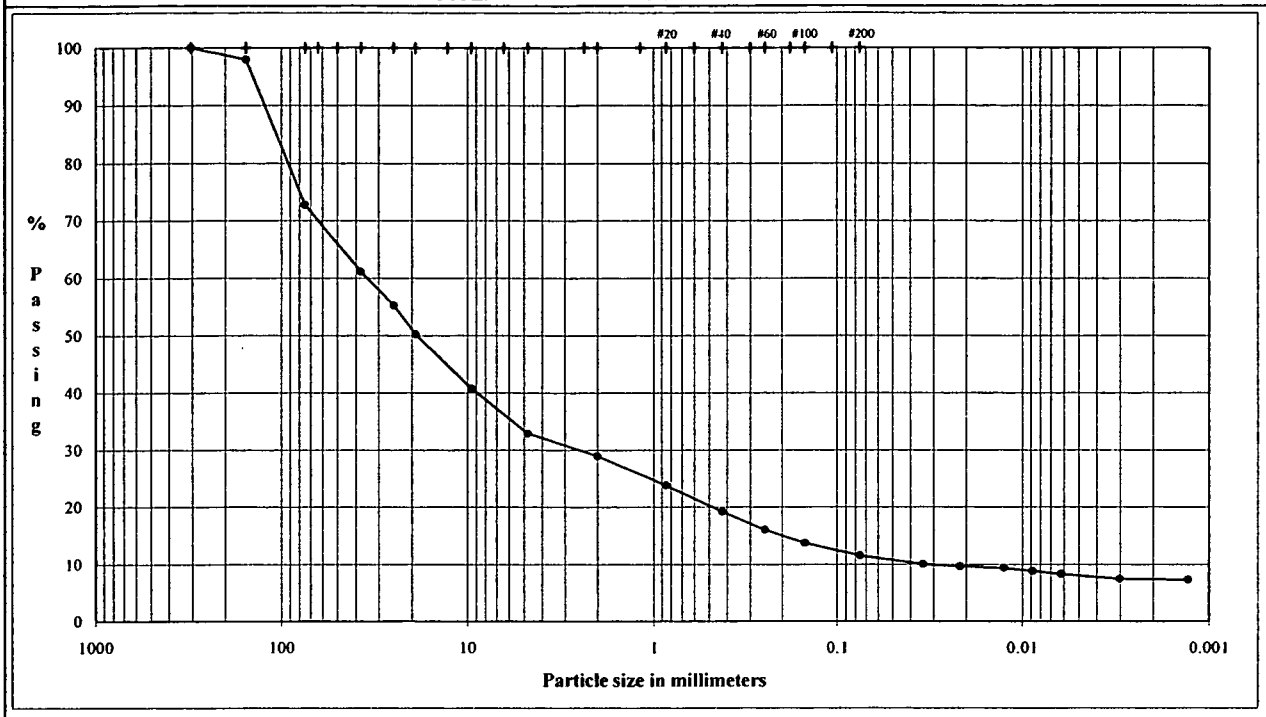
184

August-05 053-2203-0001

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318, D5519

PROJECT NAME: **Kaiser Hill/Rocky Flats Field and Lab**
SAMPLE ID: **CF-08** Depth: –
TYPE: **Pail**



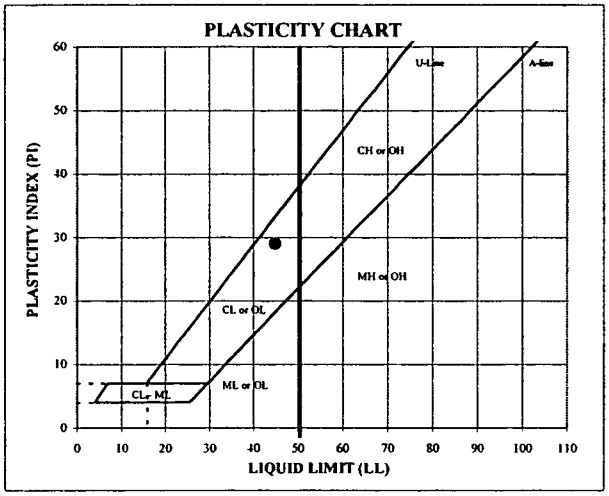
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
12.0"	304.8	100.0	Cobbles	27.27
12.0"	304.8	100.0		
6.0"	154.2	98.0		
3.0"	75.0	72.7		
1.5"	37.5	61.1		
1.0"	25.0	55.2	Coarse Gravel	22.55
0.75"	19.0	50.2		
0.375"	9.5	40.7		
#4	4.8	32.9	Fine Gravel	17.30
#10	2.00	28.9	Coarse Sand	3.99
#20	0.85	23.8		
#40	0.43	19.2	Medium Sand	9.72
#60	0.25	16.0		
#100	0.15	13.7		
#200	0.075	11.5	Fine Sand	7.68

Hydrometer Analysis

(mm)	%Finer		
0.034	10.0		
0.021	9.6		
0.012	9.3	Fines	
0.0088	8.8	Silt or Clay	11.49
0.0062	8.3		
0.0030	7.4		
0.0013	7.3		



ATTERBERG LIMITS

M_c	LL	PL	PI	SpG (assumed)
7.6	45	16	29	2.70

DESCRIPTION: Strong brown (7.5 YR 5/8) poorly graded gravel with clay and sand

USCS: GP-GC

TECH	DS
DATE	8/1/2005
REVIEW	MB

APPENDIX G

CONSTRUCTION QUALITY ASSURANCE DOCUMENTATION

APPENDIX G-1: DAILY QA REPORTS

QUALITY ASSURANCE OBSERVATION REPORT NO. 1

TETRA TECH RMC

TO:

Project No. 19-4886.007.00	Date 05/13/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Partly cloudy & breezy Temp. N/A ° at _____ a.m. Temp. N/A ° at _____ p.m.	
Observation Period: 10:30am to 3pm	

EQUIPMENT:

Hitachi (Orange) EX225 Trackhoe, Cat 345BL Trackhoe, Deere 450LC Trackhoe, Cat D10R ~~Trackhoe~~ Dozer, Cat D9R Dozer, (2) Cat 825C Sheepsfoot Compactor, (2) Cat 815F Sheepsfoot Compactor, Hyster 550 Forklift, FUEL Truck, Cat Loader Cat Scraper

Arrived on site @ 10:30am after being @ PLF since 7:15am. Regulators have not given the "OK" notice to proceed so job is on standby, as per Mike Keating. @~1:30 recieved notice to proceed & proceeded to Western end of buttress to observe 2 Cat trackhoes remove vegitation. w/in buttress footprint. Track hoes dug down to stream alluvium ~4'. D9 followed Trackhoes as they proceeded east in buttress footprint. D9 scraped broken up soils to south & east end where trackhoes moved piles to edge of access road for later trucking/hauling off site. Hitachi EX225 Trackhoe worked @ East end of buttress foot print removing veg. & top soil. D10 & Cat Scraper

05/13/05

began grubbing & removing veg. from Western edge of buffer East 100 yds South (adjacent to) main access road.

[Work to resume @ 06:30 Sat morning.]

Equipment remained in place for early start.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Patrick Niedermayer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 2

TETRA TECH RMC

TO:

Project No. 19-4886.00~~1~~2.00	Date 05/19/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. NA ° at _____ a.m. Temp. 70 ° at 12:47 p.m.	
Observation Period: 0630 – 1700	

EQUIPMENT: Cat D10 Dozer, Cat D9 Dozer, Cat D8 Dozer, Cat D6 Dozer, (2) Cat 815 Compactors, (2) Cat 825 Compactors, Cat 966 Loader, (2) Volvo A40 Dumptrucks, Hitachi ~~EX~~ 225 Trackhoe, Cat 631 Scraper/Grader Pan

PRE-EVOLUTION MTG.: DISCUSSED SAFETY, WORK SCHEDULE, FLAGGING DESIGNATION, INTRODUCED NEW PEOPLE.

(AM): Cat D10, D9, D8, & D6, Clearing & grubbing buttress focusing on West end, ~~minor~~ less work on East & Central areas. Cat 345 & Deere 450 Trackhoes clearing & stockpiling & loading excavated soils. 2 Volvo A40 Dumptrucks running soils from buttress @ West end up to NE corner above uppermost cut & fill boundary. Area ±30 yds wide through center section of buttress very moist to wet. Soils are

05/14/05

Water now discharges down stream

Silty, loamy sands w/ little stream alluvium. Envirocon has set up pumping well to reduce water. At NE corner of cut/fill area, ESE of B460, D6 Dozer is regrading followed by an 825 Compactor compacting area. Envirocon Hoping to complete haul road ~~at~~ through southern edge of buttress regrading area to expedite cycle times of A40's. Haul road completed & reduced cycle time by 2 minutes

Discussed tentative plan w/ Chad of Flat Irons Surveying & Mike Keating re: surveying any gravel fill brought in to replace sandy loamy wet soil in central southern edge of the buttress regrade footprint.

Upon further excavation in soft sandy loamy area described above did find hard claystone ~2' beneath the surrounding stream alluvium beds.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 3

TETRA TECH RMC

TO:

Project No. 19-4886.00~~7~~1.00	Date 5/16/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. N/A° at _____ a.m. Temp. N/A° at _____ p.m.	
Observation Period: 6:30am – 4:00pm	

EQUIPMENT: (1) Deere 450LC, (1) Hitachi EX225, (4) ~~D10R~~ Cat D10R, (1) Cat D9R (1) Cat D6 LGP, (2) Cat 825C, (2) Cat 815F, (1) Cat 966G, (1) Cat 14~~M~~H, (1) Hyster Forklift, (1) water truck, (1) Fuel truck, (1) Cat 345B (2) Cat 637

The contractor continued to clear any overburden material from the base of the buttress fill. The material being removed is being stockpiled, then loaded into scrapers with trackhoes and hauled to the northeast corner for fill. Cut/fill was started on the northeast corner of the landfill outside the limits of the waste. The fill being placed in this area is being compacted at existing moisture 4+ passes with both a 825 or 815. Several loads of 1½" gravel were delivered and used on haul roads or stockpiled for use as drainage rock on the buttress fill.

The west end of the buttress excavation appears to be stable but the central section is still very wet with

189

5/16/05

a layer of soft material on top.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 4

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2N.00	Date 5/17/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. NA ° at _____ a.m. Temp. NA ° at _____ p.m.	
Observation Period: 6:30am – 5:~~p~~pm	

EQUIPMENT: (1) Deere 450LC, (1) Hitachi EX225, (1) Cat 345B, (1) Cat D10R, (1) Cat D9R (1) Cat D6LGP, (2) Cat 825C, (2) Cat 815C, (1) Cat 966G, (1) Cat 140H, (1) water truck (1) Fuel truck, (4) Volvo A40D

The contractor continued to excavate and remove the soft material from the bottom of the buttress fill. The material being removed is being hauled and stockpiled at the northeast corner of the landfill. A small amount of material was placed as fill on the north east corner outside the limit of waste. The material was placed at existing moisture in 1'-lifts and compacted with a min of 4 passes with the 815 or 825.

The center section of the buttress fill excavation was cleared of mud and ~~some~~ the approx 60' on the west end was filled with 1½" rock to aid in stabalizing the area.

The geogrid was approved today by Earth Tech since the material delivered was slightly different

190

5/17/05

then what was speced.

The weekly construction meeting and the QA/QC regulator meeting was held today. The EPA, CDPHE, John Rahe, and CTR RM were on site for the QA/QC meeting as well as a site tour.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 5

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~7~~2.00	Date 5/18/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. N/A° at _____ a.m. Temp. N/A° at _____ p.m.	
Observation Period: 6:00am – 4:00pm	

EQUIPMENT: (1) Deere 450LC, (1) Hitachi Ex225, (1) Cat 345 B, (1) Cat D10R, (1) Cat D9R (1) Cat D6LGP, (1) Cat 966G, (1) Cat 140H, (1) water truck, (1) fuel truck, (2) Cat 825C, (2) Cat 815C (4) Volvo A40D

The contractor continued to remove any soft/wet material from the ~~toe~~ bottom of the buttress fill and haul it to the stockpiles on the northeast corner of the site. The 1½" rock was placed at the bottom of the excavation in any wet areas to help in stabilization. R.F. Alluvium was placed as fill over the rock or in areas that were not soft at the bottom of the buttress. The base of the buttress was released for geogrid from the west end to stake # 6017 by QA, QC, and Jack Woo of CH2M Hill. The fill being placed at the bottom of the buttress has only been rough graded and has not been compacted at this time.

The contractor has also been doing cut/fill operations at the northeast corner and southwest corner of the site. The cuts/fills have all been

5/18/05

outside the limits of the waste. The fill is being compacted on the northeast corner at existing moisture in 1'- lifts and a min of 4 passes of the 825 or 815.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 6

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00	Date 5/19/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. N/A ° at _____ a.m. Temp. N/A ° at _____ p.m.	
Observation Period: 6:20am - 5:30pm	

EQUIPMENT: (1) Deere 450LG, (1) Hitachi Ex225, (1) Cat 345B, (1) Cat D10R, (1) Cat D9R (1) Cat D6LGP, (1) Cat 966G, (1) Cat 140H, (1) watertruck, (1) fuel truck (2) Cat 825C, (2) Cat 815C, (4) Volvo A40D

The contractor continued to remove the soft/wet material from the base of the buttress fill. The wet areas were filled with a layer of 1½" rock to help stabalize the material then covered with a layer of R.F. Alluvium. The area was inspected by QA, QC, and Jack Woo of CH2M Hill and released from the west end to stake #6018. The material being removed from the base was being stockpiled at the northeast corner of the site.

The EPA and CDPHE were on site for a tour and to observe 2 percolation tests on the stream alluvium @ the base of the buttress fill. One test was taken on the west end, and one on the east end by URS. The results will have to be calculated and reviewed by Earth Tech.

192

5/19/05

The test fill for the use of pit fines from Pioneer as regrade fill was started today. The first lift was placed 12"± deep and half was compacted with 3 pass, & half w/ 2 passes of the 825. The pad will be completed and tested on 5/20/05.

The east section of the SED was cleared of soft/wet material to stable material, to weathered claystone in some areas. The channel was backfilled with a small amount of R.F. Alluvium, 2'±. The material was placed in 1' lifts and compacted with a min of 4 passes with the 825.

The first excavating was done for regrading within the limits of waste at the central section of the buttressfill. No trash was encountered in the exclusion zone.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 7

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00	Date 5/20/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. N/A ° at _____ a.m. Temp. N/A ° at _____ p.m.	
Observation Period: 6:30 – 5:00pm	

EQUIPMENT: (1) Deere 450LG, (1) Hitachi Ex225, (2) Cat 345B, (1) Cat D10R, (1) Cat D9R (1) Cat D6LGP, (1) Cat 966G, (1) Cat 140H, (2) Cat 825C (2) Cat 815C, (1) watertruck (1) fuel truck,

The contractor continued to remove soft/wet material from the east end of buttress fill bottom. The excess material from this area is being hauled and stockpiled at the north east corner of the site. Several loads of drainage rock was delivered and stockpiled just west of the buttress fill. Backfill of the SID was also continued using R.F. Alluvium placed in 1' lifts and compacted with a min of 4 passes with the 825.

The test fill with the pit fines from Pioneer was completed today. The pad was constructed in 2 one foot lifts and compacted with 2 and 3 passes with the 825 and tested. Then it was scarified and compacted with 2 passes with the 815 and tested.

193

5/20/05

All the tests passed for density with the lowest being 95% and the highest 98% with an average of approx. 96% of standard proctor.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 8

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~7~~9.00	Date 5/23/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. N/A ° at _____ a.m. Temp. N/A ° at _____ p.m.	
Observation Period: 5:00am – 4:30pm 3:15pm to 1:30am	

EQUIPMENT: (1) Deere 450LC, (1) Hitachi Ex225, (2) Cat 345B, (1) Cat D10R (1) Cat D9R, (1) Cat D6LGP, (1) Cat 966G, (1) Cat 140H, (1) water truck, (2) Cat 825G (2) Cat 815B, (1) Fuel truck, (4) Volvos Articulated Dump Trucks

The contractor continued to remove any soft wet material from the central and west sections of the SID ditch. The SID ditch was also being backfilled from the east end with import R.F. alluvium from Centerial. Fill was also being placed at the north east corner of the site, also the import R.F. Alluvium. The material placed in both areas was placed at existing moisture and compacted with a min of 4 passes with the 825.

Clear and Grubb / regrade was continued in the exclusion zone in the central section from the base of the buttress fill up approx 300'.

The base of the buttress fill was cleaned and cut to final grade in preperation for the

194

5/23/05

placement of the geogrid.
[PM SHIFT NOTES BEGIN] PATRICK
2 Lightning delays, not much work (~30 min) accomplished from 3:30 until 6:30. @ 6:30pm work resumed. (71°F @ 6:30pm)
Cat 825 compacting soil imported by 2 belly dumps & 2 side dump tractor-trailers from Centenial @ East end on the upper side. Cat 345 excavator regrading middle of the upper side of the buttress/waste boundry interface. (Upper, meaning top of slope, (up hill))
Relocating waste into SIO. as well w/ Cat 345 & D9.

Surveyors surveyed West end of buttress to update elevations, while trucks cont'd to haul in fill to East end. Left site @ 01:30am.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:
(am) None / None (pm)

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:
(am) None / None (pm)

Copies to: John Rahe

Observer: 1st shift Josh Valentine / 2nd shift Patrick Niedermayer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 9

TETRA TECH RMC

TO:

Project No. 19-4886.00~~1~~2.00	Date 5/24/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. N/A° at _____ a.m. Temp. N/A° at _____ p.m. 81°F @ 4:15pm / 60°F @ 11:32 am	
Observation Period: 5:00am – 4:15pm 3:00pm – 1:30am	

EQUIPMENT: (1) Deere 450LC, (1) Hitachi Ex 225, (2) Cat 345B, (1) Cat D10R (1) Cat D9R, (1) Cat D6LGP, (1) Cat 966G, (1) Komatso Front end loader, (1) Cat 140H (1) water truck, (2) Cat 825G, (2) Cat 815G, (1) Fuel truck, (1) Cat D5M

The contractor continued to back fill the STD ditch from east to west using import and on-site R.F. alluvium. The material was placed in 1'- lifts and compacted a min of 4 passes with the 825 or the 815. A large soft spot was excavated on the east end of the site approx 40' Ø and 5'± deep outside the limit of waste. The excavation was back filled with import R.F. alluvium and compacted with a 825 compactor.

The west 150' of the buttress base was scarified 6" and covered with geogrid. The geogrid was overlapped a min of 24" in all directions and shingled in the direction of rock placement. A few areas were notched to match the curves of the footprint, these areas were ~~zip~~ tied every 2' per the

195

5/24/05

manufacturers recomendation.

(PM SHIFT BEGIN) Lightning delay until 5:15pm±. Observed Cat D5M regrading center section of buttress footprint. Geo grid layed out w/ 2' overlap starting @ west end. Gravel to begin to be placed shortly. in 2' thick, 3/4" to 1½" gravel to Spec. Prior to geogrid's placement the Cat scraper ripped up the buttress fill. Belly & side dump semi's hauling in R.F. alluvium to East end where it is being placed & compacted by an 815 compactor w/ at least 4 passes.

No gravel placed on geogrid. Continued pushing waste in central area to the north into waste boundary. Continued to place geogrid East in buttress footprint. ending @ 3+25. Geogrid needs to be extended up 3:1 slope on Southern boundary. 3 to 1 slope cut into Southern edge of buttress to station 7+00.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None (am) / None (pm)

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None (am) / None (pm)

Copies to: John Rahe

Observer: Josh Valentine / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 10

TETRA TECH RMC

TO:

Project No. 19-4886.00~~1~~2.00	Date 5/25/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. 49 ° at 6:30 a.m. Temp 52° @ 1:15 am Temp. 69 ° at 4:00 p.m.	
Observation Period: 5:00am - 4:00pm 3:00pm - 1:30 am	

EQUIPMENT: (1) Deere 450LG, (1) Hitachi Ex225, (2) Cat 345B, (1) Cat D10R (1) Cat D9R (1) Cat D5M, (1) Cat D6LGP, (1) Cat 966G, (1) Komatsu Front End Loader, (1) Cat 140H (2) water truck, (2) Cat 825G, (2) Cat 815G, (1) Fuel truck

The contractor continued to place regrade fill on the north east corner of the site. The material placed was imported R.F. Alluvium placed in 1'- lifts and compacted with a min of 4 passes with the 825. The east end of the buttress footprint was cut/filled to finish grade.

The west 150' of geogrid was stockpiled with drainage rock, but has not been spread @ this time. The next 150' of geogrid placed by the night crew had several large rocks, and deep ruts. The area was rolled back and reworked to remove the rocks and smooth out the ruts. The geogrid has not been replaced @ this time.

The SID cleanout was continued as well as cut fill operations in the central section of the landfill

196

5/25/05

exclusion zone.

[PM shift begin] P. Niedermeyer

D9 cutting roadway after fill was placed over waste through center of site above buttress. 3 side dumps & 2 belly dumps imported RF alluvium to East end of both a D6 & D10 worked @ different times to stockpile RF alluvium @ Eastern edge of waste boundary exclusion zone. 825 compactor compacted inside waste boundary south of newly cut road a minimum of 4 passes to spec. Fill stockpiled will be brought in to exclusion zone in next shift to add to the few loads placed @ east end tonight. Crew of 3+4 worked to remove boulders from beneath geogrid & dress existing to spec. Initially geogrid extended from West to east ending @ 3+25. 3 man crew continued laying geogrid as far as 5+75. w/ the southern most layer skipped. In this area 5+75 → 6+00 observed minor depression that was very wet. Requested 1½"(-) gravel be brought in to bring flush to existing areas.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None am shift / None pm shift.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: AM Josh Valentine / PM Patrick Niedermeyer

Reviewing Engineer: John Rahe

5/25/05

D9 began cutting top of bank @ NW corner of site, ESE of T130W. Pushing soils down to edge of waste boundary. Scarifying & grooming of buttress material completed to ~ 7+25.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Copies to: John Rahe

Observer: Josh Valentine / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 11

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~7~~1.00	Date 5/26/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. 48 ° at 6:00 a.m. 55° F @ 12:30 am Temp. 74 ° at 3:27 p.m.	
Observation Period: 5:00am – 3:30pm 3:00pm – 1:30am	

EQUIPMENT: (1) Deere 450LC, (2) Cat 345B, Hitachi Ex225, (1) Cat 10R, (1) Cat D9R (1) Cat D6LGP, (1) Cat D5M, (1) Cat 966G, (1) Komatsu front end Loader, (2) Cat 140H, (2) water truck, (1) Fuel truck (2) Cat 825G, (2) Cat 815G.

The contractor continued to do cut/fill operations in the central and west sections of the landfill regrade area. The central section section is being filled with import RF. alluvium and Pioneer pit fines. The fill was being placed in 1'- lifts and compacted with a min. of 4 passes with the 825 or 815.

The drainage rock was continued on the geogrid from the west end approx 160' to the east. The rock was placed using a front end loader driving on the previously placed rock then rough graded.

A small section of the SID was cleaned out near the center. The ~~me~~ wet material removed was spread in thin lifts to dry or be mixed with other fill material

198

5/26/05

at a later date.

[PM Shift]

815 or 825 compactors began compacting cut @ NW corner of waste boundary that D9 pushed down to the South last evening. 4 side dumps & 2 belly dumps imported RF Alluv. from Cutenial to East end while Cat 966 transported RF Alluv. down haul road to the west. 825 compacted 1' lifts to spec. as placed & spread on South side of main haul road. 966 also continued to spread 1½"(-) gravel over geogrid to 2+50. Geo grid ~~was~~ continued to be placed to the west from 5+75 to 7+00 ±.

Also D9 continued to cut @ NW corner of waste boundary.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None am, None pm

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None am, None pm.

Copies to: John Rahe

Observer: Josh Valentine / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 12

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00	Date 5/27/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve	
Weather Conditions: Temp. 49 ° at 6:00 a.m. Temp. 73 ° at 3:40 p.m.	
Observation Period: 5:00am - 3:30pm 3:00pm - 1:45am	

EQUIPMENT: (2) Cat 345B, (1) Hitachi Ex225, (1) Cat D10R, (1) Cat D9R, (1) Cat D6 LGP (1) Cat D5 M, (1) Cat 966G, (1) Komatsu front end Loader, (2) Cat 140H, (2) Cat 825G (2) Cat 815G, (2) water trucks, (1) Fuel truck.

The contractor continued to place 1½" drainage rock on the geogrid. The rock was placed ~~g~~ 50' out and rough graded to 1' east 300' from the west end.

Fill was continued at the north east corner of the OLF. The material was imported RF alluvium or pit fines placed at existing moisture and compacted a min of 4 passes with the 825 or 815.

Cut was also continued at the north west corner as well as the central section of the SID inside the exclusion zone

QC took a sample of the 1½" drain rock for a seive analysis.

199

05/27/05

[Pm Shift]

6 to 9 trucks continued hauling in R.F.A. to east end where it was dumped & moved west along main haul road & placed & not compacted a min. of 4 passes w/ 825 & D6. D9 & Cat 345 excavator cut/regraded western end moving east, the exclusion zone while being hosed down w/ ~~w~~ for ~~water~~ w dust suppression.

In east end of buttress area large (12"+) boulders/cobbles where removed w/ 966 & Komatsu 420 front end loaders

R.F.A. was placed in SID extending its fill into the center of the site, from the east.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine / Patrick Niedermeyer

Reviewing Engineer: John Rahe

447-1836

QUALITY ASSURANCE OBSERVATION REPORT NO. 13

TETRA TECH RMC

TO:

Project No. 19-4886.001.00	Date 5/31/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 46 ° at 5:00 a.m. Temp. 68 ° at 5:37 p.m.	
Observation Period: 5:00am – 3:45pm ~~3:00pm – 2:06am~~	

EQUIPMENT: (2) Cat 345B, (1) Hitachi Ex225, (1) Cat D10R, (1) Cat D9R, (1) Cat D5M (1) Cat D16LGP, (2) Cat 966G, (2) Cat 140H, (2) Cat 815G, (2) Cat 825G, (2) Water Truck, (1) Fuel Truck, (1) Vib. Smooth drum

The contractor continued to place the 1½" drain rock on the geogrid for the base of the buttress fill. The rock was being compacted using a vibratory smooth drum compactor.

The cut/fill operations were continued in the central and west end of the exclusion zone. RF alluvium and pit fines were placed as fill on the east end and the central section of the landfill. The material was placed in 1' lifts and compacted ~~with~~ by a min of 4 passes with the 815 or 825 compactor.

[PM Shift]:

D9, D10, & Cat 825 continued cut/fill operations @ North western waste boundary w/ compaction of fill comprised of 1' lifts w/ min. of 4 passes.

200

5/31/05

From ~5+00 to ~6+00 it was observed that the geogrid had been disturbed to the point that the 1½" drain rock needed to be removed & patches placed over damaged areas. As well folds were pulled out & overlaps were redressed to spec. The edges of the patches were ~~covered~~ covered w/ drainrock by hand approx. 6" then the D6 & John Deere 310 covered remaining areas w/ upto 18" of drain rock under close observation to ensure patch position & overlap was maintained to spec. w/ 2' overlap in all directions. Prior to geogrid repair, trucks imported drainrock while D6 spread & Ingerroll 100 Vibratory Smooth roller compacted drainrock in buttress.
Trucks imported REA to center of site while D10 & 825/815 placed & compacted REA in 1'-lifts w/ a min. of 4 passes for compaction.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:
None/None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:
None/None

Copies to: John Rahe

Observer: Josh Valentine/Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 14

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00	Date 6-1-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 54 ° at 6:00 a.m. Temp. 80 ° at 6pm p.m.	
Observation Period: 6:00am – 4:30pm 3:00 – 1:30 am	

EQUIPMENT: (2) Cat 345B, (1) Hitachi EX225, (1) Cat D10R, (1) Cat D9R (1) Cat D10 LGP (2) Cat 966G, (2) Cat 140H, (2) Cat 825G, (2) Cat 815G, (1) Vib. Smooth Drum, (2) water Truck, (1) Fuel truck

The contractor continued to place 1½" drainage rock on the buttress base. There are a few areas in the rock that have a large number of fines that will be identified and removed. There were also a few areas of geogrid on the N. slope that had pulled the overlap to less than 2' when the rock was placed. These areas will be pulled to get the 2' overlap and tied to keep the lap from moving.

The cut/fill operations continued in the central and west sections of the exclusion zone. The last section of the SID was backfilled with import material. The import fill was also being placed in the central section of the landfill. The

201

6-1-05

material was placed in 1' lifts and compacted with a min of 4 passes with the 825 or 815 compactors.
[PM SHIFT]
R.F.A. was imported & spread w/ D6 & D5 dozers in center of site. D9 & D10 dozers continued cut/fill ops @ center of site 1/3 of the way from west end of buttress. 825 compacted fill to spec. Geo grid was placed from 7+00 to 9+00 after ~~scarify~~ scarifying buttress footprint. 1½" drain rock was imported and placed over geogrid. D6 & D5 dozers, Cat 140H grader, & Ingersol Rand 100 vib. roller compacted & spread ~~Rff~~ drain rock.

Lightning shut down site @ ~10:30pm to 12:30am.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:
None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:
None

Copies to: John Rahe

Observer: Josh Valentine / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 15

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00 Date 6-2-05	
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 54 ° at 5:00 a.m. Temp. 65 ° at 10 p.m.	
Observation Period: 5:00am – 4:15pm 3:00pm – 2am	

EQUIPMENT: (2) Cat 345B, (1) Hitachi Ex225, (1) Cat D10R, (1) Cat D9R, (1) Cat D6LGP (2) Cat 966G, (2) Cat 140H, (2) Cat 825G, (2) Cat 815G, (1) Vib smooth drum (2) water truck, (1) Fuel truck.

The Contractor continued to place 1½" drain rock on the geogrid for the base of the buttress fill. The rock was being dumped on rock to solve the geogrid pull-apart problem and was being spread around by the D5.

The cut/fill operations were continued in the central section ~~of~~ EAB of the exclusion zone. R.F. Alluvium and Pit fines were placed as fill along the road and were compacted and occasionally graded. The material was placed in 1' lifts and compacted by a minimum of 4 passes with the 815 or 825 compactor.

Cut and Fill operations continued in the central and western portions of the upper EAB exclusion zone. ~~Once~~ EAB The D10R started managing fill into the central portion while

202

6-2-05

regrading continued in the western portion. [PM shift] D9, D10 & Cat 345 excavator ~~spread~~ cut/filled ~~RFA~~ in the exclusion zone on the Northern central area. 9 trucks brought in RFA @ NW corner continuing ~~west~~ NW eastward D8, 966 loader, & 825 compactor spread. Imported RFA into the downparted NW corner, working material South, compacting as they went to spec.

D5 dozer spread drainrock eastward in buttress area. Geo grid was placed in buttress from 7+00 to 10+00 & D5 cont'd to rip N.East end of buttress foot print.

~~&~~ Grader maintained haul roads.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe ~~& Eric Berghoff~~ Eric Bergstrom

Observer: Josh Valentine / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 16

TETRA TECH RMC

TO: _____

Project No. 19-4886.001.00	Date 6-3-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 54 ° at 5:00 a.m. Temp. 63 ° at 5:30 p.m.	
Observation Period: 5:00am - 3:30 3:00pm - 6:00pm	

EQUIPMENT: (2) Cat 345B, (1) Cat D10R, (1) Cat D9R, (1) Cat D8R, (1) Cat D5M (2) Cat 966G, (1) Komatsu 400, (1) Cat 140H, (2) Cat 825G, (2) Cat 815G (2) water truck, (1) Fuel truck

The contractor continued to haul and rough grade the 1½" drainage rock at the base of the buttress fill

The cut/fill operations also continued in the central and west sections of the exclusion zone. The import pit fines and RFA were placed in the central and west sections as well. The fill material was being placed in 1' lifts and compacted with a min of 4 passes with the 825 or 815.

[PM. SHFT]
D8 & 825 spread RFA in middle of site & compacted in 1' lifts. Came on to site to a lightning delay. Worked about 1 hour +/- then an additional lightning delay made work cease. Day was called @ 6:30 due to impending weather.

203

6-3-05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Josh Valentine / Patrick Niederwieser

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 17

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00	Date 6-4-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQuery	
Weather Conditions: Constant Rain ~ 1/4" per hour 5:00AM-2:30PM Temp. 56 ° at 5:00 a.m. Temp. 60 ° at 10 p.m. Little to no rain from 3pm on.	
Observation Period: 5:00AM - 3:30pm 3:00pm - 12:30am	

EQUIPMENT: (1) Cat 966G, (2) Cat 140 H, (1) Cat D9R, (1) Cat D~~10~~8R, (2) Cat D10R
(1) Cat D5M, (1) Cat 825G, (1) Smooth Vibratory Drum Roller
(1) Fuel Truck, (1) Cat 345B

The contractor continued to rough grade and compact the 1½" drain rock at the base of the buttress fill. No new drain rock was placed due to road conditions.

Regrading operations continued in the north central portion of the exclusion zone. Landfill material was moved using the 825 compactor and the Cat 8 + 9 dozers.

Rocky Flats alluvium material was stockpiled off the northeast boundary of the exclusion zone. Material could not be placed in the central area of the landfill due to road conditions. Stockpiling operations were limited to the morning hours ~ 7:00 → 9:30

204

[PM Shift]
Cat 825 compactor & D6 dozer spread and compacted drainrock to 8+25. QA noted that approx. 50% of drainrock ~~[illegible]~~ to have more than 5% fines & therefore out of spec. QC took 5 gal. sample @ 5+25 to have analyzed for seive analysis. D9 cut high area on west side of central haul road. QA asked Envirocon not to place any soils due to high moisture content, D9 stockpiled in centre of site to be ~~[illegible]~~ laid out in ~6" lifts to dry @ later date prior to compaction/fill. D8 was moving R.F.A. at west end ~~&~~ outside of exclusion zone. QA requested Envirocon cease earth moving due to high soil moisture content. D9 cont'd cutting/regrading/stockpiling top 1' of soil in exclusion zone to the east, to be spread to dry @ later date to dry out sufficiently prior to placement & compaction.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None. Possibly fine in excess of 5% in drainrock. QC took sample for seive analysis. QA requested rush analysis of sample.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Eric Bergstrom / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 18

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00 EAB	Date 6-6-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQuery	
Weather Conditions: Temp. 60 ° at 6:00 a.m. Temp. 65 ° at 12:00 ~~p.m.~~ am	
Observation Period: 5:00AM - 3:30PM 3:00pm 1:45 am	

EQUIPMENT: (1) Cat 345B, (1) Cat 825G, (1) Cat 815 F, (2) Cat 140H (2) Cat D10R, (1) Cat D8R, (1) Cat D5M, (1) Smooth Vibratory Drum Roller (1) Fuel Truck, (1) Cat 966G, (1) Water Truck, (1) Cat D9R

The contractor continued to place 1½" drain rock in the buttress fill area. The D5M and the Ingersoll 100 Drum roller were used to spread the drain rock and compact it. CQC collected sample DR-2 from the east end of the drain rock in the morning. Several areas within the drain rock were marked for excavation and removal due to excessive fines content. Other areas were observed but we will wait for the test results to determine ~~how~~ CAN if the material meets specifications.

Rocky Flats Alluvium was placed as fill in the central portion of the landfill. Material was placed in 1' lifts and compacted with at least 4 passes of the 815 F compactor. Cut/Fill and regrade activities continued in the west area of the exclusion zone. Material (existing) was moved with the D8, D9, + D10 dozers as well as the 345B and 966G

205

06/06/05

excavator and loader and then compacted with a minimum of 4 passes with the 825G compactor in the center of the site.

[P.M. Shift]

825 compactor & ~~825~~ D8 Dozer cut/fill regrading in NW corner of exclusion zone, working East. D6 dozer spread drainrock in buttress to 8+75. 815 compacting in center of site over SID due N. of haul road. Trucks importing RFA to center of site where aforementioned 815 was spreading & compacting RFA to spec. Later, all work focused on ~~Northern~~ & NW quadrant of site. (2) D8 dozers spread imported RFA. while 825 compacted to spec. D9 & D10 cont'd regrading in exclusion zone.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Eric Bergstrom / Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 19

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00 (CAB)	Date 6-7-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQuery	
Weather Conditions: Temp. 48 ° at 6:00 a.m. Temp. 73 ° at 6:00 p.m.	
Observation Period: 5:00 AM – 3:30 PM (1530) 2:30pm – 1:30am	

EQUIPMENT: (1) Cat 345 B, (2) Cat 825 G, (1) Cat 815 F, (2) Cat 140H (1) Cat D10R, (1) Cat D9R, (1) Cat D6R, (1) Smooth Vibratory Drum Roller (1) Fuel Truck, (1) Water Truck, (1) Cat 966 G

The contractor continued to place 1½" drain rock in the buttress fill area (South border of site). The drain rock was spread using the D6 dozer and compacted with the Ingersoll Roller. Surveying was continued to check the thickness of the drain rock layer.

Rocky Flats alluvium was brought into the center of the site and spread with the 140H scrapers. The material was placed to 1' lifts and compacted with a minimum of 4 passes from the 825G and 815F compactors.

The D9 + D10 dozers continued cut/fill operations in the Northwest Quadrant ~~of~~ (CAB) and the North-Central quadrant of the site.

206

06/07/05

The submittal for the geotextile material arrived for review at Wednesday's meeting.

(PM) The contractor continued to do cut/fill operations on the west and central sections of the exclusion zone. Import RFA was also placed on the upper east end of the landfill. All material was placed in 1'- lifts and compacted with a min of 4 passes with the 825.
The contractor also spent part of the shift spreading 1½" drain rock that had been hauled by the day shift.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Eric Bergstrom / Josh Valentine

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 20

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00 EAB	Date 6-8-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQuery	
Weather Conditions: Temp. 46 ° at 6:00 a.m. Temp. 63 ° at 8:30 p.m.	
Observation Period: 5:00 AM - 4pm 3:00 pm — 2:00 am	

EQUIPMENT: (1) Cat 345 B, (1) Cat 966 G, (2) Cat 825 G, (1) Cat 815F (2) Cat 140H, (1) Cat D10R, (1) Cat D9R, (1) Cat D8R, (1) Cat D6R (1) Smooth Vibratory Drum Roller, (1) Fuel Truck, (1) Water Truck

The contractor began placing geotextile material along the southern border of the site at the edge of the drain rock. Drain rock was pushed onto the geotextile ranging from 1 to 1½ feet wide. The 1½" drain rock was spread using the D6 dozer and compacted with the Ingersoll roller. 2 QA samples were taken from the geotextile, one from roll 2.41487, the other from ~~NG 0987300.~~ EAB NG 0986659

Pit fines were placed in the center of the site. The material was spread with the 140 H graders and compacted ~~with a minimum~~ EAB in 1' lifts with a minimum 4 passes of the 815 or 825 compactors.

The D8 and D9 dozers continued cut/fill operations in the north west quadrant of the site. The D10 dozer was checked and will be out of commision for

207

06/08/05

roughly one month.

QC collected one sample of pit fines for sieve analysis + atterbergs and one sample from the Rocky Flats alluvium for sieve analysis and atterbergs.

[PM shift]

Observed that geotextile @ station 3+50 is covered by drainrock upto 6'. 966 loader cont'd to spreadrock at East end of buttress keyway. A40 & A35 Volvo Articulated dump trucks imported 1½" drainrock to buttress area. D6 dozer spread drainrock while Ingersoll Rand 100 smooth vibratory roller compacted drainrock. D8 dozer & 825 compactor spread & compacted RFA to spec. in NW quadrant of site, west of exclusion zone. D9 & D10 dozers cut/filled in center of site, N. of central haul road w/in the exclusion zone ~~[illegible]~~ NW w/ 825 compacting to spec. At 8:25 pm work called off due to lightning. 9:35 back to same in NW quadrant of site.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Geotextile is covered by 6' of drainrock @ Station 3+50. & <5' ~~[illegible]~~ NW of the bottom between the 3:1 slopes of the keyway is left open for pitfines.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Eric Bergstrom NW / Patrick Niedermeyer

Reviewing Engineer: John Rahe

[FAX (303)447-1836]

QUALITY ASSURANCE OBSERVATION REPORT NO. 21

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00 (EAB)	Date 6-9-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQuery	
Weather Conditions: Temp. 58 ° at 9:15 a.m. Temp. 61 ° at 9:00 p.m.	
Observation Period: 5:00 AM – 3:30 PM 3:00pm – ~~[illegible]~~ 10:30pm	

EQUIPMENT: (1) Cat 345 B, (2) Cat 825G, (1) Cat 815 F, (2) Cat 140H (1) Cat D10 R, (1) Cat D9R, (1) Cat D6R, (1) Smooth Vibratory Drum Roller (1) Fuel Truck, (1) Water Truck, (1) Cat 966G, (1) Deere ~~344~~ 310G (EAB)

The contractor continued to place ~~6~~ (EAB) 1½" drain rock in the SouthEastern quadrant of the buttress fill area. The seep area at the southeastern boundary was excavated using the 345 B, then it was filled with drain rock, then the geogrid was laid over it. ~~The contractor expected to have~~ (EAB)

The contractor pulled back the drain rock along the southern border of the drain rock fill in order to reduce the overlap of the drain rock on the geotextile. The rock was moved with the Deere 310G (EAB) and the Cat D6 with hand dug finishing. This work brings the geotextile placement back into spec for ECR-002.

Pioneer pit fines were brought into the center of the site. The material was spread with the 140H

208

06/09/05

graders and compacted in 1' lifts with a minimum of 4 passes of the 825G or 815F compactors.

The D9 + D10 dozers continued cut/fill operations in the north central quadrant of the site.

QC collected samples DR-3 and DR-4 of the drain rock for permeability and grain size analyses.

[PM shift]

3 Volvo ~~[illegible]~~ dumptrucks brought in 1 load of 1½" drainrock each. Ingersoll Rand 100 vibratory smooth drum roller compacted newly laid rock from 1st shift. Extreme east end of buttress footprint was noted to have been excavated to remove soft spot & back filled w/ 1½" drain rock. Geotextile ~~[illegible]~~ along southern edge of buttress was noted to be brought into spec compliance w/ respect to drainrock/geotextile overlap. D8/D6 dozers spread imported Rocky Flats Alluvium (RFA) in NW quadrant progressing in a western & southern direction. An 825 compacted area, but became too moist to reach specs. for compaction. D8/D10 & 825 cut/filled, regraded in exclusion zone N. Central part of site.

~~[illegible]~~ Work called off @ 9:05pm due to rain.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Geotextile uncovered & exposed all but 1ft. along entire southern boundary of buttress footprint - now in compliance as spec'd.

Copies to: John Rahe

Observer: Eric Bergstrom ~~Josh Valentine~~ / Patrick Niedermayer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 22

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00 (CA13)	Date 6-10-05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. 50° at 6:00 a.m. Temp. ____° at ~~10:30~~ p.m.	
Observation Period: 5:30 – 10:30 am (No pm. shift due to rain.)	

EQUIPMENT: (1) Cat 345 B, (1) Cat 825G, (1) Cat 815 F, (2) Cat 140H (2) Cat D10R (1) Cat D8R, (1) Cat D5M, (1) Smooth Drum Roller (1) Fuel Truck, (1) Cat 966G, (1) Water Truck, (1) Cat D9R

The contractor hauled material for regrading from Pioneer Pit + Centennial pit. (Pit fines and Rocky Flats Alluvium respectively.) The amount of work being performed was limited due to the wet weather and numerous lightening shut downs. The RFA + Pit Fines were spread with a D10 + D9 Dozer and the 815 + 825 compactor made a minimum of 4 passes per lift. QC pulled a Bulk Sample numbered RF-03. Access to the sample was limited so the sample will stay onsite in a tarp until a gradation can be performed on Monday.

No work was performed during the PM shift. – GAN

209

06/10/05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Ryan Woodruff

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 23

TETRA TECH RMC

TO: _____

Project No. 19-4886.00~~1~~2.00	Date 6/13/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent:	
Weather Conditions: Temp. 48 ° at 5 a.m. Temp. 78 ° at 3:26 p.m.	
Observation Period: 5am-3pm 3:30-2am	

EQUIPMENT: (1) Cat 345 B excavator (2) Cat 825G compactors, (2) Cat 815 F compactors, (2) Cat 140H Graders (1) Cat D10R dozer, (1) Cat D9R, (1) Cat D6R, (1) Smooth Vibratory Drum: Ingersoll Rand 10 (1) Fuel Truck (1) Water Truck (1) cat 966G loader (1) Deere 310 EB (2) Volvo Trucks A40 & A35's

The contractor continued to place drain rock on the eastern portion of the butress. 2 Volvo trucks delivered drain rock while the loader spread the rock, and then the smooth drum roller made a minimum of 4 passes. The geotextile on the most easternly toe of the fill had not been anchored by the drainrock. This area had been flooded over the weekend and was pumped out throughout the day. The site appeared to be dryed out by 10 or 11am.

Regrading Operations continued near the northern access road. Side Dumps hauled material from pioneer pit (Pit Fines). A 825 compactor made a minimum of 4 passes, while a D9 & D10 Dozer spread the material. The fill appeared to have adequate moisture.

The Volvo trucks began hauling Pit Fines from centerial in the late afternoon. QC performed a moisture/density test with the

210

(06/13/05)

nuclear gauge (QC-BF-01) and by the sandcone (QC-BF-SC-01) methods. The fill appeared firm and stable, and met the project specifications. The Volvos continued to haul in the material while 815 compactor spread the material and compacted the fill. QC performed the Bulk gradation on sample RF-03, and collected a sample from the buttress fill BF-1.

[PM Shift]

815 & 825 sheepsfoot compactors compacted/regraded N. Central area. D6 dozer also cutting/filling in same area. (2) Cat 140 H graders leveling western most area along top of slope, working in a gen'rl S. & E. direction. Early in shift a Cat 815 sheepsfoot compacted extreme western end of buttress keyway footprint after a Komatsu loader brought in pit fines that were stockpiled earlier that day up on the haul road above the buttress. Ingersoll Rand 100 vibratory smooth drum roller broke down compacting 1½"(-) drain rock. D9 & 825 cut/filled eastern end of N. slope in the exclusion zone. D6 & D8 dozers spread RFA that was imported all shift in the NW quadrant in 1 foot lifts while they were compacted to spec by the 825 sheepsfoot. Soils judged to be ~~sufficiently~~ sufficiently moist for placement/compaction.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe
Ryan Woodruff / Patrick Niedermeyer

Observer: ~~Josh Valentine~~

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 24

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 06/14/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: ~~Michael Keating~~ Mike Keating ~~Steve McQueary~~	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 50° ° at 5 a.m. Temp. 62 ° at 10:33 p.m.	
Observation Period: 5am - 3:30pm 3pm - 1:30 am	

EQUIPMENT: (1) Cat 348 Excavator (2) Cat 825G Compactors, (2) Cat 815F ~~Compactors~~ Compactors, (2) Cat 140H Graders (1) Cat D10R Dozer (1) Cat D9R Dozer (1) Cat D6R loader (1) Smooth Vibatory Drum Inersoll 100 Rand (1) Fuel Truck (1) Water Truck (1) Cat 966 Loader (1) Deere 310E/AB (3) Volvo Trucks A40 + A35's

The contractor continued to place drain rock, regrade material, and butress fill. The drain rock was hauled by Volvo trucks and spread with a dozer. The vibratory smooth drum compacted the rock. The regrade fill was hauled by belly dumps, and spread with 140H, + 825 compactor. The compactor made a minimum of 4 passes, along the fill. The butress material was being hauled by side dumps and compacted with an 815 compactor and spread with a front end loader. I took a sample of the regrade fill from Pioneer's Pit Fines. (QA-RF-01). I also took two samples from the geotextile one from Roll NG-0986659 and one ~~from an unknown roll number~~ Roll # 2,41487 in the south eastern portion of the Keyway.

211

06/14/05

Drain rock was removed in areas that appeared to have a high fines content. The material was windrowed by 140H grader and removed by a front end loader. There are still fines in the drain rock, however ~~the~~ the QC/QA samples should be representative of the in place material. An inventory of the geotextile was taken and the "shiny" geotextile was resampled and is roll # NG0986659, there appears to be 5 rolls on the list of Geotextiles that are not onsite.

[PM SHIFT BEGIN] →

Trucks were importing both $1\frac{1}{2}$"(-) drainrock & pitfines to buttress. D6 dozer spread drainrock while Ing. Rand 100 compacted rock. (2) 825's compacted/regraded NW quadrant. Cat 140H grader worked NW quad as well. After lunch (9-10pm) trucks imported REA to NW quadrant w/ D6 & 815/825 compactors compacted/spread REA to the east. Cat 140H grader maintained haul roads throughout night.

Imported REA judged to have adequate moisture.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Ryan Woodruff / Patrick Niedermayer

Reviewing Engineer: John Rahe

447-1836
233-4683

QUALITY ASSURANCE OBSERVATION REPORT NO. 25

TETRA TECH RMC

TO: _____

Project No. 19-4886.00200	Date 6/15/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 58 ° at 5 a.m. Temp. 63 ° at 7:15 p.m.	
Observation Period: 5am-3pm 3pm - 2am	

EQUIPMENT: (2) Cat 825G & (2) Cat 815F compactors (2) Cat 140H Graders (1) Cat D10R Dozer, (1) Cat D9R, (1) Cat D6R Dozer, (1) smooth Vibratory Drum: Ingersoll 100 Rand, (1) Fuel Truck, (1) Water Truck, (1) Cat 966G loader (1) Deer 310 EAB (2) Volvo Trucks A40 + A35's

Side Dumps + Belly Dumps continue to haul butress fill while 140H Blade, 815 compactor, + a 966G loader spread the material in approximately 1' lifts. The 815 compactor made an minimum of 4 passes over the fill. QC performed 3 compaction/moisture tests with a nuclear density gauge. All three tests appear to be passing. Geotextile was placed under the butress fill w/ a minimum of a 2' overlap. They placed geotextile roll numbers 241478 and NG097312 and 241436 today. (3) Volvos continued to haul drain rock to the eastern portion of the site, while a D6R dozer and a WA 420 loader spread the material and the Ingersoll Smooth drum made a minimum of 4 passes over the material. The contractor patched the geotextile along the Keyway that I sampled yesterday with a minimum overlap of 2 feet on either side of the patch. Surveyors have been

212

6/15/05

Working on the ~~asbuilts~~ record drawings for the drain rock by taking 15 foot shots along the edge of the geotextile. There was a lightning shut down at 1:00 pm that lasted 15 min, there was not a lot of moisture. I collected a sample QABF-01, for the Butress Fill from the Centennial Pit, to run index testing and a standard proctor. The sample was collected at N 747498.30, E. 2081701.62 + EL. 5947.0

[PM Shift begin]

D8/D9 dozers spread RFA at top of Eastern end of the regrade area. Cat 140H maintained haul roads. Pit fines were brought in (imported) to buttress & placed/spread/compacted ~~to~~ from 3+75 ~~N~~ east ward to 7+25 in the keyway & 8+50 North of the toe on the buttress. Geotextile was laid w/ a minimum of 2' overlap ahead of the pit fines. Compaction of the pit fines occured w/ a minimum of 4 passes w/ both an 815 & a 825 sheepsfoot compactors. These compactors spread/placed the pitfines. The D6 & 140H grader assisted in spreading the pitfines as well.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Ryan Woodruff / Patrick Niedermayer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 26

TETRA TECH RMC

TO: _____

Project No. 19-4886.00200	Date 6/16/05
Project: Rocky Flats RCRA Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 58° at 5 a.m. Temp. 55° at 12 p.m.	
Observation Period: 5am - 3pm 3pm - 1:30am	

EQUIPMENT: (2) Cat 825G (2) Cat 815F compactors, (2) Cat 1404 Graders (1) Cat D10R Dozer, (1) Cat D9R, (1) Cat D6R Dozer, (1) Smooth Drum Vibratory Compactor, (1) Fuel Truck, (1) Water Truck, (1) Cat 966G loader (1) Deer 310EAB (2) Volvo Trucks A40 + A35s, (1) WA420 Loader

Contractor continued to place and compact buttress fill in 1' lifts, The D6 Dozer, 966G loader, WA420 Loader, 1404 Scraper, 815 compactor, + 825 compactor spread and compacted the buttress fill. Prior to fill placement geotextile roll #'s 2.41449, 2.41435, 2.41427, ~~place~~ 2.45958, + NG098312 were placed on top of the drain rock with a minimum of 2' of overlap. The buttress fill was tested by both QA/QC. The QA test appeared to be passing using the characterization proctors. A sample of the buttress fill was submitted yesterday and the results are still pending. The smooth drum roller compacted the drain rock as the backhoe spread ~~compacted~~ it. The contractor also continued to place and compact regrade material. A D-9 Dozer spread the material while the 825 compactor, compacted the fill. The QA test on the Buttress fill passed, while four out

213

6-16-05

of the five tests passed. The failing test ~~was~~ was due to low compaction and was retested ~~after~~ and passed after the material was reworked. QC collected a bulk sample of the RFA used for regrade material. The 3"+ material was sieved and weighed and a sample was submitted to the lab.

[PM Shift begin]:

Truck imported pit fines from Centenial to buttress' ~~East~~ West & center sections. Laid geotextile in a N-S orientation starting @ the extreme ~~e~~ West end (0+00) & completed laying out @ station 5+25±. Ran out of pit fines @ 9pm. D6 & 825 compactor spread & compacted the pit fines w/ a min. of 4 passes, but there still exist some small stockpiles on buttress. QC performed 5 density/moisture tests - all passed. After lunch RFA was imported from Centenial to top central haul road & spread & compacted the RFA in ~~an~~ a southern direction.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Josh Valentine~~ Ryan Woodruff / Patrick Niedermayer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 27

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6-17-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 56 ° at 610 a.m. Temp. 67 ° at 815 p.m.	
Observation Period:	5am-3 pm 3pm-2am

EQUIPMENT: (2) Cat 825G Compactors, (2) Cat 815F compactors, (2) Cat 140H Graders, (1) Cat D10R Dozer, (1) Cat D9R, (1) Cat D6R Dozer, (1) Smooth Drum Compactor, (1) Fuel Truck, (1) Water Truck, (1) Cat 966G loader, ~~(1) Deer 310 EAB~~ (3) Volvo Trucks, A40 + A35's (1) 310 G Backhoe

The contractor continued to haul and place the regraded fill while a D9 + D10 Dozer spread the material and one 825 compactor and (2) 815 compactors made a minimum of 4 passes over the material. A 140H blade helped spread the material after cleaning up the haul roads. With a limited supply of buttress fill there was only a small amount of fill placed for the buttress. However, the fill that was imported was spread with a D-6 Dozer, 310G Backhoe, and a 966G loader. The material was compacted with a 825G compactor. The fill was tested by both QA/QC. One test was performed by QA which appeared passing while QC performed 10 tests (nuclear gauge) and 2 sandcones, all of which passed. QA collected a regrade fill sample No. ~~QAR~~ QARF-02 of the RFA from the

214

06/17/05

Centenial Pit for a Sieve Analysis, Atterberg Limits, & Moisture. QA collected (2) Buttress Fill Samples (BF 2 & BF-3), and one regrade fill sample from Pioneer Pit (Pit Fines), (RF-6). The 470 Excavator cut the material staked by the surveyors at the toe of the buttress at a 3:1 slope. Cut material was then placed in other areas within the buttress. No additional Geotextile was placed today.

[PM Shift begin]

Trucks importing RFA to NE quadrant all evening. D9 & D8 spread to the South & West. Laborer wet down areas ahead of dozers & 825 compactor rolled out RFA w/ a min. of 4 passes. Imported RFA judged to have appropriate moisture content. An additional 825 sheepsfoot worked the extreme NW corner and progressed to the east.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer (p.m)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 28

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 6/20/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70° at 700 a.m. Temp. 66° at 2:21 ~~p.m.~~ am	
Observation Period: 5am - 3pm. 3pm — 2:30am	

EQUIPMENT: (2) 825 compactors, (2) 815 Compactors, (1) D9 Dozer, (1) D6 Dozer (2) 140H Blades, (1) Water Truck, (1) Fuel Truck., (1) 966 Loader

Contractor continued to haul a small amount of Buttress Material with Volvos. A D-6 Dozer, 966 loader, and a 825 compactor spread and compacted the material. QC performed 8 density/moisture tests with a nuclear gauge. All but two tests passed the initial tests. QC-BF-30 ~~passed after being too dry~~ failure due to low moisture, while QC-BF-32 failed due to the shallow depth of the gauge. After taking two additional tests in the location of QC-BF-32 the test location passed. The material was reworked, moisture conditioned and recompacted in the area of QC-BF-30 and was retested and passed. (2) 815 compactors, (1) 825 compactor, D-9 Dozer, and a loader spread and compacted regrade material with a minimum of 4 passes. Lab results were recieved for the geotextile sampled on June 14, 2005, and the test results indicate that the fabric is within the project specifications.
Two additional panels of geotextile were place along the slope of the buttress. The surveyors surveyed in the as-builts for

315

06/20/05

the drain rock ~~and~~ RW to check the thickness.

[PM shift begin]

D9/D10 worked in exclusion zone all shift. Trucks imported RFA to NW quadrant all evening/shift. D6 dozer worked to stockpile imported mat'l. On West end, subgrade 2 was completed & 825 sheepsfoot compacted a min. of 4 passes & D6 began to place finish grade in a 2' lift @ as one lift. Total volumes imported to date are attached. (see attachment of Envirocon Production Report)

Lightning shutdown from 1808 to 1923 hrs.

CQA ~~MW~~ E (John Rahe) or SQUAM RW needs to inspect subgrade 2 before subcontractor proceeds w/ finish grade placement on West end.

QC took 4 density/moisture test on pitfines in buttress. 1 test did not meet spec for moisture - all other tests met specs.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None / One density/moisture test location

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer (p.m.)

Reviewing Engineer: John Rahe

Attachment to Daily Report: 06/20/05

ENVIROCON PRODUCTION REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)		DATE: 06/20/2005
TASK ORDER NO.: 1456A	LOCATION: Original Landfill	
SUPERINTENDENT/SITE MANAGER: Steve McQueary	PREPARED BY: Steve McQueary/Chris Pearson	
General Weather Conditions: Hot,thunderstorms, windy		

WORK PERFORMED TODAY

Drain rock				Pit Fines (Centennial)			
Trucks Received	0	Trucks to date	496	Trucks Received	57	To date	699
Tons Received	0	Tons to date	11924	Tons Received	1156	To date	16838
RFA				Pit Fines (Pioneer)			
Trucks Received	85	Trucks to date	1245	Trucks Received	153	To date	1382
Tons Received	1177.26	Tons to date	30139	Tons Received	3548.93	To date	31164.9

Project Totals (All Soils)

Total Trucks Received Today	295	Total Tons Received Today	6882.55	Total Trucks To Date	5130	Total Tons To Date	90065.23

Placed the last of the drain rock
Hauled in regrade fill, placed it west to east, downposting as we went
Placed bottom fill
Pretty well completed covering the waste area
Collected the D10 dozer from the west gate

Type	Equip #	Quantity	WBS
D10 dozer		1	GR861900
D9 dozer		1	GR861900
[illegible] compactor		2	GR861900
[illegible] compactor		2	GR861900
345 exc.		1	GR861900
450 exc.		0	GR861900
D6 dozer		1	GR861900
4000 gal.water trk.		2	GR861900

Personnel Resources

Job Type	Assigned	In Attendance	Comments
Site Manager	2	2	
H&S Manager	1	1	
H&S Supervisor	1	1	
Operator Foreman	0	0	
Operator GP-5	15	14	
Construction Specialist-Foreman	2	2	
Construction Specialist	17	16	
Teamster Foreman	0	0	
Teamster	0	0	
	35	33	

WAS A JOB SAFETY/PRE-EVOLUTION BREIFING HELD THIS DATE? (If YES attach copy of the meeting minutes)	Yes
WERE THERE ANY DOCUMENTED ACCIDENTS/INJURIES ON THIS DATE? (If YES attach copy of accident/injury report)	Harold B. went to medical complaining of a hurt back

LIST SAFETY ACTION TAKEN TODAY/SAFETY INSPECTION CONDUCTED: See Attached

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB:

TASK ISSUES / IMPACTS / SCOPE CHANGES: Lightning shutdown at 1808hrs until 1923hrs.

REMARKS:

SITE MANAGER/FOREMAN DATE

216

(303) 255-4683

QUALITY ASSURANCE OBSERVATION REPORT NO. 29

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6/21/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 61 ° at 5 a.m. Temp. 85 ° at 1717 ~~p.m.~~ hrs	
Observation Period: 5am – 3pm 3pm – 9:30pm	

EQUIPMENT: (1) D9, (1) D10, (1) D6 Dozers, (1) 966 + (1) Kamatsu loader, (2) 825 Sheepsfoot, (2) 815 Sheeps foot, (2) Blade (140H), (1) Water truck (1) 345

Contractor continued to work on the buttress fill and the regrade material. The D10, D-9, + D6 Dozers spread the regrade fill and (1) 815 and (1) 825 compacted the material with a minimum of 4 passes. The (1) 825 and (1) 815 compacted and spread the buttress fill material. QC performed (5) density/moisture tests and 4 out of the five tests passed the initial tests. One test failed due to high moisture and the area was scarified and reworked and retested and passed. One bulk RFA sample was collected by QC along with one Pioneer Pit Fines sample both used as regrade material. QA performed a density/moisture test which appeared to pass, and I collected a sample for index testing and a proctor test for the Lafarge buttress fill. Subgrade 2 was close to grade throughout the site but is as built and has been ~~expected~~ inspected by QA from the most western portion of the site continuing to the east 400'. (8) rolls of geotextiles that were not on the approved

217

06/21/05

list were found in the buttress. (5) were still in rolls while (3) of which were placed last night. The contractor will submit the manufacturers QC data for the rolls on-site. (5) Approved rolls were delivered to the site at 2pm and will be placed ~~tonight~~ NW.
[PM shift begun]

NW Surveyors took locations of 2 rolls # 1.76.... that were placed & partially covered. These are two of the rolls that have not yet been approved for use. Around 1900± hrs work was called due to lighting. QA ~~called AW~~ requested that no further earthwork be done this evening. Foreman realeased crew @ 8:45 pm.

Prior to shut down, pit fines were imported to buttress, where (2) 825 compactors compacted pitfines. D9/D10 dozers cont'd cut/fill operations in the exclusion zone.

Unapproved Roll #'s Were: 1.76780, 1.76826, 1.76772, 1.76784
1.76790, 1.76794, 1.76858, 1.76782,
1.76819

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer (pm)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 30

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6/22/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 7:00 a.m. Temp. ____ ° at ____ p.m.	
Observation Period: 5am – 3pm 3p – 1:30 pm	

EQUIPMENT: D9, D10, D6 Dozer, (2) 825 & (2) 815 Compactors, (1) 966G Loader, (1) 345 Excavator, (2) 140H Blades, (1) Water Truck,

Contractor continued to place buttress fill from Lafarge. The fill was very wet and all material placed today did not pass density/moisture tests performed by QC. QC did perform 6 density/moisture tests on fill previously placed which passed. The fill was scarified and dried out. The 345 excavator worked along the top of the buttress cutting the anchor trench. (5) Geotextile rolls were placed last night with a additional five placed in the afternoon. RFA was hauled on site for cover material and was mixed with some topsoil which was stockpiled after excavating the buttress. The topsoil will be mixed with the entire cover lift per Buckner w/ the EPA. The topsoil was not good for purely topsoil use apparently. The new geotextile rolls QC data from the manufacturer was recieved today and reviewed. All of the test values appear adequate with exception to the unit weight. However, the previously placed geotextile had a low unit

218

06/22/05

weight too. An ECR issuing acceptance may be required.

[PM shift]

Contractor continued to place butress fill from borrow. CAT D8 & 825 regraded and compacted RF alluvium on the east third of fill area. CAT D9 and D5 dozers graded the western third. QC tested 2 areas. The areas were located by the survey crew to locations which previously had failed. Four tests were conducted, 2 at each location. 3 passed while 1 failed, having a moisture lower than 2% of optimum. QC performed 2 more tests on the slope at one location. Both failed in their compaction, as the area had not been completely worked. QC discussed the results with Chris Peterson. He agreed that the areas needed to dry and that they would be reworked tomorrow.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Buttress Fill

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ NW Nathan Toohey (pm)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 31

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6/23/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. ____ ° at _____ a.m. Temp. 67 ° at 1:48 p.m.	
Observation Period:	5am 5pm 5pm–2:15 am

EQUIPMENT: (1) D10 Dozer, (1) D-9 Dozer, (1) D6 Dozer, (2) 825, (2) 815, (2) 14H Blades, (1) Water Truck, (1) 345 Excavator, (1) 966G Loader, (1) Kamatsu loader

The contractor continued to place buttress fill material from Lafarge while bringing in some loads from Centenial to dry out the material. (3) Tests were performed by QC on the buttress fill. They all had adequate moisture and compaction. A retest from last night on a test in the western slope of the buttress did not pass tod'y. The night shift will need to retest the failed area. (2) 825 + (2) 815, D6, D-10, 966G, + Kamatsu all worked on the buttress fill. The fill being hauled in appeared to have adequate moisture. The D-6 + D-9 worked on the regrade fill. The ~~fa~~ regrade fill is nearly complete all but the center cut has been completed and inspected and appears to be sufficient. (1) 345 Excavator worked all day on the anchor trench while 2-4 Laborers helped fold over the geotextile and lay out new panels of the geotextile.

219

6/23/05

[PM Shift Begin]

(2) 825 sheepsfoot & D6 dozer spread imported pit fines into buttress. QA/QC determined w/ moisture gauge that mat'l excessively wet. Requested subcontractors to stop work & stockpile & remaining trucks full of pit fines. There is approx 2' to 3' ± of this wet mat'l on the mid eastern portion of the buttress that ~~should probably be~~ was judged to have too high a moisture content. CQAE phoned CQAM & requested he make call to site tomorrow & review mat'ls placement/moisture. After buttress was ripped throughout the flat bottom, the D9 dozer began cutting in the Western diversion channel. Trucks imported REA to the NW quadrant, where ~~we~~ ~~[illegible]~~ NW a D5, & (2) D8 dozers spread the final cap mat'l to the S & E. D10 dozer & Dual Engine Scraper moved high organic soil stockpile @ extreme NE corner of waste boundary to the NW quadrant. Approx. 20% of the pile was spread.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

[A.M.] Buttress Fill Density/Moisture test on Western buttress slope.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

~~None~~ Moisture test on 4 point w/ in buttress by QC - all failed.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 32

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6/24/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 7:00 a.m. Temp. 57 ° at 1:08 p.m.	
Observation Period: 5am-3pm 3-1:30am	

EQUIPMENT: (1) D10, (1) D-9, (1) D-5 Dozers, (2) 825 + (2) 815 compactors (1) 140H Blade, (1) Water Truck, (1) 345 Excavator, (1) 450 Excavator, (1) 310 backhoe.

The material placed last night was extremely wet. The material was reworked and left to dry. Fill was then brought in at approx. 9:30am. QA/QC visited the Lafarge Pit to investigate a potential borrow source pile that may have been more dry. The stockpile was wet inside and was not approved. The contractor was stripping off of the approved stockpiles all of the drier material. Buttress fill was continuously placed throughout the day. QC performed 5 density tests and one sand cone all of which passed. While compacting the material on the slope an 825 caught the underlying geotextile and made a hole. The hole was patched with a 10 foot patch and was surveyed for record. Partial rolls were layed out in the ~~some~~ remaining areas of drain rock. Approx. one more roll is needed to complete the geotextile but the contractor ran out of material. The drain rock final thickness as builts were shot late yesterday. ~~and~~ Earthtec is creating additional

220

06/24/05

Control points for the regrade fill. The original points did not depict the swales along the slope. The 345 Excavator loaded the R-tr trucks with stock piled RFA along the western edge of the site. The trucks then hauled the material for the cover and a D-5 Dozer then spread the material. A D-9 dozer worked on getting the regrade fill to Subgrade 2.

[PM Shift begin]

(2) 825 Sheepsfoot compacted/spread pit fines from Lafarge Pit fines were imported using A40 & A35 Volvo Articulated truck along w/ side- & bolly dump semis. Shortly after pre-ev mtg QA/QC looked over newly placed pit fines & QC took multiple moisture tests. All test were too moist & trucks only stockpiled mat'l but didnot place mat'l. D5 dozer ripped existing/placed pit fines to dry over weekend. Last 80'± of geotextile was placed & less than 1' of pit fines were placed, but not compacted to keep textile in place. Appox. 5:30 pm lightning shut down until 8:35 pm. Long lunch from 8:35 to 10 pm to allow rain to subside. D10 dozer cont'd cutting western diversion ditch, D8 & (2) 627 scrapers cont'd moving high organic top soil stockpile from NE corner to center of site

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Pit fines still too ~~dry~~ wet JW

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Pit fines still too ~~dry~~ wet JW

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer (p.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 33

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6-27-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 93 ° at 11 a.m. Temp. 63 ° at 100 a.m.	
Observation Period: 5am - 3pm 3pm - 1:30	

EQUIPMENT: (1) D9, (1) D8, (1) D10, (1) D6, (1) D5 Dozers (2) 825 + (2) 815 Compactors, (1) 140H Blade, (1) Water Truck, (1) 345 Excavator, (1) 310G Backhoe (2) Scrapers

The contractor used (2) Scrapers to haul the organic top soil pile on the east side of the site to the cover soils. The entire pile was spread throughout the regrade slope. The subgrade was watered down and a sheepsfoot compactor made a pass prior to placing the organic material. The 345 excavator was used to grade the 3:1 slope at the toe of the buttress. One portion of the regrade fill along the middle road was worked on by a D-10 dozer along with an 815 compactor. The fill was regraded and compacted with a minimum of 4 passes. The material that was stockpiled on Friday was spread throughout the floor of the buttress. A total of (20) nuclear density/moisture tests were performed today by QC and a sample of the buttress fill was collected. QA performed (2) nuclear density/moisture tests which both passed, and all of QC's tests passed as well. The geotextile was punctured by dozers in two locations today. The holes were then patched with

221

6-27-05

a piece of geotextile w/ a minimum overlap of 2' was used to repair the holes. Both holes locations were surveyed. (pm shift)

Beginning the shift, CAT D8R dozer punctured geotextile lining attempting to expose areas for nuclear density/moisture testing. There was approximately only 6" of compacted soil above the geotextile. QC took 3 tests, Two of which passed. QC checked moisture content of in coming loads. Moistures ranged from 13.5 to 21.9 %. Patrick Niedermeyer had instructed ~~QA~~ PN to spread out contents, stop dumping after 20 trucks, and leave until tomorrow. QA told QC & Chris Issacs that being out of spec, this was the desired procedure. Chris Issacs said they would form a windrow in order to dry the material out. At 8:00pm, QC ran several moisture tests along the buttress, all of which failed. Trucks stopped at appx 12:30PM. The damp soil was windrowed and left until morning. Throughout the shift a D8R dozer was ~~compacting~~ spreading Rocky Flats alluvial fill in the north west end.

- to command to the contractor

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Buttress Fill

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Buttress fill was tested ~~[illegible]~~ in many locations and all tests were incompliance with the project specifications in the a.m. shift, however, outstanding tests were performed in pm.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ PN Nathan Toohey

Reviewing Engineer: John Rahe

CLIENT Kaiser Hill JOB NO. PAGE 3 OF 3

PROJECT Rocky Flats DATE 6/27/06 DATE CHECKED

DETAIL Daily log (cont.) COMPUTED BY NMT CHECKED BY

Nine total density/moisture tests were conducted by QC. The remaining four were located in the south east end. Most of these failed by compaction. The contractor left the east side of the wind rw. The west side was mixed and spread in a thin even layer up the slope.

222

QUALITY ASSURANCE OBSERVATION REPORT NO. 34

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6/28/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 60 ° at 6 a.m. Temp. ____ ° at ____ p.m.	
Observation Period: 5am-3pm 3pm-1:30 pm	

EQUIPMENT: (1) D10, (1) D9, (2) D8, (2) 825 Compactors, (2) 815 Compactors (Excavators) (1) 140 H Blade, (1) D5 Dozer, (1) Water truck, (1) 345 Excavator, (1) 310 Backhoe, (4) Scrapers (627), (1) Disc.

Contractor continued to haul cover material with (4) 627 Scrapers, and spread the material with a D8 Dozer. The work on the regrade fill is ~~be~~ continuing in the areas of the swales. The swales were surveyed in on top and fine grading was being performed by the D-10 Dozer. Work continued in the buttress as well. The contractor reworked the fill ~~from~~ last night and the fill was retested. The retests passed moisture and compaction. The fill was tested throughout the day and all of the tests passed. The 345 Excavator worked with survey in building the 3:1 slope at the buttress toe. The 310 backhoe maintained the haul roads with the water truck. The final portion of the geotextile anchor trench was covered. One QA nuclear density / moisture test was also performed and does meet the project specifications, ~~for~~ ~~for compaction moisture~~, because ~~the fill was too wet~~ for both compaction and moisture. TW TW

223

6-28-05

(pm shift)

Day shift reported that the east end of the base passed on the highend of spec, but was still pumping. The plan was to leave the east side to dry and place material on the west end. At 1040, QC took tests on the northwest line of the west end. Of the 4 tests taken, 1 failed by low compaction. However, operators had placed a 1.5-2 foot lift in the middle, sloping down to both sides. QA recommended to scrape and level to a small lift depth. The contractor continued to import material and began dumping it on the east side. QA, QC, Chris Pierson & Chris Isaacs discussed a plan. Chris Pierson wanted to work the east side despite the day shift's recommendation. QA recommended to cut 3 depths, 6", 12", & 24", to test to check for stability. QC conducted the test which all passed. The contractor decided to import material & spread evenly, mixing with drier material, across the entire base. After some working, QA took some moisture test, which were high. The contractor decided to continue to work the entire base and leave to dry until morning. QA recommended to have surveyors, once a week, locate a grid, so as to have a base reference throughout the week to better control lift depths.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Fill in buttress was too moist and will need retested

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ RW Nathan Toohey

Reviewing Engineer: John Rahe

CLIENT Kaiser Hill JOB NO. PAGE 3 OF 3 6-28-05

PROJECT Rocky Flats DATE DATE CHECKED

DETAIL Daily Log COMPUTED BY NMT CHECKED BY

Until 21:00h, compactor #256 & dozer D8R worked the base - At 2100h, a second dozer, D9R, was brought in. A Dozer D8R worked the north east end, placing Rocky Flats alluvium the entire shift.

A lightning warning was issued at approximately 2000h, work ceased for approximately 40 minutes before resuming

224

QUALITY ASSURANCE OBSERVATION REPORT NO. 35

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6-29-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 10 a.m. Temp. 60 ° at 10 p.m.	
Observation Period: 5am-3pm 3pm-1:30am	

EQUIPMENT: (1) D10, (1) D9, (2) D8, (2) 825 Compactors, (2) 815 compactors (1) 140H Blade, (1) D5 Dozer, (1) Water Truck, (1) 345 Excavator, (1) 310 Backhoe, (4) 627 Scrapers, (1) John Deere w/ Disc

The buttress material was wet again this morning. The contractor reworked the material until about 8:30 am. Fill was then brought in, spread by D8 dozer, compacted and/or disced to achieve proper moisture content and compaction. Material hauling was again held up in the buttress as the material placed throughout the morning was too wet. Therefore, the wet areas were disced and retested with passing results. QC performed 22 density moisture tests today in which some failed initially on moisture but eventually ~~Pass~~ all passed. Earthtec gave the surveyors some points to shoot in along the western top of the buttress in which the fill is 8 feet high. Fabric material and large boulders were picked out of the cover material. (4) Scrapers hauled cover material from centerial and placed throughout the day. The 345 excavator completed cutting in the 3:1 slope at the toe of the buttress. One QA test was performed on the

225

6-29-05

buttress fill which passed both moisture and density.
(pm shift)
After the preshift meeting, Mike Keating voiced his concern that QA/QC was attempting to direct operations. We agreed that the function of QA/QC is to observe and suggest only. At 1630h, QC performed 9 density/moisture tests along the south end of the base. 3 failed, one for compaction & two for moistures. These areas were reworked. QC retested, passing two tests at each location. At 2330h, QC ran 9 tests down the centerline of the base. The contractor had run out of pit fines at approximate 2000h. The material was worked by a 825G CAT compactor until 2330h. All 9 tests passed. Throughout the day a D8R & D10R dozer along with the 825G compactor worked the base of the buttress. A D8R dozer began placing Rocky Flats alluvium at the east end of the upper slope, steadily moving west throughout the shift. At approximately 2315h, trucks were used along with the three scrapers to feed the dozer

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Density/Moisture tests were performed on fill from last night, all retests passed

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Tooley

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 36

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 6-30-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 57° at 7 a.m. Temp. 57° at 1245 ~~A~~ PM p.m.	
Observation Period: 5am - 3pm 3pm - 1:30am	

EQUIPMENT: (1) D10, (1) D9, (1) D8, (1) D6, (1) D5 Dozers, (2) 825, Compactors (1) 140H Blade, (1) Water Truck, (1) 345 Excavator, (1) 310 Backhoe, (3) 627 Scrapers, (1) John Deer W/Disc

The contractor continued to work on the buttress fill. The fill was brought in wet, so the lift was placed and spread out thin. The material was disced and allowed to stay open for 2 hours. QC/QA performed several density tests all of which passed. QC performed a bulk gradation on the cover soils. 3 scrapers haul RFA ~~[illegible]~~ and placed it east to west. The contractor was directed by Earthtech to excavate the 8' high spot on the buttress, removing the rock and geotextile approximately 10'-15' down the slope. Then to place buttress material in place of the rock in order to achieve a 2' lift above the drain rock. Excavated drain rock (pm shift) and geotextile was spread in regrade fill below subgrade 1).

At the beginning of the shift, one D8R dozer placed Rocky Flats alluvium beginning at the northeast, fed by four scrapers. At approximately 2200h, two D8R dozers steadily

2200

6-30-05

placed material from east to end, fed by scrapers and trucks. At 1540h, QC conducted four tests along the south end, 3 of which failed for moisture. The outer edge was ~~not~~ dry while the inner was wet, along with the material dumped by the trucks. Chris Isaacs decided to lift a foot of dry material along the entire south end to mix with the wet material. By 2000, there was no material left to be placed. The compactor spent the rest of the shift working & compacting the base of the buttress. At 2315, QC conducted 9 tests in a staggered formation east to west on the base of the buttress, all of which passed. QC then retested the 3 that previously failed. 2 passed and one failed for compaction. Before 2000, the ~~area~~ buttress base was worked by a D8R & D10R dozer and a 825G compactor. After 2000, only the compactor worked the footprint area. Towards the end of the shift, a grader ~~scraper~~ worked with the compactor. During the shift QA identified approximately 12-15 rocks with greater than one foot diameter, as requested by John Rae. QC informed Chris Isaacs, who replied there was no dimension spec. for Rocky Flats alluvium.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Buttress fill had a failing density test for compaction

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Fahey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 37

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-1-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 60 ° at 7 a.m. Temp. 65 ° at 1:30 p.m.	
Observation Period: 5am - 3pm 3pm - 1:30am	

EQUIPMENT: (1) D10, (1) D9; (1) D8, (1) D6, (1) D5 Dozers, (2) 825 compactors (1) 140H Blade, (1) Water Truck, (1) 345 Excavator, (1) 310 Backhoe (4) 627 Scrapers, (1) John Deer W/ Disc

The contractor continued to place buttress fill material after QC performed retest from last night and an additional 5 nuclear tests. The fill was again brought in wet and worked with D8, 825 and disc. Tests were performed on the fill in the afternoon and the fill passed both moisture and density. QA performed one moisture/density test which passed both moisture and compaction. The 345 worked on the high spot at the top of the buttress and they used a 450 excavator until it broke down. The fill was excavated approx. 30' and will be continued once the excavator is fixed. The D-9 and D-5 ~~was~~ were spread the regrade fill just above the buttress. 4 Scrapers hauled cover material and continued to place the material throughout the day.

227

(pm shift)
At the begining of the shift, the contractor continued to place 12" fines on the base of the buttress. A D10R dozer, 825G compactor and a grader worked the material. At 22h00, QC conducted ~~7~~ density/moisture tests along the south end, 2 of which failed for moisture. Chris Pierson decided to disc the south west corner, where the failures occurred, water them and recompact. At 24h00, QC conducted retests at the locations of the two failures, both of which pass.
At the begining of the shift a D8R dozer and 4 scrapers placed material, ~~on~~ Rocky Flats alluvium, on the east end of the north slope. At approximately 20h30, a D9R dozer began placing material on the west end of the north slope. Trucks also began feeding the two dozers at this time –

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Failing Desity test from yesterday was retested and passed

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Tabey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 38

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-5-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 60 ° at 7 a.m. Temp. 71 ° at 7:30 p.m.	
Observation Period: 5am - 3pm 3pm - 1:30am	

EQUIPMENT: (1) D9, (1) D6, (1) D5, (1) D8 Dozers (2) 825 compactors (2) Blades, (7) Water Trucks, (1) 450 Excavator, (1) John Deere w/ DSC

The contractor continued to place buttress fill. (2) 825 Compactors, (1) D8, and the 140H Blade Spread and compacted the buttress fill in maximum 12" lifts. The material appeared to be placed at optimum. QC performed 6 density/moisture tests all of which passed. A ~~(1)~~ D9 dozer worked the regrade fill while a D5 worked on fine grading the regrade fill. The buttress material was ripped and moisture conditioned prior to fill placement due to drying out over the long weekend. The 450 excavator was used to excavate the buttress material, ~~and~~ the geotextile and drain rock on the western top of the buttress. By the end of the shift the excavation was complete however the geotextile was damaged in many locations and will need to be patched w/ an additional roll w/ a minimum of a 2' overlap.

228

7-5-05

(pm shift)

The contractor continued to place buttress fill material at the begining of the shift. The material was worked by a CAT D8 & D5 dozer, 825 G compactor and a grader. Material was placed until approximately 20h45, At 16h00 QC conducted 4 tests along the south edge, 3 of which passed. The area was disced, watered and recompacted, as the westly location which failed did so due to moisture content. At 19h30, QC retested the location which failed. The location again failed. The area was reworked and ultimately received passing values for moisture & compaction at approximately 19h15. At 22h00, QC conducted 4 tests down the centerline of the buttress footprint, from East to west @ 12", all of which passed for both moisture & compaction. At approximately 22h00, a D9 dozer replaced blocky flat alluvium in the area excavated during the day shift on the northern slope.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ RW Nathan Tobey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 39

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-6-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 9 a.m. Temp. 65 ° at 1245 p.m.	
Observation Period: 5am - 3pm 3pm - 1:30 am	

EQUIPMENT: (1) D9, (1) D5, (1) D8 Dozers, (1) 825 Compactor, (1) 450 Excavator (2) 140H Blade, (2) Water Truck, (1) John Deer w/ Disc.

The contractor continued to place buttress fill. One 1 foot lift was spread throughout the buttress and was disced for approximately one-hour. Tests were performed by QC/QA. The QA test passed both moisture and density while three QC tests failed the initial tests. Therefore, I informed the contractor that the lift needed to be reworked. The fill was disced up and left to dry out for the night crew.

The high spot on the northwestern portion of the buttress was excavated further by hand in order to achieve the 2' overlap. The contractor filled approximately 20 feet and then ran out of geotextile. A new roll which has not been approved was then used to complete the anchor at the top of the buttress. The roll ~~was~~ will be sampled since the QC test results from the manufacturer have not been provided. The roll # was 2-50036.

229

7-6-05

Work also continued on the regrade fill using the D-9 Dozer and D-5 Dozer

(pm shift)

At the beginning of the shift, a 825G compactor, D8 dozer, and a grader worked material in the north end of the buttress footprint. QC immediately took 5 tests, all of which passed. QC also had surveyors locate one site to take a bulk sample in the center of the north slope. At 17h00 2 scrapers and a D9 dozer placed material on the west side of the north slope. At 22h00, A Deere 450LC track hoe excavated the location previously identified for QC's bulk sample. QA & QC returned to the buttress area at approximately 24h00. QC took 3 tests along the south edge, 1 of which failed. QC retested the location which failed. It passed the retests. Throughout the shift, a 825G compactor, D8 dozer, and a grader placed fill in the north end of the buttress.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Toohey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 40

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-7-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 8:20 a.m. Temp. 79 ° at 1030 p.m.	
Observation Period: 5am - 1pm 3pm - 1:30am	

EQUIPMENT: (1) D9, (1) D5, (1) D8. Dozers, (1) 825 + (1) 815 compactor (2) 140H Blades, (2) Water Trucks, (1) 450 Excavator, (1) 310 Backhoe (1) John Deer w/ Disc.

The contractor completed placing the geotextile along the excavation of the high spot on the buttress. The 450 and D5 worked on the 3:1 slope grading in the southeast corner of the buttress. Fill was brought in to the buttress and spread with a dozer and compacted with the 825 and/or the 815. QC performed 7 tests in which 1 failed and the area was reworked and retested until passing. QA performed a density/moisture test as well which passed. The fill was hauled and placed wet. After processing the material it appeared firm and stable. Survey worked on the 3:1 slope w/ the contractor as well as laying out points in the buttress to determine how much additional fill is needed. They also staked the top of rock on the east side of the buttress. The top of rock appears to be at the same elevation as subgrade 2. There must be 2 feet of buttress fill above the rock at a minimum.

230

7-7-05

I will talk to Earthtech tomorrow about this grade issue.
(pm shift)
At the beginning of shift, a D8 dozer, 825G compactor & grader placed material on the footprint of the buttress. From 15h00 to 21h00, 3 scrapers placed Acky Flats alluvium on the grade break of the north slope. At 15h00 QC took 2 tests on the north side, one of which failed. The contractor continued to place material on the north side until approximately 22h00. At 18h30, QC conducted moisture spot checks. The center failed by moisture. QC ran 5 density/moisture tests on the east & west ends, all of which passed. The center area that failed was disced and recompacted. At 21h30, QC retested these two locations, both passed for moisture and compaction. QC then ran several moisture spot checks along the north end. All were above acceptable moisture content. The contractor disced and recompacted the north end. QC returned to the buttress area at 22h45 to run moisture spot checks. All failed to high moisture contents.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

One ~~No reported~~ failure, ~~however~~ fill was wet and left to dry out.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer Nathan Toohey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 41

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-8-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70° at 8 a.m. Temp. 74° at 930 p.m.	
Observation Period: ~~3pm-5am~~ 5am-1pm 1pm-11pm	

EQUIPMENT: (1) D9, (1) D5, (1) D8 Dozers, (1) 825 + (1) 815 compactor (2) 140H Blades, (2) Water Trucks, (1) 450 Excavator, (1) 310 Backhoe (1) John Deer w/ DISC.

The contractor continued to place buttress fill. Pioneer Pit fines were approved by Earthtech, so some of the trucks were coming from Pioneer. The 450 excavator worked on the 3:1 slope. QC performed density tests, the tests in the morning were passing with the exception of one which was a retest from last night. The pm shift will retest and perform additional testing. The cut stakes on the east side of the buttress were changed to fill stakes last night allowing for the 2' of buttress fill over the drain rock. The QC data from the manufacturer for the geotextile was recieved on the last roll today. The results appear to meet the project specs. Earthtech reviewed the as builts on the west side of the buttress for the high spot that was repaired this week. One point is still in question and will be resolved on Monday.

231

7-8-05

(pm shift)

At the beginning of the shift, a CAT D5 dozer and 4 scrapers placed Rocky Flats alluvium on the grade break of the north slope. This continued through out the shift. A John Deer tractor/disc, CAT D8 dozer, CAT 825G compactor, and a graded worked to place buttress fill on the buttress footprint. Buttress fill was available until 21h30. At 18h45, QC took 5 density/moisture tests along the south end of the buttress footprint. All of the test passed for both dry density and moisture. At 20h00, ~~QA~~ NW QC took a one tone bulk sample of the Rocky Flats alluvium cover fill on the east side of the north slope. At 22h15, QC performed four tests along the north slope, 2 of which passed. ~~None~~ NA failure occured on the west side of the east half of the north end for moisture. One ~~test~~ NW failed for compaction on the east side of the west end. The contractor disc-ed the area which failed and left open for monday.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

1 test moisture failure, north end, west side of east half.
1 test failed for compaction, north, end, east side of west half
Contractor disc-ed the failed area left open for monday.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Fill was retested from last night and passed for both compaction and moisture.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ NW Nathan Tochey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 42

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-11-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 8:30 a.m. Temp. 65 ° at 11:00 p.m.	
Observation Period: 5am - 1:30 pm 1:30pm - 11 pm	

EQUIPMENT: (1) 815 Compactor, (1) 825 Compactor, (1) D5 Dozer, (1) D8 Dozer (1) D9 Dozer, (7) 140 H Blades, (1) 450 Excavator, (2) Water Trucks (2) Loaders,

The contractor continued to place buttress fill material. Fill is very close to grade. Both QC + QA performed density tests on the fill. The fill passed both moisture + density. QA collected a sample of buttress fill from the Pioneer Pit. The high spot on the western portion of the buttress may not be completely corrected. The contractor was going to clean up the area and removed any drain rock ~~not~~ ~~needed.~~ that was pulled out adjacent to the highspot. The surveyor staked the crest of the buttress this morning. Mike Keating informed us in the meeting that they would like to leave the seep on the eastern side of the site alone. It has not decreased w/ the fire line shutoff. The contractor will pot hole certain location to gather more information about the seep.

232

7-11-05

(Day shift) At the beginning of the shift, a CAT D8 & D5 dozer, a CAT 825G & 815F compactors, a CAT grader 140H worked to place fill on the buttress ~~footp~~ footprint. The D5 dozer worked to grade the south slope of the buttress. On the north slope, a CAT D9 dozer and Deere 310G back hoe excavate excess material down to subgrade 2. At two locations, above subgrade 2, the dozer hit waste. The waste was excavated to subgrade 2 and placed to the west of the location. This location was identified by the contractor as having an elevation below subgrade 1. QC raised a concern that the RWP had expired and handling potentially radioactive waste without a permit is not advisable. QC informed the site RSO. The RSO proceeded to have samples from these locations tested. QA informed John ~~Bay~~ Rahe of the situation. At 1945, the contractor ran out of pit fines and continued to work the buttress footprint. A CAT D8 dozer, CAT 825G & 815F, and two CAT graders worked the area. QC performed 8 density/moisture tests along the ~~south edge~~ final grade, one of which failed for both moisture and compaction, one for moisture only.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

2 failures along the south end at surveyors' points 265 / 269.

D9 dozer encountered waste upon excavating north slope.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

QC performed retests of failing tests from Friday all tests passed both moisture / density.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Tookey (p.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 43

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-12-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 8:00 a.m. Temp. 82 ° at 10 00 p.m.	
Observation Period: 5am - 2pm 1pm - 11pm	

EQUIPMENT: (1) D9 Dozer, (1) D5 Dozer, (1) 420 Komatsu, (2) 825 compactors (2) Blades, (1) 450 Excavator, (1) 815 compactor, (2) Water Trucks. (1) 310G Backhoe

The contractor removed buttress fill from the east slope and placed it up on the north end of the buttress. The 310G backhoe was used to excavate the remaining high spot on the north end of the buttress. Surveyors staked the grid along the buttress indicating the top of the buttress. The area which encountered waste last night was filled last night and surveyed to S-2 (subgrade 2). The excavation did not continue to S-1 due to exposure to the waste. Two test pits were dug last night north of the seep to find the depth of groundwater. QA/QC was not informed prior to excavation to observe the test pit however the contractor informed us that the groundwater was approximately 8' deep. The test pit locations and seepage spots were surveyed today. QC performed retests on the failing tests last night. The test passed with some rework and ~~the~~ AW 7/12/05 five additional tests were taken which all met moisture

233

7-12-05

and density specifications, Survey now needs to perform a topographic survey over the entire buttress prior to any regrade fill and or cover material placement.

(pm shift)

At the beginning of the shift, 2 D8 and a D6 dozers placed material, Rocky Flats alluvium, on the eastend of the north slope. One CAT 815F compactor, a grader, and a CAT D5 dozer placed material on the buttress area. The CAT D5 dozer excavated excess material in the south east end to grade. A Deere ~~350~~ 450LC truck hoe, a CAT D6 dozer, and a CAT 140H grader worked to cut the west end of the buttress to grade. A Deere ~~excavator~~ 310G backhoe excavated material on the west end of the north slope ~~at~~ the exposed patch to allow for a 2 foot overlap by the replacement geotextile patch. This area was backfilled to grade. QC ran six density/moisture tests along the north end of the buttress area. One failed for compaction and one failed for moisture. After the contractor reworked these locations both ~~failed~~ passed for both moisture and compaction. QC has now completed all required testing and the area is to grade.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

One area on the north side of the buttress failed for compaction, and one failed for moisture.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Both areas which failed during this shift were reworked and ultimately passing for both moisture and compaction.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Toohey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 44

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-13-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 9 a.m. Temp. 82 ° at 10:00 p.m.	
Observation Period: 5am-1:30pm 1pm - 11pm	

EQUIPMENT: (1) D9 Dozer, (1) D5 Dozer, (1) D8 Dozer, (1) 825 compactor (1) 966G Loader, (1) 815 compactor, (2) Blades, (2) Water Trucks, (1) 450 excavator

The contractor worked on fine grading on the buttress. Survey plans on as built surveying a topo this evening. Survey restaked the control points on the buttress to verify the grade prior to cover placement. The 815 & 825 compactor worked the regrade fill above the buttress. The majority of the work today was focused on the cover material. Side Dumps and Belly dumps hauled the material (RFA) on site while the dozers spread the material. The 450 Excavator and D5 dozer graded the slope of the buttress on the west side. The slope needs to be cleaned up across the length of the buttress slope prior to fill placement (cover fill.)

(pm shift)

At the beginning of the shift, a D8 & D9 dozer placed Rocky Flats alluvium on the north east end of the north

7-13-05

slope until approx. 17h00. A D8 dozer placed Rocky Flats alluvium on the west end of the north slope. Both trucks and 4 scrapers fed the dozers material. At approximately 18h00, all activity on the east end ceased & the dozers worked the west centera areas of the north slope until the end of the shift. At the beginning of the shift, a Deere 450 LC excavator excavated the East Subsurface Drain (ESD). The initial depth was taken 1 foot below the water surface (~12'). The ESD was lined with 2 feet of drain rock, 1 foot in the water and 1 foot above. The ESD was backfilled and compacted with the bucket of the excavator until it reached the service road. The remainder of the ESD was compacted by a 825G compactor. The trench was cut to a Y shape at the end and partially backfilled with rip rap. No earthwork was done on the buttress area. The surveyors continued to conduct their topographic survey of the buttress. The since 18h00. CK performed no tests. The riprap for the ESD was picked out of the regrade material on the North slope.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Todhey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 45

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-14-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 8:30 a.m. Temp. 83 ° at 9:00 p.m.	
Observation Period: 5am - 1:30pm 1pm - 11pm	

EQUIPMENT: (1) D9 Dozer, (1) D5 Dozer, (1) D6 Dozer, (1) D8 Dozer, (2) 825 Compactors, (1) 966G loader, (2) Blades, (1) 450 Excavator, (2) Water Trucks

This morning I took a picture of the East Subsurface Drain Outlet. No water was discharging out of the outlet yet, however it was still discharging out of the existing drain to the southwest. The buttress control points were staked throughout the buttress. The northwest corner of the buttress was not yet to grade over the corrected high spot area. The contractor worked on this area all morning. (2) 825 compactors compacted regrade fill on top of the buttress. The compactors made a minimum of 4 passes over the material. The D5 & D9 worked the cover soil and placed it, performing fine grading, along with D6. The excavator cleaned up the berm placed at the bottom of the buttress. The regrade material used on top of the buttress was a combination of Pioneer Pit fines and RFA. The cover ~~should~~ will need to be inspected tonight prior to the placement of any berm material. Survey collected data along the 3:1 Slope

235

7-14-05

which will verify the grade. We will need to review the data or observe grade stakes prior to cover soil placement. (pm shift)

At the beginning of the shift, a D6 & D5 dozer graded material, RFA, on the northeast end of the north slope. 4 scrapers placed regrade material on the N side of the buttress area after 1800 to bring the elevation up to subgrade. At 1800 a D6 & D9 dozer worked to place material, RFA, to the west of the grade break. QA verified surveyor's points on the west end of the buttress over the patched geotextile fabric. The control point furthest west 3056 was shot at 1.2' above grade. The day shift foreman spoke with EarthTech, who said this was not a problem and the as-built elevation remains 1.2'. Day shift QA expressed a concern about materials excavated from the patch area, as they were intermixed with pieces of excavated geotextile fabric. In the presence of night shift QA, day shift foreman contacted EarthTech and received permission to fill without their removal, approx. an additional 8' to final grade

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Area above patch on north slope brought to grade and visually verified via marked survey points by QA

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & ~~Patrick Niedermeyer~~ Nathan Tabey

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 46

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-15-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 8:00 a.m. Temp. 79 ° at 8:30 p.m.	
Observation Period: 5:00am - 1:30pm 1:30pm - 11:00pm	

EQUIPMENT: (1) D9 Dozer, (1) D5 Dozer, (1) D6 Dozer, (1) D8 Dozer, (2) 825 Compactors, (1) 966 Loader, (2) Blades, (1) 450 Excavator, (2) Water Trucks,

Contractor continued to place RFA on the cover soils and the regrade material on top of the buttress. 4 Scrapers hauled onsite RFA from the east portion of the site to the north slope. The regrade material was hauled from Centennial (RFA), and spread with (2) 825 compactors and a D-8 Dozer. The fill was compacted with a min. of 4 passes with the 825 compactors. Several areas of debris were noted by QA. The geotextile from the buttress that was excavated from the high spot was placed in the regrade fill below S-1. Concrete was uncovered by the scrapers last night that was stockpiled and will be removed from site. Some rebar and wood is still laying next to the SID which needs to be removed. The original drain (subsurface) into the SID is still flowing while the new East Subsurface Drain (ESD) is ~~still~~ not

236

flowing yet. The seep area along the slope is still present as well.

[pm Shift]

D-8 + D9 Dozers + (2) 825 compactor worked to place RFA and Pioneer Pit Fines in regrade area above the buttress. After 18h00, only (1) Cat D8 Dozer and (1) 825 Compactor worked to place RFA along the north edge of the buttress fill area until the end of shift. The D-5 was working ~~the~~ west of the grade break and a D6 was working on the grade break. placing RFA on the north slope. After 18h00, 3 Scrapers worked on the Diversion Berm / on the west end of the ~~buttress~~ of the north slope. No tests ~~on~~ samples were taken

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

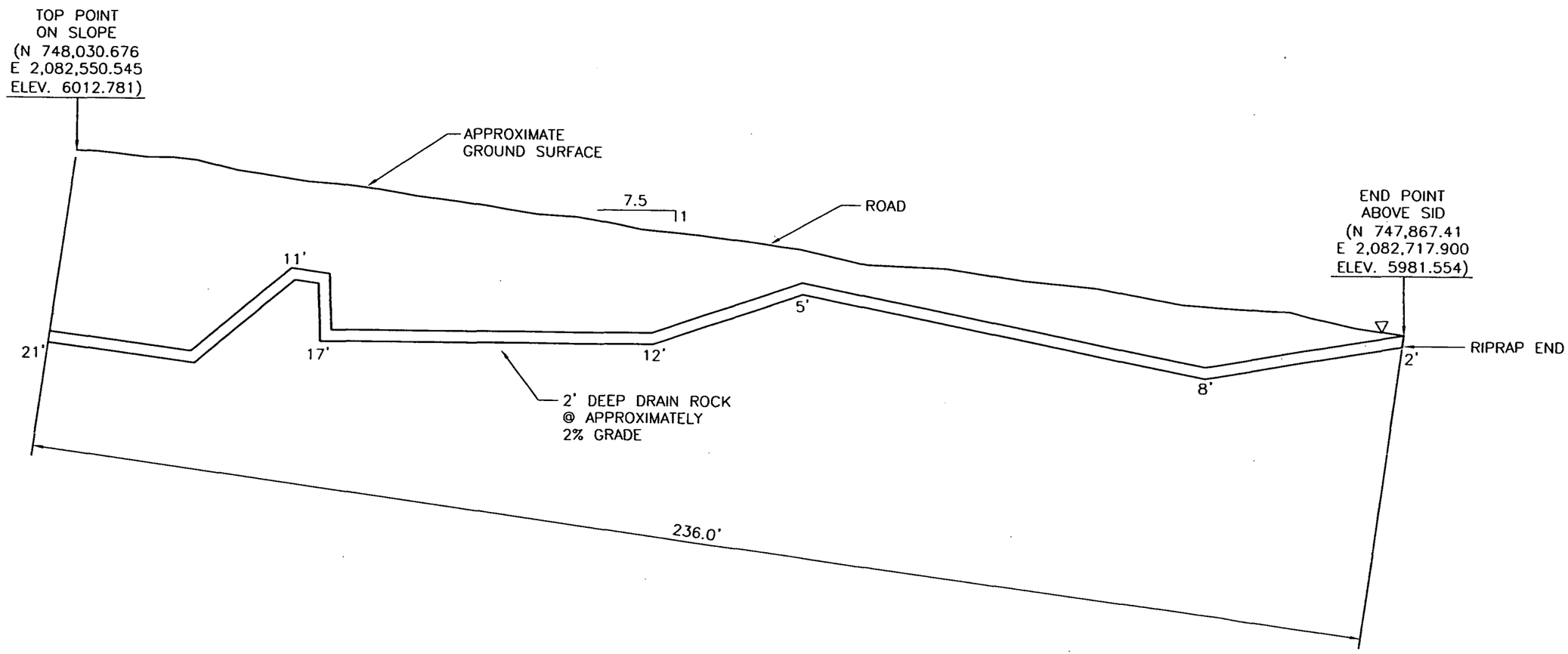
FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) + Ryan Woodruff for Nathan Toohey (pm)

Reviewing Engineer: John Rahe



EAST SUBSURFACE DRAIN PROFILE

HORIZ. & VERT. SCALE

20 0 20 FEET

NOTES:

1. DEPTHS TAKEN FROM PRE-EXISTING SLOPE SURFACE.
2. ALL DIMENSIONS ARE APPROXIMATE.

237

238

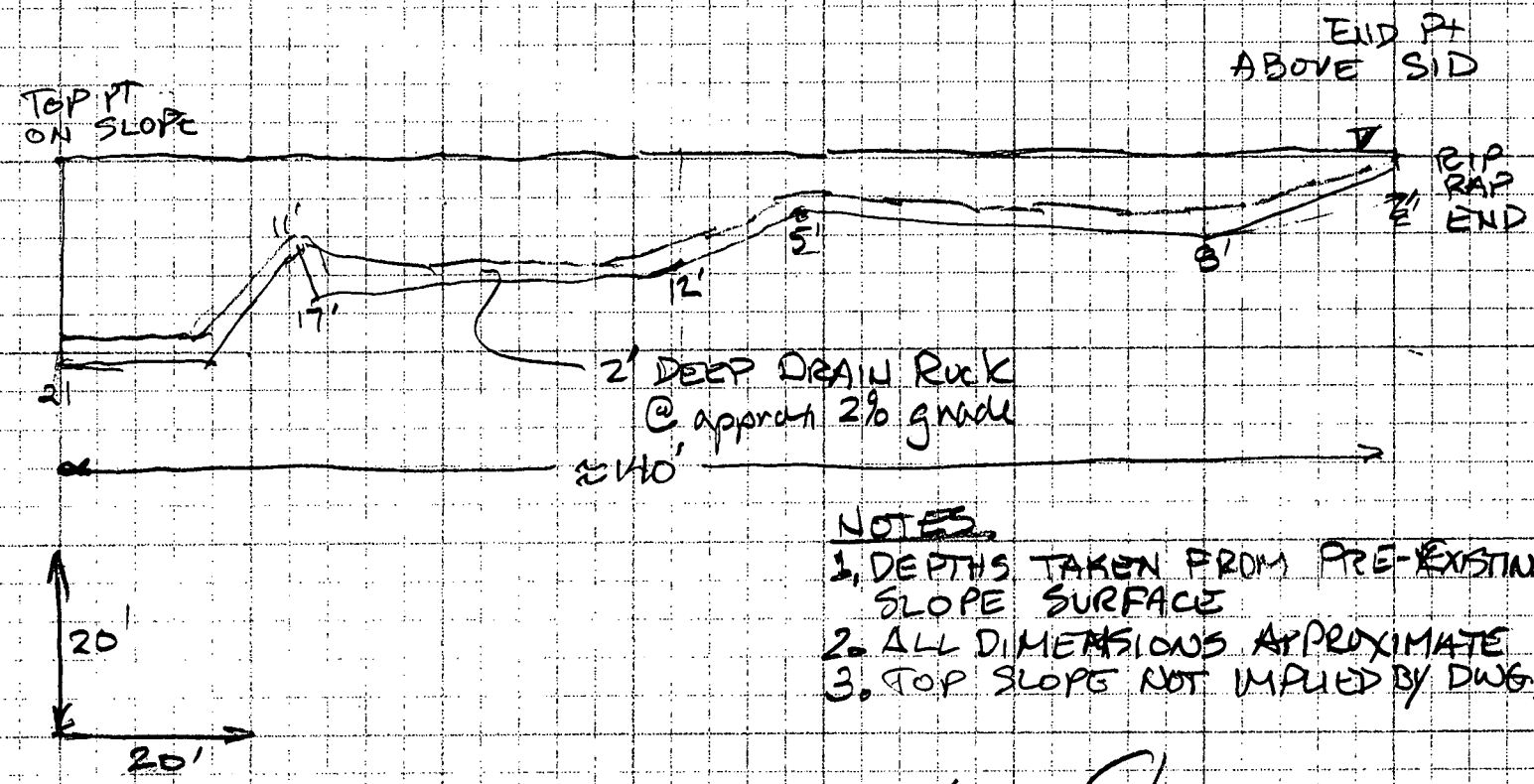
CLIENT _____ JOB NO. _____ PAGE _____ OF _____

PROJECT _____ DATE _____ DATE CHECKED _____

DETAIL _____ COMPUTED BY _____ CHECKED BY _____

EAST SUBSURFACE DRAIN PROFILE

SCALE AS SHOWN



NOTES:

1. DEPTHS TAKEN FROM PRE-EXISTING SLOPE SURFACE
2. ALL DIMENSIONS APPROXIMATE
3. TOP SLOPE NOT IMPLIED BY DWG

7/15/05

MFG consulting scientists and engineers

QUALITY ASSURANCE OBSERVATION REPORT NO. 47

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-18-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 8:15 a.m. Temp. 84 ° at 8:00 p.m.	
Observation Period: 6:30am – 8:15 pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) D5 Dozer, (1) 420 Kamatsu, (2) 825 compactors, (1) Blade, (1) 450 Excavator (1) Water Truck.

The contractor continued to place regrade fill over the buttress. RFA was hauled in from Centenial and placed in the regrade fill area. The D8 + (2) 825 compactors spread the material and the compactors made a minimum of 4 passes to compact the material. 3 Scrapers cut the West Channel after 5pm and placed the material in the regrade fill. (1) 825 compacted the material with a minimum of 4 passes. A hole in the geotextile was located on the east end of the buttress. The contractor repaired the hole by excavating the buttress fines and drainrock and placing an additional piece of geotextile over the exposed drainrock. The buttress fill was then placed over the repaired area in order to achieve a 2 foot cover. Point 1251 was again staked with the original design elevation which is too low. Earth tech intends on creating

a design change to raise the control point. The material was starting to be cut to shallow when QA and the design engineer found the mistake and had survey change the stake to read the new elevation. The fill was corrected and the area meets the project specifications. The East Subsurface drain is now draining water however the original french drain discharging into the SID is still draining water as well. The contractor extended the original drain an additional ~50 feet and backfilled the west end of the SID for the East Channell and access road. The French drain extension was ~5' wide and three feet thick wrapped in woven geotextile. The 450 Excavator also removed approximately 300' feet of the abandon natural gas line in the grade to drain area. There is still a small section in the access road that will be removed later. Mr. Keating provided QA with a letter from Mr. Buckner stating that the topsoil from the east pile should be spread throughout the two foot cover and should not be placed directly on top of the surface.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

7-18-05

Notes from 6/1/05 Field Visit to Old Landfill
David L. Buckner, ESCO Associates

The remediation site at the Old Landfill was visited 6/1/05 to ascertain the nature of salvaged and stored topsoil material and its potential use in the reestablishment of a plant growth medium on the Old Landfill cover. The East stockpile consisted of material removed from a strip adjacent to Woman Creek. Included were small cobbles (<10% volume) in a matrix of dark, organic enriched sandy clay loam (USDA texture). This material would be best used as a subsoil (i.e. not placed as the top layer). Because of its fine texture, the relatively high soil moisture storage capacity of this material could best be used best in a position beneath another material that itself had a higher infiltration rate and an ability to accept moisture then retain it briefly as it moved down into the sandy clay loam.

The west stockpile consisted of very dark and apparently favorable material that had a loam (USDA) texture. This soil will serve very well as a topdressing layer, functioning as the moisture-accepting layer.

Use of matting: The CA350 matting that includes the 3-dimensional plastic mesh and will be used on the lower slope edges should have a soil cover a few inches thick over it. Mat used upslope (125 BN) should be placed on the surface.

240

QUALITY ASSURANCE OBSERVATION REPORT NO. 48

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 7-19-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 89 ° at 11:00 a.m. Temp. 68 ° at 6:00 p.m.	
Observation Period: 6:30 am – 8:30 pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) D5 Dozer (2) 825 compactors, (1) 450 Excavator, (1) 310G Backhoe, (1) Water Truck (4) Scrapers,

The extension on the original French Drain appears to be flowing steadily and immediately seeping into the rock within the SID. The East Channel was started and remains open. No groundwater was observed in the excavation yet. The Dozers worked on the cover and Diversion Berm 1 West of the grade break. Significant cuts were required to get the diversion berms to grade. The contractor used the 310G Backhoe to remove large rocks, greater than 12" in diameter, from the north slope. The rocks were stockpiled near the East Channel alignment. Regrade fill placed last night was mostly composed of clay with high plasticity. The requirements for regrade fill is that it is RFA. The contractor was informed and elected to remove the material. All of the clay was removed from the regrade fill. The excavated material was removed from the OLF project site. Regrade fill was

241

7-19-05

in from Centenial with haul trucks until 5:30pm. At that time (4) Scrapers began hauling the regrade fill from Centenial. Throughout regrade fill placement the fill was spread by a D9 Dozer and compacted with a 825 compactor. The 450 excavator continued to work on the West Channel where the Scrapers had cut last night. The surveyors continued to stake the regrade fill and cover soils as well as the Diversion Berm 1 and Diversion Berm 2.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

The clayey material within the regrade fill which was removed during this shift.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff ~~(a.m.)~~ RW

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 49

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-20-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 87 ° at 11 a.m. Temp. 95 ° at 5 p.m.	
Observation Period: 6:30am - 9pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) D5 Dozer, (1) 825 Compactor (1) Blade, (1) Water Truck, (4) Scrapers, (1) 310 G Backhoe, (1) 450 Excavator

The contractor completed the regrade fill. Material (RFA) was hauled from Centennial and Placed above the buttress. A D8 Dozer spread the material and 825 compactor made a minimum of 4 passes to compact the material. Cover Soil was also placed east of the grade break, and spread with a D8 + D9 Dozer. The contractor also began shaping the Diversion Berm 2, and also worked more on Diversion Berm 1 with a D5 Dozer and D6 Dozer. Survey verified that S-2 has been reached throughout the site. Water samples were collected out of the original French Drain and were shot in by survey. The 310G Backhoe was used to remove large rocks from the Slope. The 450 Excavator loaded the concrete pile and the excavated natural gas line pipe into a truck which hauled the material out as municipal waste. (4) Scrapers cut the West Channel south of the access road. The excavated material was hauled up to the adjacent job site off of the OLF Project Site.

7-20-05

The 450 excavator cut the end of the East Channel and the scrapers moved the material to the top of the buttress as cover material. The stockpile ~~was first~~ AW of material excavated out of the East Channel was first inspected by both QA and QC for approval prior to placement as cover soil.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 50

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-21-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 87 ° at 9:00 a.m. Temp. 96 ° at 1:30pm ~~p.m.~~	
Observation Period: 6:30am – 8:30pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) D5 Dozer, (1) Blade, (1) 450 Excavator, (3) Scrapers, (1) 310G Backhoe, (2) Water Trucks

The contractor continued to place cover soil on the north slope. The RFA was hauled from Centennial all day until 5:30pm. The material was hauled and placed by side dumps and belly dumps and spread with the D9 and D8 Dozer. The contractor continued grading Diversion Berm 1 + 2. Surveyors layed out Diversion Berm 3 and checked the grade between Diversion Berm 1 + 2. In some spots the grade was out of tolerance. The contractor was informed and will need to regrade the area prior to discing. The 450 excavator was used more on the East Channel. QA and QC inspected the excavated material and did not approve it as cover soil due to the clay content. Some of the material appeared adequate but it had been blended with unsuitable material. The old abandoned gas line was grouted on the east end. Some of the material excavated from the East Channel was used to fill in the west

243

portion of the SID, in order to widen the east access road (Legacy Road). The contractor requested QA and QC to approve the RFA in pit 371 on the Rock Flats Project Site as suitable cover material. After visiting the pit QA and QC both agreed that the material was suitable as cover fill. ~~The contractor then hauled cover material from the 371 Pit and placed it along the buttress with 3 Scrapers. Prior to placing material on the buttress the~~ The Buttress fill was scarified and sprayed to achieve a good bond with the Cover Soils. The 2 Scrapers were used to pioneer a road from 371 to the OLF Project Site. The D6 Dozer spread buttress fill material, which was stockpiled at the East Toe of the buttress, along the East Channel.

AW 7-21-05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

~~None~~ Out of tolerance final grade between Berm #1 & #2

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 51

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-22-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 86 ° at 9 a.m. Temp. 98 ° at 3:45 p.m.	
Observation Period: 6:30am 5pm	

EQUIPMENT: (1) D9 Dozer, (2) D8 Dozers, (1) D6 Dozer, (1) D5 Dozer, (1) Blade, (4) Scrapers, (2) Water Trucks, (2) Loaders, (1) 450 Excavator,

4 Scrapers hauled material (RFA) for the cover all day long. First they placed material on the crest of the buttress in a window to be pushed down the slope. They also placed some material along the top of the buttress. Later they placed material on the north slope. In the morning haul trucks were used to place material on the north slope. The material was then spread by (2) D8 Dozers. The 450 Excavator was used to cut the slopes into the south portion of the west channel. The D-9 helped grade the slopes along with a D-6 Dozer. A D5 and D6 dozer also graded the Diversion Berm #2. At the bottom of the West Channel the design grade was lower than the existing grade. The contractor asked me what needed to be done so I called Scott Powell with Earthtech and he informed me to tell them to grade it so it will drain and he will look at it on Monday. The record drawing survey will be adequate for this area. The loaders were

244

used to transport excess material from the Berms down to the buttress as cover material. The blade graded the Legacy Road on the east side of the site and maintained the roads where the Scrapers hauled. The D5 scarified the 3:1 buttress slope then the water truck sprayed the slope prior to cover soil placement. The slope looked well prepared for cover soil placement. The D8 then proceeded to knock down the windrow at the top of the buttress, filling the cover soil slope from top to bottom.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 52

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-25-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 76 ° at 11 a.m. Temp. 80 ° at 3 p.m.	
Observation Period: 6:30am - 5:30pm	

EQUIPMENT: (1) D10 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) 450 Excavator (1) Blade, (2) Water Trucks, (1) Kamatsu 420 Loader,

The contractor continued to excavate the West Channel with the 450 Excavator. The contractor ask QA and QC to inspect the excavated material to determine if the material was Suitable for cover soil. QA/QC determined that some of the material was RFA and would be acceptable however, the contractor had contaminated the material with on site Clays making the excavated material unacceptable. The contractor removed all of the material excavated from the West Channel from the OLF project site. The loader moved material for the Diversion Berms from a stockpile created Friday to Diversion Berm #2. The D6 Continued to grade the Diversion Berm #1. Haul Trucks continued to haul in RFA from Centennial and place it at the bottom of the north slope above the buttress a cover soil. The D-8 & D-10 then graded and spread the material. Surveyors continued to check the grade of the cover soil along the south

245

end of the north slope over the buttress. They also checked the cover soil grade on the east side of the northslope. There were 2 cut locations and 1 fill location on the east side of the north slope which were fairly minimal cut/fills. The surveyors also layed out the points for Diversion Berm #4 thru Diversion Berm #7. QC collected a sample of the Cover soil and will perform a gradation and Atterberg Limits tests. Work was stopped at 4:00pm for the quarterly safety meeting followed by a lightening shut down until 5:30pm when the contractor elected to send every body home.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

~~None~~ Grade Tolerances for coverfill between diversion Berm #1 & #2 were corrected today.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 53

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 7-26-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 66 ° at 11 a.m. Temp. 66 ° at 5 p.m.	
Observation Period: 6:30am - 5:30pm	

EQUIPMENT: (1) D10 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) 450 Excavator (2) Blades

The contractor continued to place cover fill material at the top of the north slope along the northern waste boundary. The RFA material was hauled in from Centenial by Side dumps and belly dumps. The material was then spread with D10 + D8 dozers. The site was extremely wet today so the contractor elected not to bring any haul trucks down to the buttress. The 450 Excavator worked on the West + East Channel. The material was stockpiled and will be hauled off site once truck access is deemed safe. The D6 dozer shaped Diversion Berm #1. The Diversion Berm appears to be much more functional now that the material has more of a percentage of fines. (2) Blades maintained the road ways all day, while the surveyors verified grades along the north slope where the cover material was being placed. The contractor held a meeting to discuss their plans for the erosion

2446

Control installation. The contactor intends on installing the erosion control within the specifications provided by the manufacturer and/or the Revised Seeding Spec submitted as ECR #8. The night crew did not work since there was limited access to the site due to the heavy rains all day.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 54

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 7-27-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 10 a.m. Temp. 88 ° at 3 p.m.	
Observation Period: 6:30am – 8:30pm	

EQUIPMENT: (1) D8, (1) D6, (1) 450 Excavator, (2) Blades, (3) Scrapers (1) D10 Dozer, (1) 825 Compactor

The contractor continued to place material at the top of the slope in a small triangular regrade fill section and cover material. The regrade fill was compacted by an 825 compactor with a minimum of 4 passes. The fill was spread with a D8 dozer along the top of the north slope. The 450 excavator loaded the articulated trucks with excavated material from the West and East Channel. The material was hauled ~~from~~ to offsite. The articulated trucks also hauled in cover soil from 371 Borrow Pit and placed the material along the crest of the buttress. The scrapers also hauled RFA from 371 and placed it ~~to~~ along the grade break, as cover material. QC collected (2) additional bulk samples for cover soil completing all of their sampling per the QA/QC Plan. Survey shot the location of the western seep south of the was boundary since it lies directly within the alignment for Diversion Berm #3. The design engineer, Earthtech,

247

7-27-05

is coming up with a typical design for any areas in which the Diversion Berms intersect the seep. Preliminary designs will include drain rock and geotextile along with over excavation. Survey also collected additional cover fill grade shots along the north slope. The contractor did 4 test passes with the disc to determine what steps would be needed prior to seeding and erosion control. The disc was able to penetrate one foot in one area adjacent to the berm and only ~~4 inch~~ 4 inches in other locations. The contractor was informed that ideally the soil should be loosened from a min. of 6" deep to preferably 12" deep. Therefore, we recommend that some areas be ripped before discing. The contractor agreed that ripping would be performed or if applicable multiple passes with the disc would be performed to achieve a lower compaction layer of at least 6" deep up to 1' deep.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~53~~ 55

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 07/28/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 82 ° at 9:40 a.m. Temp. 74 ° at 8:40 p.m.	
Observation Period: 6:30 am – 9 pm	

EQUIPMENT: D6 DOZER, D9 DOZER, D10 DOZER, KOMATSU 420 FRONT LOADER, 140H MOTOR GRADER, 825 COMPACTOR, DEERE 450 EXCAVATOR, (2) WATER TRUCKS, FUEL TRUCK, (PM ONLY) 3 SCRAPERS, DITCH WITCH,

IMPORTED REA TO BOTH THE BUTTRESS & THE NORTH HAUL ROAD ALONG THE EAST END. D10 & Komatsu loader SPREAD REA AT NE CORNER DOWN HILL TO SOUTH ~~AL~~ AW. D9 SPREAD REA SOUTH OFF BUTTRESS' SOUTHERN SLOPE FROM EAST TO WEST. D6 & LATER D10 DRESSED TRAPAZOIDAL CHANNEL ALONG WEST END – INTERMITTENTLY CHECKED BY SURVEYORS.

EXCAVATOR DUG SOUTHERN HALF OF EASTERN TRAPAZOIDAL CHANNEL – ROUGH ONLY.

DITCH WITCH CUT 6" CHANNEL ALONG TOP (UPHILL OF) EROSION MATTING THAT WAS LAID @ NWestern most diversion CHANNEL #1. MATTING OVERLAPPED ~6" to 12" & WAS ROLLED OUT ALONG FLOW PATH (NOT ⊥ to BERM). MATTING (COCONUT) WAS SECURED W/ "U" STAPLES & 6" STEEL SPIKES W/ 2" GREEN WASHER @ MAX 2' CENTERS (WHITE DOTS ON MATTE)

SURVEYOR CONT'D CHECKING REA DEPTHS & OVERALL

248

07/28/05

TOPO POINTS W/ IN SITE BOUNDARIES.

MOTOR GRADER MAINTAINED HAULROADS THROUGHOUT ENTIRE SHIFT.

AFTER 5 PM (3) SCRAPERS IMPORTED RFA FROM BORROW PIT DUE WEST OF ~~BF~~ B371
NO OTHER EROSION MATTING WAS PLACED BESIDES ALONG ENTIRE LENGTH OF NW MOST DIVERSION BERM, #1

RECEIVED ECR RE: TYPICAL JEEP REPAIR

RM told QC that their services were no longer needed. QC left site.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

~~NONE~~ No QC for afternoon-early evening.
SPEC-01100-0972-1.05-E potential violation of the QA/QC Plan

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

NONE

Copies to: John Rahe

Observer: ~~Ryan Woodruff (a.m.)~~ IW Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~54~~ 56 AW

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 7-29-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 102 ° at 1:15 p.m. Temp. 94.5 ° at 5:00 p.m.	
Observation Period:	

EQUIPMENT: Cat 140H Motor grader, Deere 9400 Tractor, Tatu disc, Ditch witch 3700, (2) water trucks, (4) Cat 950 G Loaders, 4 Cat Scrapers, 3 Volvo Articulated Dump trucks, Cat 966 G Loader, Komatsu 420 loader, (2) D6 Dozers, (2) D8 Dozers, D9 Dozer, D10 Cat Dozer, D5 dozer out of commision, 825 Compactor.

825 Compactor was deconned for leaving site; Cat 950G loader out of commision getting new tracks & wheels; D6R dozer cont'd building berm #5. 4 Scrapers imported RFA from borrow pit due West of B371 to buttress as cover material.

Surveyors staked elevations for berm #5, buttress cap & trapazoidal channels. D8 dressed 3 to 1 southern slope of buttress. D9 spread RFA along top of buttress from east to west. 450 Deere excavator & D10 dozer cont'd cutting & fine tuning eastern trapazoidal channel under continued staking of surveyors. Material excavated from trapazoidal channel was hauled off site to 400 Area. (Articulated Trucks) AW

Artics brought RFA to central area of Northern haul road

249

7/29/05

where it was dumped. Cat 966G & Komatsu 420 loaders hauled/placed RFA from haul road south down slope to surveyed alligment of berm #5. D6 shaped & compacted piles to spec. under NW ~~continual~~ occasional checking by surveyors.

Laborers cont'd to place & staple erosion matting on berm #1. Deere 310 backhoe/loader placed RFA in 6"x6" trench along uphill side, (appox. 16' from toe), of berm #1 after erosion matting was placed in trench w/ 12" lying loose uphill of trench. Appox. 1/2 of berm #1's trench had been backfilled by end of shift.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

No QC on job. SPEC 01100-0972-1.05-E, Potential Violation of the QA/QC Plan

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: ~~Ryan Woodruff (a.m.)~~ NW Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~35~~ 57

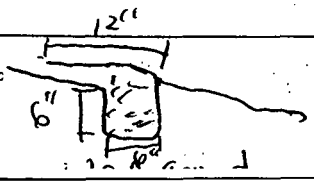
TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 7-30-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 65° at 7:30 a.m. Temp. 94.3° at 4:30 p.m.	
Observation Period: 6:30am - 5:00pm	

EQUIPMENT: (2) D8 Dozers, (1) D10 Dozer, (3) Scrapers, (4) Volvos Trucks, (1) Blades, (1) 450 Excavator, (2) D6 Dozers, (2) Watertrucks,

Contractor continued to place cover soil on buttress. Volvos hauled RFA from 371 and placed the material on the crest of the buttress slope. A D8 then spread the material down the slope. (3) Scrapers place RFA on the top of the buttress as well. The 450 Excavator continued to cut the West Channel eliminating the West access road. Material will be hauled offsite by Scrapers. D6 shaped East Channel. The D6 worked the cover soils along the grade break. Surveyors followed the D6 verifying that grade had been met. Survey also shot in points along the buttress and East + West Channel for the contractor. (2) Laborers worked on the anchor trench north of Diversion Berm #1. The trench was 6" deep, 6" wide, with a One foot wrap around. See Fig. The contractor began placing the erosion matting on the Diversion Berm #2. The area was first disked to a



7-30-05

depth of approximately 6", then the blade knocked down the material to provide a smooth surface. The area was then seeded by hand broad casting. The erosion matting was only applied to the upstream face and flow channel of the berm. The white spots were nailed with a spike and washer (Staple Pattern D). The contractor placed the material along Diversion Berm #4 with 966 G Loader.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Potential non-conformance with the QA/QC plan since, QC was not present

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

Rahe, John -- MFG, Inc.

From: Rahe, John -- MFG, Inc.
Sent: Wednesday, September 14, 2005 5:33 PM
To: 'ryan.woodruff@ttrmc.com'
Subject: FW: QC activities at OLF

-----Original Message-----
From: Keating, Michael [mailto:Michael.Keating@rfets.gov]
Sent: Saturday, July 30, 2005 8:44 AM
To: Spreng, Carl; Birk, Bob; Moritz. Vera (E-mail)
Cc: McQueary, Steven; Wiemelt, Karen; Randy.Thompson@earthtech.com; John.Rahe@mfgenv.com
Subject: QC activities at OLF

All,
Since QC has finished the last of the soil sampling/testing at the OLF and we will be substantially complete with the earthwork on Sat, I have put QC/Golder on an "on call" basis. The primary activities for the week of 8/1 will be grading the diversion berms and reveg (erosion mat, seeding, discing, etc). QA will remain on site full time to observe all construction activities.
Contact me if you have any questions.

Mike Keating, P.E.
RFETS Project Manager
Michael.Keating@RFETS.gov
Phone: 303.966.4815
Cell:303.994.0691

251

3 of 3

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~56~~ 58

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-1-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 68 ° at 7 a.m. Temp. 77 ° at 2:30 p.m.	
Observation Period: 6:30am - 8:30pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (2) Water Trucks (1) 966G Loader, (3) Scrapers, (1) 140H Blade; (1) Ditch Witch, (4) Volvo Articulated Trucks

The contractor continued to place cover soil on the buttress. Side Dumps + Belly Dumps hauled RFA from Centenial Until approx. 10am when Articulated Volvos began hauling material from the 371 borrow pit, and the belly dumps stopped hauling. Material was placed on the top of the buttress and the D8 Dozer spread the material down the 3:1 slope. The D9 graded the eastern grade to drain area, while a D6 Dozer graded the east channel. The 450 excavator was used to remove material previously excavated from the West Channel, by loading the Artics. The artics hauled the material to 371. The 140H Blade maintained the haul roads all day. Surveyors continued to support the contractor laying out points through the project site mainly on the buttress and the Channels. The Artics also stockpiled RFA for the 966G loader. The loader then transported the material to the Diversion

252

8-1-05

Berm #4 + #6 alignment. The material was placed but not shaped. Erosion Matting was placed along Diversion Berm ~~#3~~ #2 using the White Dot (Staple Pattern D) up the north slope of the berm and on the cover. The red dot system (Staple Pattern B) was used on the down slope side of the Berm. The 8" Staples were used on the matting. The contractor intends on using a spike drasher to secure the mat in the near future. A ditch witch was used to cut a 6"X6" Trench 16' off off the ℄ of the flow of the Berm. The contractor completed the trench and 12" overlap of the erosion mat on Diversion Berm #1. (3) Scrapers hauled RFA from the 371 Borrow Pit and placed the material on the top of the buttress.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Potential violation of the QA/QC Plan due to the lack of QC attendance.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 59

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 8-2-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 87 ° at 11 a.m. Temp. 75 ° at 6:00 p.m.	
Observation Period:	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) D5 Dozer, (1) 966G Loader, (1) 450 Excavator, (2) 140H Blades, (1) Kamatsu 420 Loader, (2) Water Trucks,

The 450 Excavator continued to load the Volvos with material excavated from the West Channel. A D9 Assisted the excavator. Material was removed continuously throughout the day. A D8 Dozer was used to grade the 3:1 Buttress Slope cover. A Loader hauled material to the West end of Diversion Berm #1 off at the tie in of the West Channel. A D5 dozer then graded the east side slope of the channel and placed the berm material at the tie in along the 3:1 Channel side slope. Two loaders and the blade graded the cover material on the south side of Diversion Berm #6. There was a lightening shutt down from ≈2:30 to 4:30. The erosion crew continued working on the erosion matting on Diversion Berm #2. Survey continued to perform record surveys and assisted the contractor with additional control points. QC was not present

253

8-2-05

today.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Potential violation of QA/QC Plan due to lack of QC.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~58~~ 60

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-3-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 74° at 7 a.m. Temp. 83° at 4 p.m.	
Observation Period: 6:30am - 5 pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) Blade, (1) 450 Excavator, (1) Water Truck, (1) 310G Backhoe

The contractor began placing the P550 Erosion Matting on the West Channel using Staple Pattern E (Yellow Staple Pattern). Prior to placing the erosion mat top soil was spread along the bottom of the channel in a 2" Loose lift. The area was then seeded throughout the channel. The erosion mat was trenched and achored at the top of the channel slope and the beginning of the channel as recommended by the manufacturer. However the trench was located along the top of the slope, ~~to~~ the specifications state that the trench should be a 10' offset from the channel. A RFI was written to allow the trench to be adjacent to the channel. I also spoke with Earthtech regarding the grade of the channel. The top soil was placed after the grading was complete. Therefore, the grade ~~is~~ potentially 2" high. Earthtech informed me that this would be adequate as the channel could still handle the design flows. A 450

254

8-3-05

Excavator was used to remove the excavated material from the West Channel via articulated Volvos, A D6 worked on the final grade of the Channel (west). A D8 graded the buttress 3:1 slope and the western grade to drain area. Loaders placed the Diversion Berm #7 material, at first the material was placed on the wrong side of the Stakes for approximately 100'. The material will be moved when the Berms are shaped to grade.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

~~None~~ QC was not on site

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~59~~ 61

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-4-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 66 ° at 630 a.m. Temp. 78 ° at 10 ~~10~~ ~~p.m.~~ am	
Observation Period: 6:30 am - 10:15 am	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) Motor Grader Cat 140H, (1) 450 Excavator, (1) Water truck, (1) Deer 310 G Backhoe.

Wet conditions throughout day. No work on landfill. Small crew began tearing out & ripping up the West access road. QA left site @ 10:15 am after discussions w/ Envirocon & KH & QASM (TTRFG).

255

8/4/05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ NW (a.m.) Patrick A. Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~60~~ 62

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 8/5/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 66 ° at 6:30 a.m. Temp. NA ° at _____ p.m.	
Observation Period:	

EQUIPMENT:

QA not on site. No work performed on landfill – too wet. Small crew cont'd to work on ripping up west access road. as per Health & Safety (Envirocon)

256

8/5/05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: ~~Ryan Woodruff (a.m.)~~ AW Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 61 63 1W

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-8-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 10 a.m. Temp. 84 ° at 4 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (1) D9 Dozer, (1) D8 Dozer, (1) D6 Dozer, (1) 450 Excavator (1) Drill Rig, (2) Blades, (2) Water Trucks, (1) Ditch Witch Trencher, (1) Kamatsu 420 Loader,

The contractor continued to rip and remove the west access road. A D9 Dozer worked the west side of the West Channel grading it to drain. Laborers continued to place the P550 erosion matting on the west channel, and the C125BN on the west end of Diversion Berm #1 where it ties into the channel. Previously place ~~ge~~ new erosion matting along Diversion Berm #2 was a combination of C125 + C125BN. ECR #8, the new seeding spec., specifies that C125BN be used on the diversion berms, however C125 was originally specified. Scott Powell with Earthtech informed me that either erosion mat would be acceptable and the contractor was informed that an RFI was needed to ~~see~~ document the situation. Georidge was installed on Diversion Berm #1 at a maximum spacing of 130 feet. A D8 Dozer was used to grade ~~th~~ the top of the buttress.

257

8-8-05

MW 80205 located at the Southern toe of the buttress in the center of the site was installed by High Plains Drilling. The Monitoring well was installed 20.5' deep. The casing had holes in it from the bottom of the whole to 5' deep with one additional foot of sand to 4' deep. Bentonite was then packed around the casing from 0 to 4' below existing grade/Final grade. There appears to be some water in the West channel which may indicate a groundwater seep. The Seep was surveyed in by Flatirons Survey. The seep seemed to create rills along the bottom of the channel which will need to be graded prior to placement of the erosion matting. After 5pm the contractor only stockpiled material but did not place it, so I did not observe this process.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Potential violation of the QA/QC plan due to no QC presence

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Mike Keating informed me that QC will be returning to the site ~~today~~ tomorrow.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 6264 TU

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-9-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 77 ° at 7 a.m. Temp. 83 ° at 4 p.m.	
Observation Period: 6:30am - 7pm	

EQUIPMENT: (2) D6 Dozers, (1) D5 Dozer, (2) Blades, (1) 450 Excavator (1) 310G Backhoe, (1) 966Cat Loader, (1) Kamatsu 420, (1) John Deere Tractor w/ disc + crimper, (1) Ditch Witch Trencher, (1) John Deer Tractor w/ hay buster, (1) Drill Rig

Laborers continued to place erosion matting on West Channel and Diversion Berm #1 + #2. Topsoil was placed at the buttress toe up the slope 30 feet. The blades were used to grade between the stakes. The small dozers were used to grade the Diversion Berms # 4 + 5. The 450 excavator was used to remove the temporary berm of pit fines at the eastern toe of the buttress, so that the area would drain towards Woman Creek. It was determined that the erosion matting along the buttress side slope would need to be stapled using staple pattern A, by Earth tech. Two more seeps were identified today one in the East Channel and another in the West Channel. Both seeps appear to be causing stability issues with the Channel sideslopes. The East Channel Seep caused a slope

258

failure, while the West Channel Seep only caused a tension crack to develop. The East Channel was cut back to a 4:1 slope to provide more stability. The WEST Channel was graded to finish grade and the tension crack is still present. MW # 80005 was installed today. The well was 21 feet deep and the well was screened from the bottom to 5.5' deep with sand. An extra foot ~~and a half~~ of sand was placed in the well up to 4.5 feet. The area north of Diversion Berm #1 was disced and seeded prior to Straw crimping. The process was performed in compliance with ECR #8.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

QC was still absent today which is a violation of the QA/QC Plan

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~65~~ 65 Pan

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-10-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 78 ° at 8 a.m. Temp. 76 ° at 5 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (2) D6 Dozer, (1) D5 Dozer, (1) 450 Excavator, (1) Drill Rig (2) Blades, (2) Water Trucks, (1) Ditch Witch Trencher, (1) Kamatsu 420 Loader,

The contractor continued to place berm material on Berms 5 thru 7. Diversion Berm #4 + 5 are close to grade but still require more material between the grade stakes. The D5 + D6 were used to shape the berms. A D6 Dozer was used to final grade the West Channel. The seep in the West Channel appears to be creating stability problems along the side slope of the channel, similar to the problems in the East Channel. The design engineer was informed of the problems and will design a solution to these problems. Survey continued to support the contractors with grade stakes throughout the site but particularly along the berms assuming that the grade was 2-5%. The D6 Dozer was used to spread a thin 2 to 4" lift along the bottom 30' of the buttress 3:1 slope. The area was then seeded and C 350 was

259

8-10-05

Stapled using Staple Pattern D, the White Dot System. There was a lightening shut down at 3:30pm, followed by heavy rains. Contractor did not work after 3:30pm.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

QC was onsite on a part time basis

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None other than QC part time presence.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. ~~65~~ 66 Gan

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8/11/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Partly cloudy all day, warm. Temp. 76° at 6:45 a.m. Temp. 74° at 7:50 p.m.	
Observation Period: 66° 6:30 am	

EQUIPMENT: Deere 9400, TATU Machensan Disc, (2) Cat D6R-LGP Dozer, (2) Cat 140-H Motor Grader, Deere 7400, Cat 966G Loader, Crimper Disc,

Motor grader cont'd shaping berm #7. Large majority of crew cont'd placing erosion controlls. 9400 Deere w/ Tatu disc made 2 rounds up slope of berm #4 & b/w berms #1 & 2. D6 LGP followed disc above berm #4 to level soil prior to placing erosion matte. Hand seeded area b/w berm #1 & #2, (roughly 1.25 acres). Applied 2½ bags of seed. QA requested documentation of seed mixture from Jeremy of Envirocon Erosion Control. D6 LGP also cont'd shaping dogleg portion of bermS #4 & #6 @ their west ends. Ditch witch cont'd cutting 6" x 6" trench @ edges of west trapazoidal trench & along top slope of berm #4, (16 ft. up slope of northern toe of berm.) Motor grader maintained roads throughout site. Crews cont'd placing ~~C-250~~ C-350 NAG erosion matting

260

08/11/05

on south 3:1 slope of ~~to~~ buttress.
Surveyors provided support for operators by marking & staking berms & channels.

Volvo artics imported RFA from borrow pit to berm #7. D6 assisted 140H grader in placing & shaping material for berm #7.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

~~NA~~ QC here on part time basis.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None except Q.C. part timers.

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ RW (a.m.) Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 67

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 8/12/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 61 ° at 6:30 a.m. Temp. 72 ° at 7:05 p.m.	
Observation Period:	

EQUIPMENT: (2) D6 Dozer, (1) D5 Dozer, (1) Deere 450 Excavator, (1) Cat 966 Loader, (1) Deere 310G Backhoe, (1) Cat D8 Dozer, (1) Cat D7 Dozer, (2) Cat 140H Grader, (1) Ditch Witch, (1) Flexterra Truck, (1) Water Truck, Fuel Truck, Deere 9600 w/ Tatu disc, Deere 7400 w/ bale forks & round bale shooter.

Completed tie-in's & bringing berms to grade. Tie-ins are the ends of berms where intersecting channels. Crews cont'd laying erosion matting on south 3:1 slope of gutters & berm #4.
Flexterra cont'd on area b/w berms #1 & 2.

450 Excavator & D6 Dozer removed questionable soils from west slope of eastern trapezoidal channel. Stockpiled soils to the west for removal off site.

Surveyors, under the guidance of QA/QC, surveyed the extents of the seep under berm #3. Once located, surveyors staked trench allignment for riprap placement subgrade. 310G backhoe excavated "T" channel to

241

8/12/05

Spec. Trench was lined w/ 8 oz. geotextile & Class VL rip rap was placed in ~~the~~ trenches to a min. of 1 ft. thickness. During excavating, an abandoned 8" gas line was ~~bracced~~ NW, uncovered. Surveyors determined that there would still exist 14% grade if channel ran over the top of pipe – therefore pipe remained in place & not removed from area. This 14% grade began at "T" intersection & ran south approx. 25' to pipe x-ing. From pipe x-ing to southern end of trench, grade maintained at least 19% grade. At southern end of north-south leg, ~~channel~~ NW trench tied into 1 ft. layer of ~~2 ft~~ 1½" (-) drainrock layer of buttress. Once riprap was in place, geotextile was folded over w/ a minimum of 2 ft. overlap. Small amount of excavated soils where then placed over geotextile 2 ft. overlap to secure cloth.

(See attached sketch of riprap/drainrock interface.)

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

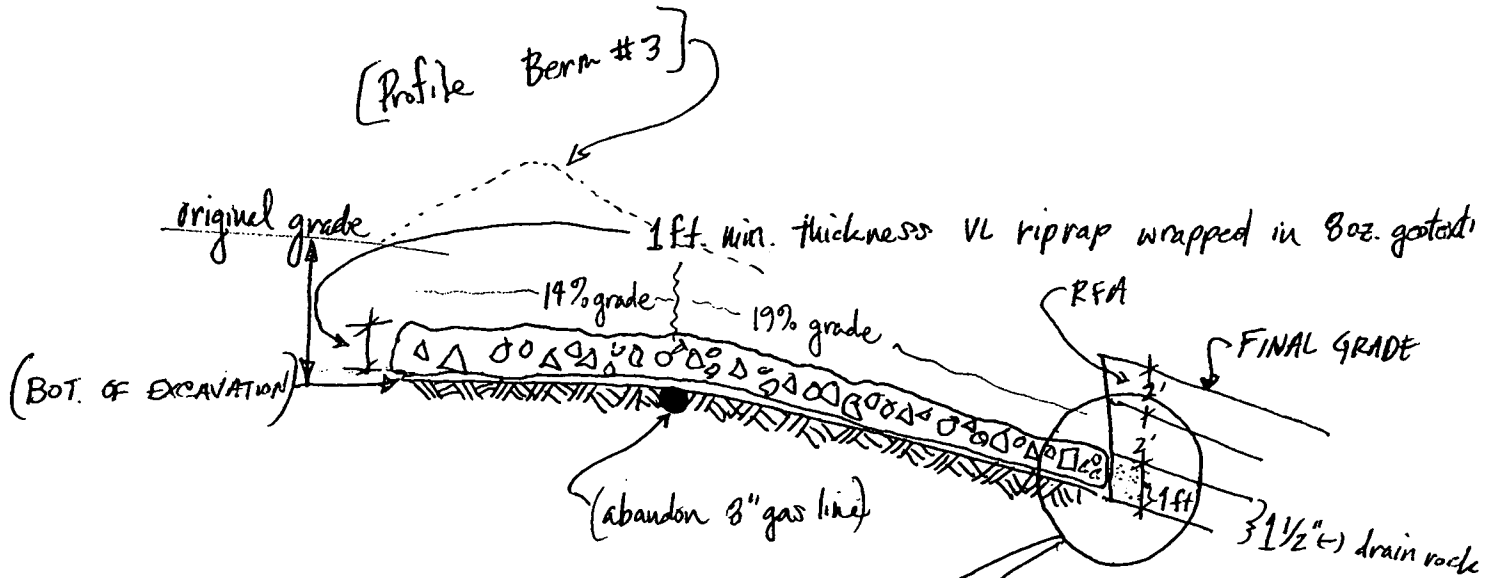
FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

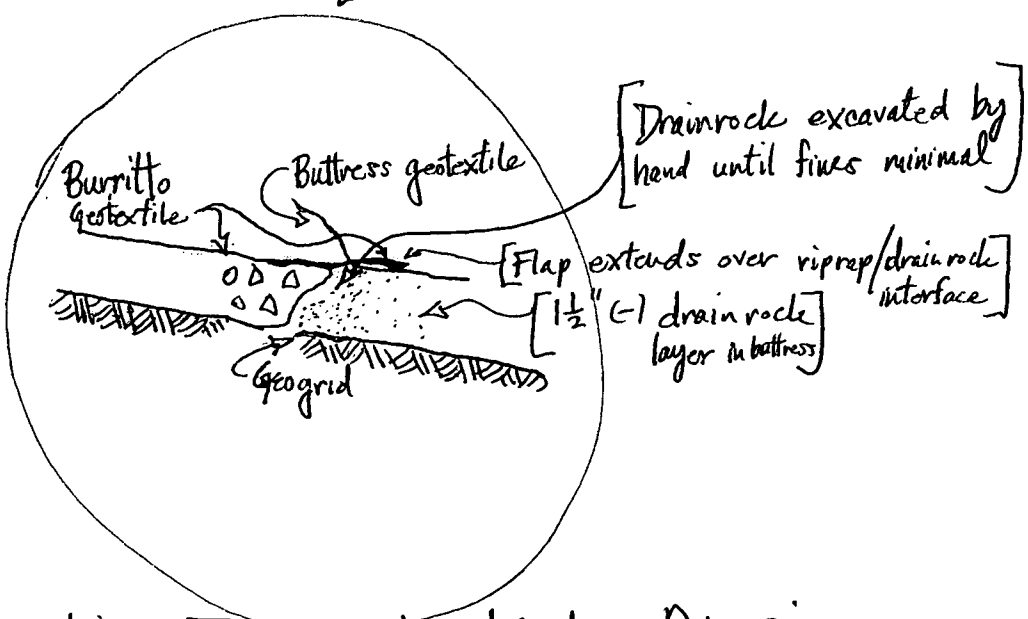
QC was Onsite

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ NW (a.m.) Patricia Niedermeyer

Reviewing Engineer: John Rahe





Seep Mitigation T-trench Under Diversion Berm #3 - 8/12/05

262

QUALITY ASSURANCE OBSERVATION REPORT NO. 68

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 08/13/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 62° at 6:30 a.m. Temp. ____° at ____ p.m.	
Observation Period: 6:30 - ~~6:45~~ 1W am 1W ~~7:15~~ am 8:30 am	

EQUIPMENT:

No work today — too wet.

Surveyor surveyed top of VL riprap 1W ~~after~~ after placed in trench @ seep repair under berm #3.

263

08/13/05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

QC on site all day.

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ RW (a.m.) Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 69

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-15-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 7 a.m. Temp. 75 ° at 7 p.m.	
Observation Period: 6:30am – 7pm	

EQUIPMENT: (1) D9 Dozer, (2) D6 Dozers, (1) D5 Dozer, (2) Blades (1) 450 Excavator, (1) Ditch Witch Trencher, (1) Seeding Truck, (1) 966 Loader,

The contractor filled in the excavation of the East Channel side slope with RFA. The excavation had began to slump in but was remediated and backfilled. The area of concern in the West Channel was excavated and replaced with RFA. ~~The~~ Upstream from the sideslope Channel remediation another excavation was performed in the area which had the most groundwater. A layer of VL Rip Rap wrapped in geotextile was placed on the bottom of the excavation to provide a least resistant flow path for the groundwater in the vicinity. Survey captured both excavations in the West ~~East~~ Channel and the one in the East Channel. All design changes and remediation actions were approved by Earthtech. Work continued on the Diversion Berms for final grading. Erosion Matting was placed on the 3:1 slope of the buttress and the

264

8-15-05

anchor trench half way up the slope was also worked on. The remainder of the slope was ripped with a D5 and tracked back in to give a smooth loose surface for the erosion matting. The Seep Mitigation Tee trench under Diversion Berm #3 was back filled. Flexterra was sprayed between Diversion Berm #1 & #2, while the cover was disked and seeded between Diversion Berm #4 & #5.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 70

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-16-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 7 a.m. Temp. 72 ° at 5 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (1) D8 Dozer, (2) D6 Dozer, (2) Blades, (1) 450 Excavator (1) Ditch Witch Trencher, (1) Disk, (1) Crimper, (1) Hay Buster, (1) 966G Loader

The contractor cut the trench for the C125BN placed on Diversion Berm #5, and placed and crimped straw between Diversion Berm # 4 + #5. Laborers continued to place C350 on the buttress 3:1 and dug the trench halfway up the slope for the C350. The D8 was used to rip the anchor trench and the Laborers cleaned out the trench as they layed the matting. The Blade was used to grade the West grade to drain area. A D6 was used to distribute the top soil along the bottom of the East Channel approx. 2" thick. The Blade was also used to grade the top cover along the northern access road and tie it into the road at 2 to 5% as specified in the plans. The entire area between the berms was ripped and disked. The 450 excavator was used to place the 24" Min size boulders at the outfall of Diversion Berm #1. The boulders were spaced

266

8-16-05

a minimum of 2 feet away from eachother for a total length of 15 feet. The 966 G Loader was used to distribute the rock throughout the site at all Diversion berm outfalls and stock piled for placement. Survey continued to take record shots throughout the site and assist in the final grading of berm #7 and the cover tie in on the north access road.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 71

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-17-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 76 ° at 10 a.m. Temp. 70 ° at 5 p.m.	
Observation Period: 6:30 am - 5 pm	

EQUIPMENT: (1) 450 Excavator, (1) 966G Loader, (1) Ditch Witch Excavator

The contractor continued with erosion control. P 550 was placed in the West Channel and along the outfalls of Diversion Berm 2 + 3. The 24" Boulders were placed in the channel with a maximum ~~average~~ average spacing of 2'. Then, P 550 was place at the channel bottom (west) so that the 24" Boulders could be placed at the channel bottom also spaced 2' apart for a distance of 40'. The staples used today ~~were~~ varied from biostakes to 8" pins with a rounded head. The biostakes do not appear effective. I asked Earthtech if they still wanted ~~those~~ the biostakes to be used and showed how they did not hold the matting completely. Earthtech again approved the stakes for use although every other stake actually secures the matting to the soil. The contractor began placing C125 on the buttress 3:1 slope. The specifications contradict Eachother mainly in ECR #2 + ECR #8

266

8-17-05

When specifying the type of temporary erosion matting, ECR #8 specifies C125BN while ECR #2 specifies C125. Mike Keating with Kaiser Hill will generate an RFI and submit it to Earthtech to determine which matting is acceptable.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 72

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-18-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 81° at 11 a.m. Temp. 61° at 4 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (1) 966 G Loader, (1) Ditch With Trencher, (1) 450 Excavator (1) Disk, (1) Crimper, (1) ~~Seeding~~ Flexterra Truck

The contractor continued with the erosion control. They placed the majority of the C125 on the buttress in accordance with ECR#2. They also placed P550 in the West Channel, and in the East Channel. The portions in the East Channel were placed at the diversion berm outfalls only so that the 24" Boulders along the Channel outfalls could be placed. The Boulders were placed at the outfalls of Berm 4-7 at an minimum of 2' spacing for a length of 15' as per the project drawings. Seed was hand broadcasted prior to placement of all erosion matting. The contractor used the loader to grade one small portion of the slope between berm 5 + 6. Additional straw was spread between berm 4 and 5 and crimped in two directions. The area was then sprayed w/ Flexterra. Cover was seeded between berm 2 + 3 by hand broadcasting. Straw was placed between berms 2 + 3. There was a lightening

267

8/18/05

Shut down at 3:00 until 3:30pm. Work was resumed until 5pm.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 73

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 8/19/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: partly cloudy Temp. 58.5° at 7:12 a.m. Temp. 87.4° at 4:44 p.m.	
Observation Period: 6:30 am — 5pm	

EQUIPMENT: (1) 966G Loader, (1) Ditch Witch, (1) 450 Deere Excavator, (1) Crimper Disc, ~~(1) Disk~~, (1) Tatu disc, (1) Motor Graders 140H, (1) Water Truck, (1) Flexterra truck.

Completed placing 2 ft min. boulders in east trapazoidal channel outfall to spec. after placing P550 erosion matte under them. to spec. Completed placing ~~3#~~ erosion matting on 3:1 slope of buttress. Cont'd placing P550 matting on West channel - 95% complete. Straw wattles placed along west access road.
Seeded & Flexterra between berm 2&3, 5&6, & 6&7.
Broadcast straw b/w berms 2 & 3, & 5 & 6.
Crimped b/w 2/3, 5/6, & 6/7.

Used scrapers to bring in fill for NE corner of waste boundary. (Material ~~used~~ was temporarily stockpiled there and used to backfill 6"x6" trenches along channel's edges where erosion matte would be anchored. Gan 8/31/05 (Unknown volume.)

268

8/19/05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

none

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

none

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ NW (a.m.) Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 74

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-22-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 83° at 10 a.m. Temp. 80° at 5 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (2) Hydro Seeding Trucks, (1) 450 Excavator, (1) Disk, (1) Crimper, (1) Hay Buster, (1) Blade,

The contractor continued placing P550 on the West + East Channels. The West channel was completed. A delivery of the P550 came in on Friday in which the matting was tan. The contractor supplied the shipping list which stated it was P550. QC called the manufacturers to verify that the material was P550. The manufacturer stated that there needed to be 3 layers of the black plastic netting and there was, therefore the material was accepted as P550. There is a small portion of a slope between the East Channel and the ~~West Channel~~ Buttress 3:1 which will not have erosion matting on it according to the plans. I spoke to Scott Powell with Earthtech to determine if it was acceptable to have a slope without matting. He informed me that in this case it is acceptable. Flexterra was sprayed between Berm 2 + 3 and WBT, while straw crimping was performed between

269

berm 5+6 and 6+7. The area was seeded prior to straw crimping.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 75

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-23-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 60 ° at 7 a.m. Temp. 85 ° at 3 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (1) 450 Excavator, (1) Ditch Witch Trencher, (1) Hay Buster, (1) Crimper, (1) Disc., (2) Blades, (1) Forklift

One location along Berm 3 was ran over by an excavator which left tracks over the Berm. I informed the contractor that it needed to be repaired prior to placing erosion matting. Survey shot the elevation difference and of the flowline to the top of the Berm, and it was 1.6 feet. The design requires a minimum of 2 feet difference therefore the contractor re-graded the berm with a blade. Same situation on Berm 4 & 5 which has yet to be repaired. Flexterra was sprayed between Berm 6 & 7. primarily today. P550 was placed on the East Channel. The trench for anchoring the P550 along the West Channel was backfilled. C125 BN was placed along diversion Berm #3. The trencher was used to cut the anchor trench along Berm #3 & Berm #4-7 along the grade break. Blade was used to rip the flat spot at the bottom of the buttress toe. Some additional fill was required north of Berm #4 along the grade break.

270

8-23-05

The diversion berm slope for Berm #4 along the grade break was shot and calculated to be 1.5% which is less than the specified min. 2% grade. The contractor was still working in the area and will regrade the flowline and the cover. The contractor may submit an RFI requesting to leave the flowline at 1.5%. C/25 BN was also placed along Diversion Berm #7.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 76

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-24-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 65 ° at 8 a.m. Temp. 83 ° at 4:45 p.m.	
Observation Period: 6:30am - 5pm	

EQUIPMENT: (2) Flexterra Trucks, (1) Crimper, (1) Disk, (2) Blades, (1) Trencher,

Contractor continued placing C125 BN on Berm 7 + Berm 6. Georidges were spaced out along Berm #3 but not nailed down. Berm #3 was covered and completed w/ the C125BN. The area South of Diversion Berm #3 was ripped and disked and then seeded. Straw crimping was then performed. The area West of the Channel was ripped as part of the Rocky Flats Site Wide revegetation plan. Well Development started on the east well and continued on to the other two wells. One more visit tomorrow may be required to completely Develop the wells. The regulator meeting was held today in which a punch list was developed for the west side of the project. The contractor began correcting the items on the punch list.

271

8-24-05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

~~None~~ The area North of Diversion Berm #4 was regraded and the slope along the diversion berm will remain 1.9%.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 77

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-25-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70° at 8 a.m. Temp. 65° at 5 p.m.	
Observation Period: 6:30 am - 6:30 pm	

EQUIPMENT: (1) Crimper, (1) Disk, (1) Blade, (2) Flexterra Trucks, (1) 450 Excavator, (1) 420 Kamatsu Loader, (1) Trencher

Erosion control was continuosly placed on Berm #6 & #7 today. The contractor completed the Berm #7 and layed out most of the material for berm #6. The erosion matting placed on the berm today was C125BN. The material was adequately stapled ~~asno~~ according to the project specification and/or the manufacturers recommendations. The blade ripped up the top of the buttress. The area was then disked and seeded. Straw was then broadcasted and crimped in the prepared area. Flexterra was sprayed between berm #5 and berm #6. I spoke to Earth tech about possibly requiring the contractor to anchor the C350 at the bottom of the 3:1 slope because not only is it a slope but it is a potential channel sideslope during a 100-year flood. They informed me that the 2 feet of RFA on the slope with established vegetation was adequate erosion protection during the design event.

272

8-25-05

The C350 was added for protection prior to vegetation establishment, therefore they do not feel it is necessary to anchor the C350. A Loader was used to transport material to the anchor trenches for Berm #2 and the West Channel. The Loader tracked over the Flexterra previously applied to the slope. I called Mike Keating, Chris Isaccs and Chris Pearson to tell them I didn't think the loader should drive on the completed slope. Mike Keating was unreachable but Mr. Pearson and Mr. Isaccs told me it was the only way to fill in the trenches.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 78

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8/26/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 70 ° at 8' a.m. Temp. 87 ° at 4:30 p.m.	
Observation Period: 6am	

EQUIPMENT: (1) 450 Excavator, (1) Kamatsu 420 Loader, ~~(1) Crimp~~ (2) Flexterra Trucks.

Flexterra was sprayed on the buttress top using two trucks. The Flexterra trucks ran over the top of the buttress in order to access the eastern portion of the buttress top. I told Envirocon that traffic can not be on the crimped straw and they told me that the Flexterra Trucks are the same load as a crimper. I disagreed but they elected to use this procedure. The loader continued to haul material to the anchor trenches driving over the anchor trenches. P550 was placed on the east end of diversion berm #4, where the slope is in excess of 5%. Erosion matting was continued on berm 5+6 with C125BN. Two laborers worked on the punch list for the west half of the site while two laborers backfilled the anchor trench on Berm 7. When returning from lunch the laborers discovered a small fire ~~on~~ berm #5, which rapidly spread ~~down~~ along

273

8-26-05

the berm and up and down the slope. Portions of berm #4 & #6 were partially damaged by the fire, while all of berm #5 was destroyed. Areas between berm #4 & #5 along with ~~berm #~~ areas between berm #5 & #6 were also damaged by burning the straw and the flexterra. The site was shut down after the fire, and a fact finding meeting was held to determine the cause of the fire and to determine Corrective action measures

- erosion matting on

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Fire damaged material and will need repaired

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 79

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 08/27/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Mostly clear am, Temp. 62.4 ° at 7:02 a.m. Temp. 94 ° at 12:24 p.m.	
Observation Period:	

EQUIPMENT: (2) Cat 966 G Loader, (1) Fuel Truck, (2) Water truck, Deere 450LC Excavator, (2) Cat Motor Graders 140-H, Deere 7410 w/ haybale forks on front & a Haybuster 2100 in tow, Komatsu 420 Loader, Deere 9400 Articulating tractor, Tatu disc, Disc/Crimper.

Disced areas b/w 4 & 5 - ~~&~~ 5 & 6. Komatsu loader brought in RFA from stockpile south of T130W trailer. The RFA was used to fill in, 6"x6" ~~trench~~ trench at top of erosion matte at berm~~#~~ 7 & on West side of southern end of western channel.

Motor grader / ~~Scrape~~ AW ripped & leveled area north of berm #4 AW ~~&~~ Motor grader & (2) Loaders regraded burnt areas b/w berms # 5 & 6. Loaders removed burnt erosion matte. Area b/w 4 & 5 was reseeded. Area b/w #5 & 6 was not reseeded, just disced, broadcast w/ straw & crimped.

274

08/27/05

Crews cont'd placing P550 erosion matting in east channel to spec.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

NA

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

NA – Burnt areas between berms were regraded and the burnt erosion mat was removed.

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ (a.m.) Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 80

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8-29-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 80 ° at 10 a.m. Temp. 92 ° at 4 p.m.	
Observation Period: 6:30 am - 7:30pm	

EQUIPMENT: (1) 450 Excavator, (1) 140H Blade, (2) Flexterra Trucks, (1) Crimper, (1) Hay Buster, (1) Disk

The contractor continued with erosion controls. The East Channel was worked on by several laborers placing P550, in accordance with the project specifications. The majority of the matting was placed, only the anchor trench was remaining at the end of the day. Flexterra was sprayed between berms 4 + 5 and 5 + 6. Buildup on one of the Flexterra trucks caught fire and burnt a small area of straw approx. 3' x 10' in dimension. A fact finding meeting was held at 3:30pm, and it was determined that better house keeping practices were required. The areas which were sprayed with Flexterra had been seeded and hay was broadcasted prior to the Flexterra application. Specifically the area between berm #4 + 5 was seeded and straw crimped. The area north of berm #4 was seeded and straw crimped as well. I did not observe the seeding but the contractor assured me that it was done. The blade

275

8-29-05

was used to anchor the erosion matt in the West Channel. The access road which ran down the slope through berms 4 thru 7 ~~were~~ was closed along berm #5, #6, & #7. The anchor trench along berm #6 was not completed, I informed the contractor in the morning and in the afternoon.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None.

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 81

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 8/30/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 95 ° at 12 ~~pm~~ pm AW; Temp. 79 ° at 7 p.m.	
Observation Period: 6:30am - ~~5~~ AW 7:00pm	

EQUIPMENT: (1) Ditch Witch Trench, (1) 140H Blade, (1) 450 Excavator, (2) Flexterra Trucks, (1) Flexterra Pull Behind Trailer.

The contractor completed placing the P550 in the East Channel anchor trench. The trench has not been completely backfilled. The contractor then placed C125 on Diversion Berm #5. RFI # 19 AW ~~Elar~~ stated that the C125 is equivalent to C125 BN and will be used on berm #5. The blade was used to regrade the area north of berm #5 and was then seeded prior to erosion control placement. The trencher cut the anchor trench for berm #5. The Flexterra trucks sprayed the area between berm 4 + 5, 5 + 6, and north of berm #4. After a review of draft record drawings of the cover and the slope of the diversion berms the cover appeared less than 2' thick and in areas the slope of the diversion berms were less than 2%. ~~The~~ AW The contractor, Mike Keating, Earthtech, and Flatirons Survey had a meeting about these non conformance issues and informed me

276

8-30-05

afterwards that the drawings I reviewed were draft only and will be resubmitted through Mike Keating first, and that QA does not have approval to speak directly to survey, and the plans I reviewed were draft copies and were not complete. As I was leaving for the day a crew of approx. ten people showed up and I was told would work until dark. Enviroscon was not on site. ~~QA~~ The night crew was only going to lay out matting and it will be checked in the morning by QA and the contractor.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

~~None~~ NW – Potential non-conformance on cover thickness and grades of the diversion berms

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 82

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 08/31/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Partly cloudy mild breeze. Temp. 46.9 ° at 7:09 a.m. Temp. 75.4 ° at 2:29 p.m.	
Observation Period: 6:30am to 7pm	

EQUIPMENT: (1) Ditch Witch Trencher, Cat 140 H Motor Grader, 450 Excavator, Flexterra Trucks, Flexterra Pull-Behind Trailer

Gan

Crew cont'd placing ~~P125~~ C125 erosion matting on berm #5 to spec. QA & Envirocon foreman walked down erosion matte placed by K-H crew who worked last night w/o Envirocon direct supervision. All matting appeared to be to spec. Deere 450 Excavator dressed slopes of berm #6 where it had not been shaped to spec. Same excavator repaired tracks over berm #5 where it had traveled over it to access berm #6. Both areas were in the center of the site where the access road that ran N-S had been.

Flexterra truck sprayed Flexterra to area North of (adjacent to) the berm #4 in the center of the site.
450 excavator filled semi truck belly & side dumps w/ old materials & trash from area ~100 ft. South of T130W. Trucks hauled waste off site.

277

08/31/05

Erosion matte anchor trenches on the east ~~north~~ side of the east channel have not been backfilled yet. Other trenches in need of backfilling include: Berm # ~~6~~ 5.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

~~NW~~ ~~None~~ – Survey data has not been reviewed by QA for the diversion berms + cover thickness, still nonconformance

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: ~~Ryan Woodruff~~ NW (a.m.) Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 83

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 9-1-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 82 ° at 9:30 a.m. Temp. 84 ° at 6 p.m. TW	
Observation Period: 6:30am - ~~5~~ 7:00pm	

EQUIPMENT: (1) 140H Blade, (1) Flexterra Truck, (1) Flexterra Trailer, (1) Disk, (1) Straw (Hay Buster) (1) 450 Excavator

QA walked the West + East side of the OLF to check the punchlist items. A TW list was completed a given to the Contractor. A walkdown with the contractor was then performed to show the items that needed corrective action. The contractor completed the erosion matting on berm # 6 + berm #5. The area between berm #4 + #5 along the access road was scarified with the excavator and then straw was crimped with the disk after seeding. The area was then sprayed with Flexterra. Backfill was spread throughout portions of the East Channel and a portion of the berm #6 anchor trenches. Additional fill is needed in the anchor trenches of the East Channel and berms #5 + #6.

278

9-1-05

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

RW None. Outstanding nonconformance on final cover and diversion berms since survey data has not been submitted.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 84

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 9-2-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 83 ° at 10 a.m. Temp. 80 ° at 6 p.m.	
Observation Period: 6:30 am -	

EQUIPMENT: (1) Disk, (1) Haybuster, (1) 966 G loader, (1) 140H Blade (1) Flexterra Truck, (1) Flexterra Trailer

The contractor completed placing the C125 on Berm #4 where the access road used to be. The area north of the berm along the access road was ripped, seeded, straw crimped and sprayed with Flexterra. Terra tubes were placed throughout the site spaced a maximum of 65 feet apart perpendicular to the slope. The terra tubes were secured with wooden stakes (down slope side), and metal staples on the uphill side. The wooden stakes were spaced 2 feet apart, while the staples were space every one foot. The East Channel anchor trench was backfilled using the 966G and a small gator. Survey worked on the final topo of the OLF. Georidge was placed every 200' feet along Berms #4, #5, + #7. QC + QA took some survey shots of the west end of berms #4 + 5 with a hand level. The first part of

279

Berm #4 on the very west end had a slope of 0.44% and a low spot at the bend in the berm on the east grade break. The low spot will pond water in the event of a storm. Berm #5 along the grade break had a slope of 2.3%. Additionally it appears that most of the berms have an average slope of 2% with some local areas which have less than a 2% grade. The low spot on berm #4 appears to be the only spot that will pond water and without ~~survey~~ survey data readily available it is difficult to determine if any other low spots exist.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Potential grade along Berm #4, and cover thickness since survey data has not yet been submitted

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 85

TETRA TECH RMC

TO:

Project No. 19-4886.002.00	Date 9-6-05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. 60° at 8 a.m. Temp. 75° at 2:30 p.m.	
Observation Period: 6:30 am – 3 pm	

EQUIPMENT: (1) 966G Loader, (1) 140H Blade.

The Contractor backfilled the remaining anchor trench on the east side of the east channel. Laborers collected all trash and debris spread throughout the landfill. Two of the georidges were secured more with additional stakes. A walkdown with the State and EPA was conducted at 10am. There were three items added to a punch list; Regrade Seep area south of berm #3 near East Channel, discuss what to do about Seep #7, and check survey on the West end of berm #4 & #5 for proper slopes. The seep area was regraded in the afternoon. ~~While~~ The survey information was captured along the berm as well and will be mapped out for analysis.

280

9-605

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Potential grade non conformance along berm #4 + #5, and cover thickness due to lack of survey data.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.)

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 86

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 9/7/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Temp. — ° at — a.m. Temp. 90 ° at 4 p.m.	
Observation Period: 12:30pm – 5pm	

EQUIPMENT: (1) 966G Front End Loader, (1) 310G Backhoe

QA came onsite in the morning to move out of the contractors trailer, removing the file cabinet, lap top, and site vehicle. The contractor called QA back onsite at 12:30 pm to observe the construction of the Seep 7 T-trench mitigation. The contractor used the 310G backhoe to dig a T trench at the location of Seep #7. The trench was centered at the center of the wet spot and extended east and west approximately 5 feet. The other (N) section of the trench was extended to the buttress subdrain. The entire length of the trench was a minimum of 3 feet deep and will have a minimum of 1 foot of drain rock at the bottom of the trench with a minimum of 2 feet of cover. Cover backfill will be RFA. The design is similar to the design for the seep mitigation trench under berm #3. The contractor brought a load of drain rock to place

281

9-7-05

at the bottom of the trench ~~was~~ NW which was rejected by QA because of a high fines content. Drain Rock from Centennial was ordered and will be delivered tomorrow. Centennial is the same source used for the buttress subdrain.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

None – Berm Grades and cover thickness survey data has not been submitted.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

None

Copies to: John Rahe

Observer: Ryan Woodruff (a.m.) & Patrick Niedermeyer

Reviewing Engineer: John Rahe

QUALITY ASSURANCE OBSERVATION REPORT NO. 87

TETRA TECH RMC

TO: _____

Project No. 19-4886.002.00	Date 9/8/05
Project: Rocky Flats Original Landfill Cover	
Owner: DOE	
Contractor: Kaiser Hill	
Contractor Superintendent: Michael Keating	
Subcontractor: Envirocon	
Subcontractor Superintendent: Steve McQueary	
Weather Conditions: Partly Cloudy – no rain (70°-80° +/-)	
Temp. NA ° at _____ a.m.	
Temp. ____ ° at _____ p.m.	
Observation Period: 6:30 - 11:15	

EQUIPMENT: Deere 310 Backhoe, Deere 9400 Tractor, Crimper, Tatu Disc, Deere 7410 Tractor, Round bale broadcaster, Cat 966 Loader.

Completed excavation of seep repair trench at ¢ S. of (gan) ~~south of~~ intersection of berms 3 & 7. Surveyor completed shooting/recording bottom of excavation @ endpoints, corners, intersections & every 15' along trench. Laborers laid in 8 oz. geotextile & backhoe brought in 1 1/2 inch minus washed drainrock & placed in geotextile. Surveyor again surveyed, drainrock to spec. (min 12" thickness +/- 0.2 ft). Drainrock was burrito wrapped & back filled During excavation/backfilling, East end of berm #7 was damaged & should be reshot by surveyor for the minimum ht./freeboard.

QA walked down berm #4 at it's west end it visually appeared to ~~be~~ (gan) have insufficient ht. gan

28

~~of~~ slope, both in drainage direction & Tonage.

DEFICIENCIES AND NON-CONFORMING MATERIALS OR WORK:

Possibly berm #4 needs reworked. At a minimum, it should be surveyed. ~~if QA present at time of survey.~~ QA was present during survey, data has not been submitted yet.

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES:

Copies to: John Rahe

Observer: ~~Ryan Woodruff (a.m.)~~ Ryan & Patrick Niedermeyer

Reviewing Engineer: John Rahe

APPENDIX G-2: WEEKLY QA REPORTS

WEEKLY FIELD MONITORING SUMMARY NUMBER 1
May 13, THROUGH May 24, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill cap from May 13 through May 24, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (2) Cat 815G pad-foot compactor
- (1) Cat 140H Graders
- (1) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D6R LGP dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Deere 450 Backhoe
- (4) Volvo A40D Dump Truck
- (1) Fuel truck
- (1) Hitachi Ex225 Backhoe

284

Envirocon spent the first few days clearing and grubbing the area for the footprint of the buttress fill as well as on the north east corner if the project, and everything south of the center access road. After clear and grub all of the very soft wet material was removed down to competent material per QA, QC and Jack Woo of CH2M Hill and hauled to the north east corner of the site to be used as regrade fill at a later date. The wet areas were filled with 1.5" rock to help stabilize any remaining soft spots. The remaining area was filled to grade (to the bottom of the drainage rock layer) using Stream alluvium including a thin layer on all of the 1.5" rock to add stability in preparation for geogrid installation.

The South Interceptor Ditch (SID) was cleaned of any soft wet material and is being backfilled from east to west with Rocky Flats alluvium. Rocky Flats alluvium is also being placed in fill areas in the north east corner of the site outside the limit of waste. All of the Rocky Flats alluvium is being placed at existing moisture and compacted with a minimum of four passes with either the 825G or the 815G compactor.

The test pad using Pioneer pit fine was constructed and tested this week. The pad was constructed in two one foot lifts compacted with 2 and 3 passes using a 825G then another section of the pad with 2 passes using a 815G compactor. The area was tested for moisture and density with a nuclear density gauge the lowest density was 96% and the highest was 98% of maximum dry density. All tests were within 2% of optimum moisture content.

Nonconformances

None

Record Surveys

Buttress fill footprint (base of excavation) in process.

QC and QA Testing

Grain size analyses were preformed on pit fines materials from Centennial Pit, Pioneer and Lafarge soils. Some characterization samples were slightly out of specification for buttress fill soils. Further strength testing will be required.

Meetings

The weekly site meeting was held on site on Monday May 16, 2005 and the QC/QA meeting was held immediately after. EPA, CDPHE, K-H and CQAE were on site for the weekly and QC/QA meetings, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period single shift to 5-20-05 and double shift 5-23-05 to 5-24-05.

Josh Valentine, SQAM
Tetra Tech

5/24/05
Date

John H. Rahe, P.E., CQAE
Tetra Tech

5/24/05
Date

Distribution:

CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

285

WEEKLY FIELD MONITORING SUMMARY NUMBER 2
May 25, THROUGH May 31, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from May 25 through May 31, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (2) Cat 815G pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D6R LGP dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck
- (1) Hitachi Ex225 Backhoe

286

Envirocon finished sub grade preparation on the base of the buttress fill for the geogrid. The base was scarified and all large rocks were removed, and any deep ruts from scarification were filled. The geogrid was placed from the west end of the buttress base east approximately 450'. The geogrid was placed with a minimum 2' overlap on all edges and tied at the corners and edges as needed to keep it from rolling when gravel is placed. The 1.5" gravel was placed on the geogrid in a 1' minimum lift from the west to approximately 400' east. The rock is being compacted using the vibrating smooth drum compactor after rough grading.

The South Interceptor Ditch (SID) was cleaned of any soft wet material and is being backfilled from east to west with Rocky Flats alluvium. Rocky Flats alluvium is also being placed in fill areas in the north east corner of the site outside the limit of waste. All of the Rocky Flats alluvium is being placed at existing moisture and compacted with a minimum of four passes with either the 825G or the 815G compactor. Regrade is also being done in the central and west section of the exclusion zone. The material that is cut is being placed as fill and compacted with a minimum of 4 passes with the 825 or 815 compactors.

Nonconformances

None

Record Surveys

Buttress fill footprint (base of excavation).

QC and QA Testing

A sample of the 1.5" drainage rock was taken for a sieve analysis by QC.

Meetings

The weekly regulator meeting was held on site on Wednesday May 25, 2005. EPA, CDPHE, K-H and CQAE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 5-25-05 to 5-31-05 with Saturday 5-28-05 through Monday 5-30-05 off.

Josh Valentine, SQAM
Tetra Tech

5/31/05
Date

John H. Rahe, P.E., CQAE
Tetra Tech

5/31/05
Date

Distribution:

CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

287

WEEKLY FIELD MONITORING SUMMARY NUMBER 3
JUNE 1, 2005 THROUGH JUNE 7, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from June 1 through June 7, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (2) Cat 815F pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D8R dozer
- (1) Cat D6R LGP dozer
- (1) Cat D5M dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck

288

- (1) Hitachi Ex225 Backhoe
- (1) Smooth Vibratory Drum Compactor

Envirocon continued placing geogrid for the base of the drain rock and the buttress fill. The geogrid was placed from the east end of the buttress base west to approximately 450' east of the buttress base west boundary. The geogrid was placed with a minimum 2' overlap on all edges and tied at the corners and edges as needed to keep it from rolling when gravel is placed. Additional procedures used to keep the geogrid in place include placing new drain rock only on existing drain rock (rather than directly on the geogrid) and spreading the drain rock onto the geogrid from the existing drain rock. The 1.5" drain rock was placed on the geogrid in a 1' minimum lift from the east, approximately 400' east of the construction limit to the west with several hundred feet remaining to be completed. The rock is being moved with the D5M dozer and compacted using the vibrating smooth drum compactor after rough grading.

Visual inspection of the drain rock indicates that excessive fines appear to be present above the 5% specification in areas. This is likely due to fine materials adhering to the larger gravel particles after the recent rains. The worst areas were marked for removal of the drain rock material.

Regarding the Xcel gas line, exploratory test pits were performed south of the upper gas line (outside the right of way) and no waste was encountered. Therefore it was decided to leave the gas line in place and cover soil will be ended south of the line.

Rocky Flats alluvium is being placed in fill areas in the west central area of the site outside the limit of waste. All of the Rocky Flats alluvium is being placed at existing moisture and compacted with a minimum of four passes with either the 825G or the 815F compactor. Regrade is being done in the central and west section of the exclusion zone. The material that is cut is being placed as fill and compacted with a minimum of 4 passes with the 825 or 815 compactors.

Weather including rain and lightning caused minor delays during this week's construction. Lightning delays amounted to roughly 2 hours on June 1, ½ hour on June 2, and 7 hours on June 3.

Nonconformances

Potential non-conforming drain rock.

Record Surveys

Continuous surveying of the buttress area to determine drain rock thicknesses and continuous surveying of the rest of the landfill area to confirm grade.

QC and QA Testing

A sample of the 1.5" drainage rock was taken for a sieve analysis by QC and results are pending.

Meetings

The weekly regulator meeting was held on site on Wednesday June 1, 2005. K-H, CQAE, and several members of Tetra Tech were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 6-1-05 to 6-7-05 with additional hours on Saturday 6-4-05 (due to the Memorial Day holiday). No work was performed on Sunday 6-5-05.

6-7-05

Josh Valentine, SQAM
Tetra Tech

Date

6/7/05

John H. Rahe, P.E., CQAE
Tetra Tech

Date

Distribution:

CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

289

WEEKLY FIELD MONITORING SUMMARY NUMBER 4
JUNE 8, 2005 THROUGH JUNE 14, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from June 8 through June 14, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (2) Cat 815F pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D8R dozer
- (1) Cat D6R LGP dozer
- (1) Cat D5M dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck
- (1) Hitachi Ex225 Backhoe
- (1) Smooth Vibratory Drum Compactor

290

Envirocon continued placing 1 ½" drain rock on the eastern portion of the buttress footprint and along the northern edge of the key way. The drain rock was placed to anchor the geotextile along the western ¾'s of the keyway to meet the project specifications. One row of the geotextile was extended to the north of the keyway with an approximate 2' overlap. The areas of the drain rock that appeared to contain the most fines were excavated and removed from the buttress footprint. All of the fines have not been removed from the drain rock, therefore the QA/QC samples that have been taken for the drain rock should be representative of the material in place.

Approximately, 1,000 cubic yards of buttress fill was placed along the western portion of the keyway and adjacent to the key way. Two nuclear compaction/moisture tests were performed on the buttress fill by QC. Both tests met the specifications for compaction and moisture. The fill appeared to be firm and stable with adequate moisture. Side dumps and Volvos dump truck continued to haul in the buttress material from Centennial Pit.

Belly/Side dumps continued to haul regrade material to the top portion of the excavation along the northern edge of the site while the D-9 & D-10 Dozers spread the material in a maximum of one foot lifts. The two 825 Sheepsfoot compactor then compacted the material in a minimum of four passes. The cut portion of the regrading process is now complete and the contractor will continue to place and compact regrade material. Once a one foot cover has been placed in all cut areas, then the PPE will be downgraded to Level D.

Due to the excessive rains and wind approximately two shifts were lost this week. The night crew worked half a day on Thursday while the day crew worked half a day on Friday. The night crew did not work on Friday.

The seep area in the southeastern portion of the site below the buttress toe was excavated and replaced with drain rock. Then the geogrid was placed over the drain rock with a 2 foot overlap.

The contractor removed and plugged approximately 450 LF of abandoned natural gas line as well.

Nonconformances

Potential non-conforming drain rock.

Record Surveys

Continuous surveying of the buttress area to determine drain rock thicknesses and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test locations.

QC and QA Testing

QA Testing:

- Two geotextile fabric samples were collected by QA from roll 2.41487 and NG0986659.
- A regrade fill sample was collected QA-RF-1
- Drain Rock sample was collected QA-DR-1
- Two additional geotextile fabric samples were collected

All of the QA material tests are still pending

QC Testing:

- (2) Pit fine samples were collected for the regrade fill from the Pioneer Pit
- (1) Rocky Flats Alluvium (RFA) sample was collected for regrade fill from the Centennial Pit
- (1) Buttress Fill material was collected that was imported from the Centennial Pit

Meetings

The weekly regulator meeting was held on site on Wednesday June 8, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 6-8-05 to 6-14-05.

Ryan Woodruff, EIT, SQAM — 6/15/05 Date
Tetra Tech

John H. Rahe, P.E., CQAE — 6/15/05 Date
Tetra Tech

Distribution:
CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

291

WEEKLY FIELD MONITORING SUMMARY NUMBER 5
JUNE 15, 2005 THROUGH JUNE 21, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from June 15 through June 21, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (2) Cat 815F pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D8R dozer
- (1) Cat D6R LGP dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck
- (1) Hitachi Ex225 Backhoe
- (1) Smooth Vibratory Drum Compactor
- 310 G Backhoe

292

Envirocon completed placing the drain rock on the eastern portion of the site. The test results for the drain rock were received, submitted and approved by Earthtech. The design permeability, k was 0.13 cm/s, while the samples collected from the in place material had laboratory permeability of 5.13 cm/s and 8.3 cm/s. Earthtech approved the in place material because the lab permeabilities were greater than an order of magnitude over the assumed permeability used for design

Envirocon continued to place the buttress fill along the bottom footprint and along the slope in the western portion of the buttress. Geotextile was placed prior to the buttress fill with a minimum overlap of 2'. Eight rolls of Geotextile were identified to not be on the list of approved geotextiles. Three of the rolls were placed, in partial sections, along the slope of the buttress. QA has collected a sample of the geotextile and will review the certification data provided by the manufacturer. The puncture resistance and permeability of the previously sampled geotextile was determined to meet the project specifications, while the mass per unit area was slightly under the specified 8 ounces. Although the geotextile did not meet the specifications for unit weight it did pass the more critical properties of puncture resistance and permeability which will make the material adequate to meet the design intent. Approximately (45) nuclear density/ moisture tests and (4) sand cones were performed on the buttress fill. All the tests have passed with the exception of four which failed due to low moisture and/or low compaction. Only one of the four tests failed due to low density; however all of the locations were immediately reworked, retested and found to be in compliance with the project specifications. Earthtech has approved the use of the LaFarge Pit fines in the buttress as well.

Belly/Side dumps continued to haul regrade material to the top portion of the excavation along the northern edge of the site and along the middle access road while a D-9 Dozer and 140H Blade spread the material in a maximum of one foot lifts. One 825 sheepsfoot compactor and two 815 sheepsfoot compactors compacted the material in a minimum of four passes. The regrade material has been placed to +/- subgrade 2. Envirocon has started the cover soil placement along the western portion of the limit of waste.

Survey provided additional control points along the north end of the buttress for the contractor in order to build the buttress to the design height. The as-builts of the drain rock were also provided and appeared to meet the project specifications. The drain rock had a minimum thickness of 0.8 feet with an average thickness of 1.4 feet. As-builts on the drain rock are still outstanding in the most eastern portion of the site.

The seep area in the eastern portion of the regrade material is expected to be caused by a leak in the fire water service and is anticipated to dry up once the system is turned off within the next week.

Nonconformances

None

Record Surveys

Continuous surveying of the buttress area to determine drain rock thicknesses and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test locations.

QC and QA Testing

QA Testing:

- One geotextile fabric sample was collected by QA from roll 1.76780
- A regrade fill sample was collected QA-RF-02 of the RFA
- A buttress fill sample was collected QA-BF-02 of the LaFarge Pit Fines
- (3) Nuclear density/moisture tests were performed on the buttress

QA Test Results:

- The approved geotextile is in compliance with the project specifications
- Density tests indicate that the buttress fill is in compliance with the project specifications

QC Testing:

- (1) Pit fine sample was collected for the regrade fill from the Pioneer Pit
- (1) Rocky Flats Alluvium (RFA) sample was collected for regrade fill from the Centennial Pit
- (2) Buttress Fill material was collected that were imported from the Centennial Pit
- (1) Buttress Fill material was collected that were imported from Lafarge
- (45) Nuclear density/moisture tests were performed on the buttress
- Triaxial testing on the Pioneer Pit Fines was initiated

QC Test results:

- Density tests indicate that the buttress fill is in compliance with the project specifications
- Lafarge Pit fines were approved from the strength testing results
- The in-place drain rock was approved from the permeability testing results

Meetings

The weekly regulator meeting was held on site on Wednesday June 15, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

293

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 6-15-05 to 6-21-05.

Ryan Woodruff, EIT, SQAM — Date: 6/15/05
Tetra Tech

John H. Rahe, P.E., CQAE — Date: 6/15/05
Tetra Tech

Distribution:
- CQAE (John Rahe)
- RM (Mike Keating)
- EPA
- CDPHE

WEEKLY FIELD MONITORING SUMMARY NUMBER 6
JUNE 22, 2005 THROUGH JUNE 28, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from June 22 through June 28, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (2) Cat 815F pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D8R dozer
- (1) Cat D6R LGP dozer
- (1) Cat D5R dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck
- (1) Smooth Vibratory Drum Compactor
- 310 G Backhoe
- (1) John Deer Tractor with Disc

294

Envirocon continued to place the buttress fill along the bottom and along the slope of the buttress. They completed the geotextile throughout the buttress and have placed a thin lift on top the geotextile to prevent weathering and UV degradation.

The manufacturer's quality control information for the additional rolls used to complete the geotextile within the buttress was submitted. The performance testing for puncture, water flow and permittivity were adequate, however the average unit weight of the fabric was under the specified 8 ounces/sy. The previous samples collected had similar results as reported last week. Therefore, the contractor is preparing an ECR or a RFI to determine if the in-place geotextile is acceptable since the performance tests indicate that the geotextile will meet the design intent.

QC and QA continued to test the buttress fill throughout the week. At times the fill was too wet and did not meet the project specifications, such locations were reworked and retested and approved by QA/QC prior to any additional fill placement. Holes in the geotextile were created in four different areas by construction equipment. Those areas were excavated and patched with a minimum of 2 feet of overlap.

The contractor continued to place cover soil with two to four scrapers per shift following a subgrade inspection of the regrade fill performed by QA. The cover consisted of Rocky Flats Alluvium (RFA) and a thin lift of the stockpiled organic topsoil between subgrade 2 and the RFA. This material was determined, by EPA's revegetation specialist, to be mixed within the entire 2 feet of RFA cover soils. Prior to fill placement the contractor sprayed water on the slope and made a minimum of one more pass with the sheepsfoot in order to develop a better bond between the cover soil and the subgrade. Survey and the design engineers have provided the contractor with additional control points along the regrade fill to capture grade breaks along the slope which provides sufficient drainage to the slope.

The contractor partially excavated the western diversion channel this week. The entire channel was not excavated due to the access road.

Nonconformances

Potential geotextile

Record Surveys

Continuous surveying of the buttress area to determine drain rock thicknesses and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test locations.

QC and QA Testing

QA Testing:

- A total of (6) nuclear density/moisture tests have been performed to date, all of which have passed

- Additional laboratory tests were performed for drainage gravel, buttress fill and RFA.
- Additional geotextile QA laboratory tests were performed.

QC Testing:

- A total of (114) nuclear density/moisture tests have been performed to date.
- A total of (6) sandcones have been performed to date.
- (2) Buttress Fill material samples were collected this week

Meetings

The weekly regulator meeting was held on site on Wednesday June 22, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 6-22-05 to 6-28-05.

Ryan Woodruff, EIT, SQAM — 6-29-05 Date
Tetra Tech

John H. Rahe, P.E., CQAE — 6/29/05 Date
Tetra Tech

Distribution: CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

295

WEEKLY FIELD MONITORING SUMMARY NUMBER 7
JUNE 29, 2005 THROUGH JULY 5, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from June 29 through July 5, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (1) Cat 815F pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D10R dozer
- (1) Cat D8R dozer
- (1) Cat D6R LGP dozer
- (1) Cat D5R dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck
- (1) Smooth Vibratory Drum Compactor
- 310 G Backhoe
- (1) John Deer Tractor with Disc

296

Envirocon continued to place the buttress fill along the bottom of the buttress. The contractor continued to import the material wet of optimum. A disc was used to process the material once placed, and then compacted with the sheepsfoot compactor. All of the fill was tested and has passed, backfill which did not pass initially was reworked and retested.

The western top of the buttress was determined to be approximately 8 feet higher than design due to an error in the original topographic map. The contractor has received approval from Earthtech to strip the geotextile and drainrock down the slope approximately 15 feet while maintaining the geotextile cover over the drain rock. The removed geotextile was removed while the drainrock was spread throughout the regrade fill. The contractor will then replace the excavated material with buttress fill to allow a minimum of 2 feet of buttress fill material over the drain rock. This proposed solution will be similar to drawing 51788-011 of the Project Drawings.

The contractor completed the 3:1 cut of the buttress toe slope. Scrapers continued to haul RFA cover soils and fabric and debris were picked out of the cover material.

QC and QA continued to test the buttress fill throughout the week. At times the fill was too wet and did not meet the project specifications, such locations were reworked and retested and approved by QA/QC prior to any additional fill placement. QC continued to sample buttress fill and cover soils.

The seep east of the OLF closure is still present as is a small ponded wet area on the cover soil on the eastern portion of the regrade area. No additional work has been performed on the western diversion channel.

Nonconformances

Potential geotextile which will be addressed by ECR-009.

Record Surveys

Continuous surveying of the buttress area to determine drain rock thicknesses and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test locations.

QC and QA Testing

QA Testing:

- A total of (10) nuclear density/moisture tests have been performed to date, all of which have passed

QC Testing:

- A total of approximately (200) nuclear density/moisture tests have been performed to date.
- A total of (10) sandcones have been performed to date.

- (1) Buttress Fill material samples were collected this week
- (2) Cover Fill samples were collected

Meetings

The weekly regulator meeting was held on site on Wednesday June 29, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 6-29-05 to 7-05-05, with the exception of Monday July 4th.

7-5-05

Ryan Woodruff, EIT, SQAM — Date
Tetra Tech

7/5/05

John H. Rahe, P.E., CQAE — Date
Tetra Tech

Distribution:
CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

297

WEEKLY FIELD MONITORING SUMMARY NUMBER 8
JULY 6, 2005 THROUGH JULY 12, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from July 6 through July 12, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (1) Cat 825G pad-foot compactor
- (1) Cat 815F pad-foot compactor
- (2) Cat 140H Graders
- (2) Cat 966G front-end loader
- (1) Cat D9R dozer
- (1) Cat D8R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (2) Cat 345B Backhoe
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator
- (1) John Deer Tractor with Disc

298

Envirocon continued to place the buttress fill and it is now complete. A topographic survey will be performed throughout the extent of the buttress and all testing for QC and QA has been performed within the specified frequency. All density tests on the buttress fill have met the project specifications including all sand cones and nuclear density tests along with retests. The high spot along the top of the buttress was repaired; however the as-built survey indicated that the excavation did not capture the entire high spot, so the contractor had to extend the excavation approximately 30 feet to the east in order to lower the grade of the top of the buttress.

Scrapers continued hauling RFA to the slope of the regrade fill area while a D-9 Dozer was used to make additional cuts near the buttress tie in near the east. While excavating to subgrade 1 (S-1), waste was encountered. Therefore, the contractor elected to only excavate down to subgrade 2 (S-2) in that location to limit the exposure to the waste. The waste which was encountered was placed to the west where additional fills are needed to be at S-2 elevation. The location of the area that did not reach subgrade 1 was approximately 200' X 280'. The area will be identified on the as-built drawings.

The seep on the east end of the project site is still flowing at a constant rate. The saturated areas on the slope have increased in size. The fire line has been turned off and no reduction in the amount of groundwater has been observed. The contractor dug three test pits to determine the depth of the groundwater north of where the seep daylights along the slope. The groundwater was encountered at a depth of approximately 8 feet. Neither QA nor QC observed the depth of the groundwater since it was backfilled immediately due to safety concerns. Survey information was collected in the location of the test pits and in the location of the observed saturated areas along the slope.

The cover has a final specified grade tolerance of 0 to + .2 feet. The contractor has proposed confirming the thickness of the cover prior to discing and seeding the cover and then to perform an as-built survey and topographic survey after the discing, seeding and erosion control work is complete.

Nonconformances

- Excavation to Subgrade 1 was not achieved north of the middle road which will be addressed by RFI-010.
- The topsoil excavated from the buttress area was not placed in the top 2-inches of the surface as per SPEC-02900-0990-3.01-A.2 which will be addressed by ECR-008 and a technical memorandum written by Mr. Buckner with the EPA.

Record Surveys

Continuous surveying of the buttress area to determine drain rock thicknesses and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test locations.

QC and QA Testing

QA Testing:

- A total of (14) nuclear density/moisture tests have been performed to date, all of which have passed

QC Testing:

- A total of approximately (280) nuclear density/moisture tests have been performed to date.
- A total of (14) sand cones have been performed to date.
- (1) Buttress Fill material sample was collected this week
- (2) Cover Fill samples were collected

Meetings

The weekly regulator meeting was held on site on Wednesday July 6, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 7-6-05 to 7-12-05.

Ryan Woodruff, EIT, SQAM — 7-12-05 Date
Tetra Tech

John H. Rahe, P.E., CQAE — 7/12/05 Date
Tetra Tech

Distribution: CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

299

WEEKLY FIELD MONITORING SUMMARY NUMBER 9
JULY 13, 2005 THROUGH JULY 19, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from July 13 through July 19, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 825G pad-foot compactor
- (1) Cat 815 pad-foot compactor
- (2) Cat 140H Graders
- (1) Cat 966G front-end loader
- (1) Kamatsu 420
- (1) Cat D9R dozer
- (1) Cat D8R dozer
- (1) Cat D6R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator
- (1) John Deer Tractor with Disc

300

Envirocon completed the fine grading of the buttress, while survey completed a thorough topographic as-built survey of the buttress. Upon completion of the survey the contractor began placing the regrade fill on top of the buttress and working on the tie ins along the north end of the buttress.

The East Subsurface Drain (ESD) was constructed along the northeastern slope of the project on Wednesday. The ESD is composed of a two foot thick layer of 1 ½" drain rock placed at the bottom of a trench such that approximately one foot of the drain rock is submerged in the groundwater. Flow was not observed at the outlet of the ESD until Monday; however the original French Drain which discharged into the SID was still flowing at the same time the ESD was flowing. The soil was still saturated along the slope as well.

The contractor continued to place and grade the cover soils along the north slope. Scrapers and/or haul trucks from Centennial were used to place the material. The scrapers were cutting the material from the eastern grade to drain area and placing it along the north slope. While cutting the grade-to-drain area a large volume of concrete rubble, outside of the waste area, was encountered. The concrete was too large to be placed within the remaining regrade waste area, so the contractor elected to remove the concrete from site as municipal waste after RAD clearance. Also the abandoned natural gas line was removed throughout the grade-to-drain area, and it too was size reduced and will be removed from the site as municipal waste.

Scrapers were also used to cut the West Channel. The material cut from the West Channel was placed within the regrade limits. Some of the material placed consisted of mostly high plasticity clay with some weathered claystone which did not meet the project specifications. The specifications requires that RFA be used from an approved borrow source which does not contain waste materials, ice, organic soils, vegetation, wood, peat, or other unsuitable material as determined by QCSM. The QCSM and SQAM were in agreement that the material placed did not meet the project specifications and therefore the SQAM asked the contractor to remove the undesirable fill. The contractor then elected to remove all undesirable material. The excavated material was then hauled off of the OLF project site.

The west end of the SID was backfilled in order to construct the Legacy Access Road along the eastern edge of the site. The original French Drain discharge point was extended approximately 50 feet to the east in order to convey the groundwater into the SID.

A small piece of the geotextile on the east end of the buttress was found to be damaged. The contractors removed the pit fines and drain rock down the slope a couple of feet and placed a piece of geotextile with a 2 foot overlap to complete the repair. The pit fines were then placed on top of the geotextile in order to achieve a 2 foot cover of pit fines over the drain rock.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 7-13-05 to 7-19-05.

7-19-05

Ryan Woodruff, EIT, SQAM
Tetra Tech

Date

7/19/05

John H. Rahe, P.E., CQAE
Tetra Tech

Date

Distribution:

CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

301

WEEKLY FIELD MONITORING SUMMARY NUMBER 10
JULY 20, 2005 THROUGH JULY 26, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from July 20 through July 26, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (1) Cat 825G pad-foot compactor
- (1) Cat 140H Graders
- (1) Kamatsu 420
- (1) Cat D10R dozer
- (1) Cat D9R dozer
- (1) Cat D8R dozer
- (1) Cat D6R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator
- (1) John Deer Tractor with Disc

302

Envirocon completed the final portion of the regrade fill over the buttress. The 825 was used to compact the material with a minimum of 4 passes, after the dozers completely spread the material.

The contractor continued to work on the cover soil east of the grade break and over the buttress. The area east of the grade break is complete with exception to some minimal cut/fill areas and along the top of the north slope where the cap transitions to S-2 along the northern waste boundary. Large rocks were removed from the slope and placed beneath the fill used to extend the eastern access road (Legacy Road). The cover soil was hauled from Centennial by haul trucks and Scrapers from the 371 borrow pit. QA and QC visually inspected the 371 borrow pit and granted approval to use the material as Rocky Flats Alluvium. The material from 371 has fewer large rocks and will be more suitable for the berms and/or the cover.

The contractor continued grading Diversion Berms #1 and #2. The material was placed with scrapers and moved to the desired location with the loader. The contractor worked on the West and East Channel and although some material excavated from the end of the East Channel was deemed suitable cover soils, the majority of the excavated material was hauled off site because of a high clay content within the material. The design grade at the end of the West Channel was lower than the existing grade therefore the Channel was graded to drain by raising the grade at the end of the channel.

The three seep areas, the two on the east side and the one on the west side south of the waste boundary, previously identified are still present.

Nonconformances

None

Record Surveys

Continuous surveying of the regrade fill and cover soils to verify the final grade and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test location.

QC and QA Testing

QA Testing:

- Visual Observations
- Testing of final pit fines for buttress in progress

QC Testing:

- Visual Observations
- (2) Cover soil samples were collected for index testing.

Meetings

The weekly regulator meeting was held on site on Wednesday July 20, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), and CQC were on site Monday through Friday during working hours for this reporting period 7-20-05 to 7-26-05.

7-26-05

Ryan Woodruff, EIT, SQAM — Date
Tetra Tech

7/27/05

John H. Rahe, P.E., CQAE — Date
Tetra Tech

Distribution:
CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

303

WEEKLY FIELD MONITORING SUMMARY NUMBER 11
JULY 27, 2005 THROUGH AUGUST 2, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from July 26 through August 2, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (1) Cat 825G pad-foot compactor
- (2) Cat 140H Graders
- (1) Kamatsu 420 Loader
- (1) Cat 966G Loader
- (1) Cat 950G Loader
- (1) Cat D10R dozer
- (1) Cat D9R dozer
- (2) Cat D8R dozer
- (2) Cat D6R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator

304

- (1) John Deer Tractor with Disc
- (1) Ditch Witch Trencher
- (4) Scrapers

Envirocon completed the majority of the haul for the cover soil. The final grading is ongoing. QC collected the remaining two cover soil samples for index testing. The cover soil material was hauled from Centennial and the 371 Borrow Pit.

The contractor continued grading Diversion Berms #2 and has placed material for Berm #3 thru #7. The erosion matting was placed on Diversion Berm # 1 and nearly completed on Diversion Berm #2. The contractor is using Staple Pattern D, the White Dot System, on the uphill side of the berm since it is a low flow channel. Staple Pattern B, the Red Dot System, is being used on the downhill side of the berm in accordance with the project specifications and the manufacturer's recommendations. The staples being used have been a mixture of 6" staples and 6" spike and washers. The spike and washers tend to be more effective in penetrating the cover soils and therefore providing a more secure erosion mat.

Rough grading on the East and West Channels has been completed. There are still some minor cut/fills required in some locations of the channels. The design elevations of the East Channel do not coincide with the existing grade. The design depicts a two foot deep channel at the end of the channel. However, when constructed to the design elevation the east bank of the channel is less than two feet. Earthtech has been informed of the issue and has not made a design decision yet, but the end of the channel will likely require additional fill on the east side.

Survey information was collected for the western seep area. Diversion Berm #3 has been placed over the top of the seep. The contractor still plans on placing a subsurface drain in this location as designed in RFI #14. The two eastern are still present. No groundwater has been observed in the Eastern Channel to date.

Nonconformances

Potential nonconformance with the QA/QC plan due to QC absence from the site July 21, 2005 through July 26, 2005.

Record Surveys

Continuous surveying of the regrade fill and cover soils to verify the final grade and continuous surveying of the rest of the landfill area to confirm grade. Also, surveying was performed to identify the test location.

QC and QA Testing

QA Testing:

- Visual Observations
- Testing of final pit fines for buttress complete

QC Testing:

- Visual Observations through Thursday morning July 28.
- (2) Cover soil samples were collected for index testing.

Meetings

The weekly regulator meeting was held on site on Wednesday July 27, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), were on site Monday through Saturday during working hours for this reporting period 7-27-05 to 8-02-05, while CQC was onsite only Wednesday and Thursday morning of this reporting period.

8-2-05

Ryan Woodruff, EIT, SQAM — Date
Tetra Tech

8/2/05

John H. Rahe, P.E., CQAE — Date
Tetra Tech

Distribution: CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

305

WEEKLY FIELD MONITORING SUMMARY NUMBER 12
August 3, 2005 THROUGH AUGUST 9, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from August 3 through August 9, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 140H Graders
- (1) Kamatsu 420 Loader
- (1) Cat 966G Loader
- (1) Cat D9R dozer
- (2) Cat D8R dozer
- (2) Cat D6R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator
- (1) John Deer Tractor with Disc
- (1) Ditch Witch Trencher
- (4) Scrapers

306

Envirocon continued to fine grade the cover soil and the final grade in the grade to drain areas on the east and west side of the site. The surveyors have verified the final elevation of the cover in all grid control point locations within 0 to +0.2 feet, followed by fine grading between the stakes was required.

The contractor continued grading the diversion berms. The majority of the material has been placed. The contractor continued to shape diversion berms 4 thru 7, while the surveyors provided control points along the alignment.

Additional erosion control was placed along the West Channel. The P 550 was used on the West Channel with the spike and washer using Staple Pattern E, which is the yellow dot staple pattern. Topsoil was placed along the channel bottom and was seeded prior to the erosion control placement. The erosion matting on Diversion Berm #1 was completed and the Georidges were installed at a minimum spacing of 130 feet as specified in the project drawings. The erosion matting on Diversion Berm #2 was found to be a combination of C 125 and C 125 BN. The original specifications specify the use of C 125, while the new seeding specifications specify the use of C 125 BN. Earth Tech verbally approved the use of either mat, however an RFI is required to document that both mats are acceptable. The contractor plans on using only the C 125 BN on the remaining diversion berms.

Due to heavy rains minimal work was performed Thursday and Friday. On Friday the contractor only worked on ripping out the West access road which is not a part of the OLF project which meant no involvement by QA. QA also left early on Thursday since no work was being performed on the OLF. No QC was on the jobs site for the entire week.

Two seeps were identified within the channels after the heavy rains. Seep #5 was located in the West Channel and Seep #6 was located in the East Channel. Both seeps appear to be causing tension cracks on the side slopes of the channels. Seep #6 has caused a slope failure up to 4 to 5 inches wide, with up to 6 inches of vertical displacement along the failure, approximately 50 feet long and approximately 3 feet deep with approximately 8" of groundwater accumulated at the bottom of the crack. Significant settlement has been identified due to Seep #6. The contractor intends to monitor the side slope before making a decision on the course of action needed to mitigate the impacts of the seep. However, mitigation of this problem will be required. There is a small seep further upstream in the East Channel that has not created significant movement. Survey data was collected for both seeps identifying the extent and location of the seep.

Nonconformances

Potential nonconformance with the QA/QC plan due to QC absence from the site July 21, 2005 through August 9, 2005.

Record Surveys

Continuous surveying of the regrade fill and cover soils to verify the final grade and continuous surveying of the rest of the landfill area to confirm grade.

QC and QA Testing

QA Testing:

- Visual Observations

QC Testing:

None

Meetings

The weekly regulator meeting was held on site on Wednesday August 3, 2005. K-H, CQAE, EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), were on site Monday through Thursday during working hours for this reporting period 8-03-05 to 8-09-05. CQC was not onsite during this reporting period.

8-9-05

Ryan Woodruff, EIT, SQAM — Date
Tetra Tech

8/9/05

John H. Rahe, P.E., CQAE — Date
Tetra Tech

Distribution: CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

307

WEEKLY FIELD MONITORING SUMMARY NUMBER 13
August 10, 2005 THROUGH AUGUST 16, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from August 10 through August 16, 2005. This weekly report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction Synopsis

Equipment

Envirocon had the following equipment on site:

- (2) Cat 140H Graders
- (1) Kamatsu 420 Loader
- (1) Cat 966G Loader
- (1) Cat D9R dozer
- (1) Cat D8R dozer
- (2) Cat D6R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator
- (1) John Deer Tractor with Disc
- (1) John Deer Tractor with Hay Buster
- (1) Ditch Witch Trencher

308

- (1) Flexterra Truck
- (2) Scrapers

The contractor continued grading the diversion berms. All of the material has been placed and graded. The contractor placed the erosion control over berm 4 using the C125 BN.

The majority of the C 350 was placed along the bottom of the 3:1 buttress slope. The matting was anchored half way up the slope in a 6" trench. Staple Pattern D (White Dot System) was used on the buttress 3:1. According to the project specifications Staple Pattern A is required on the buttress 3:1, however only Staple Pattern D and E were marked on the C 350 so the contractor used Staple Pattern D which is more conservative than Staple Pattern A.

The area between Diversion Berm #1 and #2 was ripped and disked prior to proceeding with seeding and straw crimping. The majority of the area was sprayed with Flexterra as well. The remaining areas between the diversion berms were ripped and disked. The area between Diversion Berm # 4 and #5 was seeded and straw was distributed and partially crimped.

The 24" boulders were placed at Diversion Berm #1 outfall. The boulders were placed 2 feet a part on average and embedded approximately 6" into the channel bottom.

The seeps identified to be causing stability issues in the West and East Channel were considered to be unstable due to the weathered bedrock contact along the slopes. Therefore, Earthtech determined that the weathered claystone would be removed in the two questionable areas and replaced with RFA. The side slope near a larger seep upstream of the tension crack observed last week in the West Channel was also excavated. Class VL rip rap, (D_{50} = 6") was placed at the bottom of the excavation and wrapped in 8 oz. geotextile prior to backfilling with RFA. The rip rap drain was approximately 20 feet long.

Nonconformances

None

Record Surveys

Continuous surveying of the cover soils and berms to verify the final grade was performed. Continuous work on the record drawings has also been performed along with submittals.

QC and QA Testing

QA Testing:

- Visual Observations

QC Testing:

- QC was performed this week by Jack Woo with CH2M-Hill, Jim Elliott with International Engineering and Jim Koffer with Golder and Assoctiates. The future plan is to have Jim Elliott cover the morning portion of the shift and Jim Koffer to cover the afternoon portion of the shift.

Meetings

The weekly regulator meeting was held on site on Wednesday August 10, 2005. K-H, CQA (SQAM), EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), were on site Monday through Friday during working hours for this reporting period 8-10-05 to 8-16-05. CQC was not onsite during this reporting period.

8-19-05

Ryan Woodruff, EIT, SQAM — Date
Tetra Tech

8/19/05

John H. Rahe, P.E., CQAE — Date
Tetra Tech

Distribution:
CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

309

WEEKLY FIELD MONITORING SUMMARY NUMBER 14
August 17, 2005 THROUGH AUGUST 23, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from August 17 through August 23, 2005. This week\y report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying, International Engineering, and Golder Associates, Inc. Golder Associates and International Engineering are performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construc

Equipment

Envirocon had the following equipment on site:

- (2) Cat 140H Graders
- (1) Kamatsu 420 Loader
- (1) Cat 966G Loader
- (1) Cat D9R dozer
- (1) Cat D8R dozer
- (2) Cat D6R dozer
- (1) Cat D5R dozer
- (2) Water truck
- (1) Fuel truck
- (1) 310 G Backhoe
- (1) 450 Excavator
- (1) John Deer Tractor with Disc
- (1) John Deer Tractor with Hay Buster
- (1) Ditch Witch Trencher

310

- (2) Flexterra Truck

The contractor completed placing the 24" boulders along the diversion berm outfalls into the channels and at the bottom of the channels. The boulders were placed with an average spacing of 2 feet. While placing the boulders the excavator ran over the majority of the berms near the outfalls. The diversion berms will be repaired in the locations where the tracks of the excavator made the berm less than 2 feet between the drainage invert and the top of the berm.

The erosion control matting along the buttress 3:1 side slope and along the West Channel were completed this week. C 125 coconut matting was placed along the upper buttress 3:1 as per ECR# 2. Clarification on the type of temporary erosion matting on the 3:1 slope was made with RFI # 17, which stated that C 125 could be used on the slope rather than C 125 BN. The contractor worked to complete the west side of the northern slope but was not able to complete the erosion control on Diversion Berm #3. Diversion Berm #1 and #2 are substantially complete as well as the straw crimping and Flexterra between Berms 1 thru 3, 4 and 5, and 6 and 7. All areas were ripped, disked and seeded prior to straw crimping. The berms were seeded prior to placing the erosion matting. The contractor began placing the C 125 BN on Diversion Berm #7.

The contractor was informed by QA that the north side of the diversion berms were considered a low flow channel and that the manufacturer's recommendation for channel installation of the C 125 BN needed to be followed. The only additional requirement is that at the end overlaps two rows of staples spaced 4" apart are required. Also Earthtech informed QA that P 550 is required on the flow side of any diversion berms which slope exceeds 5%. At the outfall of Diversion Berm # 4, near the East Channel the slope of the berm flowline is approximately 12%. The contractor was informed and will place P 550 along the portion of the berm which exceeds 5% slope.

Nonconformances

Potential grade non-conformance along the diversion berms

Record Surveys

Continuous surveying of the cover soils and berms to verify the final grade was performed. Continuous work on the record drawings has also been performed along with submittals.

QC and QA Testing

QA Testing:

- Visual Observations

QC Testing:

- Visual Observation

Meetings

The weekly regulator meeting was held on site on Wednesday August 17, 2005. K-H, CQA (SQAM), EPA and CDPHE were on site for the weekly meeting, as well as a tour afterward.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), were on site Monday through Friday during working hours for this reporting period 8-17-05 to 8-23-05.

8/23/05

Ryan Woodruff, EIT, SQAM — Date
Tetra Tech

8/23/05

John H. Rahe, P.E., CQAE — Date
Tetra Tech

Distribution:
CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

311

WEEKLY FIELD MONITORING SUMMARY NUMBER 15
August 24, 2005 THROUGH AUGUST 30, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL
GOLDEN, COLORADO

Introduction

TetraTech has prepared this weekly summary of Construction Quality Assurance (CQA) monitoring and testing performed for construction of the Original Landfill closure from August 24 through August 30, 2005. This week\y report summarizes the construction activities, CQA and Construction Quality Control (CQC) testing, and surveying activities for the Original Landfill (OLF) Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team (headed by K-H) consists of Envirocon Inc, Flatirons Surveying, International Engineering, and Golder Associates, Inc. Golder Associates and International Engineering are performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Construction

Equipment

Envirocon had the following equipment on site:

- (2) Cat 140H Graders
- (1) Kamatsu 420 Loader
- (2) Water truck
- (1) Fuel truck
- (1) 450 Excavator
- (1) John Deer Tractor with Disc
- (1) John Deer Tractor with Disc
- (1) John Deer Tractor with Hay Buster
- (1) Ditch Witch Trencher
- (2) Flexterra Truck
- (1) Flexterra Trailer

312

The contractor completed placing the P 550 matting in the East Channel. The anchor trench for the matting has not been backfilled.

The diversion berms were repaired in the locations where the excavator had tracked over the berms. C 125 BN was continued to be placed on the berms east of the grade break. A fire occurred on Friday and destroyed all of the matting on berm #5 and burned some areas up and down slope of the berm. The sloped areas were all regraded and reseeded. Straw crimping and Flexterra was then applied to the damaged areas. A small portion of the erosion matting was replaced with C 125 during this reporting period. C 125 was used because it was the only material available and it was determined equivalent to C 125 BN by Earth Tech in RFI 19. A meeting and investigation was held to determine the cause of the fire and to determine proper corrective actions. The cause of the fire is undetermined but there has been a no smoking policy adopted site wide.

The remaining portions of erosion matting outstanding includes the remainder of berm # 5, berms # 4 thru #6 where the access road cut through the berms, and berm #4 across the grade break. Flexterra was sprayed on the east side of the landfill north of berm #1 and between berms #4 thru #7. All areas were seeded and straw crimped prior to the Flexterra application.

The final walkdown for the west side of the project was performed Monday. Some additional work was found to be required to complete the punch list items. Also additional information was requested to be collected for Seep #7, south of the east end of berm #3. Earth Tech will determine the effect of the seep on the design once the information has been collected.

A meeting was held with Earth Tech, Flatiron Survey, Envirocon and Kaiser Hill to discuss the record drawings for the cover and the berms. Flatirons Survey will continue to work on the record surveys and submit them to Kaiser Hill prior to submittal to QA. Any input from QA for the record drawings is to now go through Kaiser Hill.

Nonconformances

Potential grade non-conformance along the diversion berms and cover thicknesses

Record Surveys

Continuous surveying of the berms to verify the final grade was performed. Continuous work on the record drawings has also been performed along with submittals.

QC and QA Testing

QA Testing:

- Visual Observations

QC Testing:

- Visual Observation

Meetings

The weekly regulator meeting and Pre-Final Walkdown for the west side of the OLF were held on Wednesday August 24, 2005. The Final Walkdown for the west side of the OLF was held on Monday August 29, 2005. K-H, CQA (SQAM), EPA and CDPHE were on site for the weekly meeting, the Pre-Final Walkdown and the Final Walkdown and CQAE was onsite for the Final Walkdown for the west side of the OLF.

CQA and CQC Personnel On-Site

CQAE personnel (SQAM), were on site Monday through Friday during working hours for this reporting period 8-~~17~~ 24-05 to 8-~~23~~ 30-05.

Ryan Woodruff, EIT, SQAM
Tetra Tech

8/30/05
Date

John H. Rahe, P.E., CQAE
Tetra Tech

8/30/05
Date

Distribution: CQAE (John Rahe)
RM (Mike Keating)
EPA
CDPHE

313

APPENDIX G-3: MONTHLY QA REPORTS

MONTHLY QA REPORTS DO NOT INCLUDE REFERENCE ATTACHMENTS. HOWEVER, ATTACHMENTS ARE INCLUDED ELSEWHERE IN APPENDICES F AND G

MONTHLY DATA SUMMARY NUMBER 1
May 13, THROUGH May 31, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
GOLDEN, COLORADO

Introduction

TetraTech has prepared this monthly summary of Construction Quality Control (CQC) and Quality Assurance (CQA) data testing performed for construction of the original landfill closure from May 13 through May 31, 2005. This monthly report summarizes the testing data and surveying activities for the Original Landfill (OLF) cover construction and all related activities for the construction of the OLF Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Test Data Summary

The test pad using Pioneer pit fine was constructed and tested this month. The pad was constructed in two one foot lifts compacted with 2 and 3 passes using a 825G then another section of the pad with 2 passes using a 815G compactor. The area was tested for moisture and density with a nuclear density gauge the lowest density was 96% and the highest was 98% of maximum dry density. All tests were within 2% of optimum moisture content. Data is attached.

Conformance samples for pit fines have been taken from Centennial, Pioneer and LaFarge. The results are currently being reviewed for conformance and further testing.

A sample of the 1.5" rock was taken for gradation on 5/27/05, the results are pending.

Nonconformance Materials or Work

None

Follow Up Retests and Inspections

None

315

Record Surveys

Record surveys have performed on the base of the buttress fill.

5/31/05

Josh Valentine, SQAM
Tetra Tech

Date

5/31/05

John H. Rahe, P.E., CQAE
Tetra Tech

Date

Distribution:

CQAE (John Rahe)
CTR (Bob Davis)
EPA
CDPHE

MONTHLY DATA SUMMARY NUMBER 2
June 1, 2005 THROUGH July 5, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
GOLDEN, COLORADO

Introduction

TetraTech has prepared this monthly summary of Construction Quality Control (CQC) and Quality Assurance (CQA) data testing performed for construction of the original landfill closure from June 1, 2005 through July 5, 2005. This monthly report summarizes the testing data and surveying activities for the Original Landfill (OLF) cover construction and all related activities for the construction of the OLF Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Test Data Summary

QC performed material sampling for index and/or performance testing on the cover soil, regrade fill, drainrock and buttress fill material, while QA collected samples for index and/or performance testing for the regrade fill, buttress fill, drain rock, and the geotextile.

Centennial and Lafarge Pit fines have been approved for use as buttress fill, while the results of the Pioneer Pit fines are still pending for use as buttress material. Although the two sources of pit fines had failing gradation results the triaxial test results indicated that the soil had adequate strength parameters that would meet the design intent of the buttress.

Based upon test results for permeability the drainrock placed throughout the month has been approved.

The index testing for the placed geotextile indicated an average mass/unit weight of 7.9 oz/sy which was less than the specified 8 oz/sy, while the average performance testing for puncture strength and permeability exceeded the project specifications. Verbal acceptance of the in place geotextile has been given based upon the performance testing for puncture and permeability.

316

QA/QC has performed many nuclear moisture/density tests on the buttress fill. All areas have passed, and those which have not were immediately reworked and retested until passing results were achieved.

Survey continued to as-built the project as the project progresses. As-builts have been completed on the drainrock, subgrade 1 & 2, density test locations, patch repairs to the geotextile and a portion of the western diversion channel.

Quality Control Item	QA/QC Item	QC Action	QA Action	Total QC Tests Taken	Total QA Tests Taken	Total Material Placed
Regrade & Cover Material	Sampling Atterberg Limits- (ASTM D 4318); Gradation- ASTM D 422 ASTM D 5519	1/6,500 cy	1 per 20 QC	8 Regrade Including: 4 RFA 4 Pit Fines 2 Cover (RFA)	2	62,940 cy
Buttress Fill Material	Field Density ASTM D 2922	1/5,000 sqft/lift	1 per 20 QC	195 (+ Retests)	10 All of which passed	980,000 sqft/lift
	Field Density Verification ASTM D 1556 ASTM D 2167	1 per 20 Field Density Test	N/A	10	1	34,320 cy
	Sampling; Atterberg Limits- (ASTM D 4318); Gradation- ASTM D 422 ASTM D 5519 Standard Proctor- ASTM D 698	1/6,500 cy	1 per 20 QC	8	2	34,320 cy
Drain Rock	Sampling Gradation- ASTM D 136 ASTM D 5519	1/6,500 cy	1 per 20 QC	4	1	9,000 cy
Geotextile	Sampling ASTM D 5261	1/100,000 sqft	1 per 20 QC	N/A	5	153,000 sqft

Nonconformance Materials or Work

None

Follow Up Retests and Inspections

Daily retests of reworked buttress fill

Record Surveys

Record surveys have performed on the base of the buttress fill.

7-6-05

Ryan Woodruff, SQAM
Tetra Tech

Date

7/6/05

John H. Rahe, P.E., CQAE
Tetra Tech

Date

Distribution:

CQAE (John Rahe)
CTR (Bob Davis)
EPA
CDPHE

317

MONTHLY DATA SUMMARY NUMBER 3
June 6, 2005 THROUGH August 2, 2005
CONSTRUCTION QUALITY ASSURANCE
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
GOLDEN, COLORADO

Introduction

TetraTech has prepared this monthly summary of Construction Quality Control (CQC) and Quality Assurance (CQA) data testing performed for construction of the original landfill closure from July 6, 2005 through August 2, 2005. This monthly report summarizes the testing data and surveying activities for the Original Landfill (OLF) cover construction and all related activities for the construction of the OLF Accelerated Action.

Tetra Tech is the on-site CQA Engineer (CQAE) providing CQA services as a subcontractor to the Rocky Flats Contractor Kaiser-Hill Company, LLC (K-H). Earth Tech is the design engineer for the OLF contracted by Kaiser-Hill Company. The construction subcontractor is Envirocon Inc. The Program Management Contractor (PMC) team is providing the CQC services for the OLF. The PMC team consists of Envirocon Inc, Flatirons Surveying and Golder Associates, Inc. Golder Associates of Denver is performing the CQC services. Advanced Terra Testing Inc. of Lakewood, Colorado is Performing CQA laboratory testing services for soils. Flatirons Surveying Inc. of Boulder, Colorado is the subcontractor's surveyor.

Test Data Summary

QC performed index testing on the cover soil and buttress fill material and triaxial tests were performed on the Pioneer Pits Fines, while QA collected one sample for index testing for the buttress fill.

Pioneer Pit Fines were approved for use as buttress fill. Although the pit fines had failing gradation results the triaxial test results indicated that the soil had adequate strength parameters that would meet the design intent of the buttress.

QA/QC completed the nuclear moisture/density tests on the buttress fill. All areas have passed, and those which have not were immediately reworked and retested until passing results were achieved. QC performed a total of 280 nuclear density tests along with 14 sandcones, while QA performed a total of 14 nuclear density tests along with 1 sandcone.

Survey continued the record drawings for the project. Record drawings have been completed on the drainrock, subgrade 1 & 2, density test locations, patch repairs to the geotextile and the majority of the final grade.

318

Quality Control Item	QA/QC Item	QC Action	QA Action	Total QC Tests Taken	Total QA Tests Taken	Total Material Placed
Regrade & Cover Material	Atterberg Limits- *(ASTM D 4318);*	1/6,500 cy	1 per 20 QC	8 Regrade Including: 4 RFA 4 Pit Fines 8 Cover (RFA)	2 Regrade Including: 1 RFA 1 Pit Fines	22,000 cy RFA Regrade 22,000 cy Pioneer Regrade 46,000 cy RFA Cover Soil
	Sieve Analysis (with USCS Classification) *ASTM D 422* *ASTM D 5519*	1/6,500 cy	1 per 20 QC	8 Regrade Including: 4 RFA 4 Pit Fines 2 Cover (RFA)	2 Regrade Including: 1 RFA 1 Pit Fines	22,000 cy RFA Regrade 22,000 cy Pioneer Regrade 46,000 cy RFA Cover Soil
Buttress Fill Material	Field Density *ASTM D 2922*	1/5,000 sqft/lift	1 per 20 QC	280 (+ Retests)	14 All of which passed	1,400,000 sqft/lift
	Field Density Verification ASTM D 1556 ASTM D 2167	1 per 20 Field Density Test	N/A	14	1	1,400,000 sqft/lift
	Atterberg Limits *ASTM D 4318*	1/6,500 cy	1 per 20 QC	9	3	51,862 cy
	Sieve Analysis (with USCS Classification) *ASTM D 422* *ASTM D 5519*	1/6,500 cy	1 per 20 QC	9	3	51,862 cy
	Standard Proctor- *ASTM D 698*	1/6,500 cy	1 per 20 QC	9	3	51,862 cy
Drain Rock	Sieve Analysis (with USCS Classification) *ASTM D 136* *ASTM D 5519*	1/6,500 cy	1 per 20 QC	4	1	9,000 cy
Geotextile	Unit Weight ASTM D 5261	1/100,000 sqft	1 per 20 QC	N/A	5	153,000 sqft

Nonconformance Materials or Work

None

Follow Up Retests and Inspections

Daily retests of reworked buttress fill

Record Surveys

Record surveys have performed on the base of the buttress fill.

Ryan Woodruff, SQAM
Tetra Tech

8-2-05
Date

John H. Rahe, P.E., CQAE
Tetra Tech

8/2/05
Date

Distribution:

CQAE (John Rahe)
CTR (Bob Davis)
EPA
CDPHE

319

APPENDIX G-4: QA FIELD AND LABORATORY TESTING

320

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

321

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

Mr. Bruce Marshall
Tetra Tech - RMC
1900 S. Sunset Street, Suite 1-F
Longmont, CO 80501

June 28, 2005

RE: RFETS-OLF Construction QA
Project #19-4886.002.00

Thank you for choosing Advanced Terra Testing, Inc. for your geosynthetic testing needs.

Per your request, we have completed the analyses pertinent to the recent testing campaign relative to the above referenced project. The following is a table providing a summary of the various conformance testing.

Mass/Unit Area - ASTM D 6566 & ASTM D 5261

Specimen ID	Mass/Unit Area (gms/m^2)	Mass/Unit Area ($oz/^{yd^2}$)
NG0986659 (Non-Woven G.T.)	286.7	8.5
2.41487 (Non-Woven G.T.)	270.9	8.0
NG0986659 (Non-Woven G.T.) Re-Test	258.9	7.6
2.41487 (Non-Woven G.T.) Re-Test	249.2	7.3
1.76780 (Non-Woven G.T.)	277.7	8.2

Rod Puncture - ASTM D 4833

Specimen ID	Puncture (lbs)
NG0986659 (Non-Woven G.T.)	125.7
2.41487 (Non-Woven G.T.)	121.9
NG0986659 (Non-Woven G.T.) Re-Test	110.1
2.41487 (Non-Woven G.T.) Re-Test	123.9
1.76780 (Non-Woven G.T.)	124.9

Water Permeability of Geotextiles by Permittivity - ASTM D 4491

Specimen ID	Permittivity ($sec.^{-1}$)	Permeability (cm./sec.)	Flow Rate ($gpm/ft.^2$)
NG0986659 (Non-Woven G.T.)	2.13	0.38	159
2.41487 (Non-Woven G.T.)	2.01	0.39	150
NG0986659 (Non-Woven G.T.) Re-Test	2.35	0.36	175
2.41487 (Non-Woven G.T.) Re-Test	2.02	0.34	151

K:\TT2617\TTFI0605.lwp

322

Apparent Opening Size - ASTM D 4751

Specimen ID	(U.S. standard sieve size)	(mm)
NG0986659 (Non-Woven G.T.)	100-140	0.150
2.41487 (Non-Woven G.T.)	100-140	0.147
NG0986659 (Non-Woven G.T.) Re-Test	70-100	0.165
2.41487 (Non-Woven G.T.) Re-Test	100-140	0.148

DHL shipping had lost original samples shipped to Precision Labs for the Permeability and Apparent Opening Size. Therfore, it was neccessary to resubmit the samples. You will not be charged for any standards that were re-tested.

Should you have any questions or require additional information please, feel free to give us call.

Sincerley,

Sharon Roberts

Sharon Roberts
Geosynthetic Division Manager

K:\TT2617\TTFI0605.lwp

MASS/UNIT AREA (GEOTEXTILE)
ASTM D 5261

CLIENT: Tetra Tech-RMC **JOB NO.:** 2617-11
LOCATION: Rocky Flats ULF **PROJECT:**

ROLL NO.	NG0986659	NG0986659	NG0986659	NG0986659	NG0986659
LOT NO.					
SAMPLE NO.	1	2	3	4	5
ROLL IDENTIFICATION					
DATE TESTED	06-09-05 SKL	06-09-05 SKL	06-09-05 SKL	06-09-05 SKL	06-09-05 SKL
SAMPLE DESCRIPTION	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.
MASS/UNIT AREA DETERMINATIONS					
Sample Length (in)	7.990	8.010	7.980	8.060	8.020
Sample Width (in)	4.030	3.990	4.020	4.060	4.040
Sample Area (cm²)	207.74	206.19	206.96	211.12	209.04
Mass/Unit Area (gms/m²)	327.8	260.4	252.7	333.5	259.3
Mass of Sample (gms)	6.81	5.37	5.23	7.04	5.42

Average Mass/Unit Area (5 Samples) (gms/m²) **286.7**
Average Mass/Unit Area (5 Samples) (oz/yd²) **8.5**

ROLL NO.	2.41487	2.41487	2.41487	2.41487	2.41487
LOT NO.					
SAMPLE NO.	1	2	3	4	5
ROLL IDENTIFICATION					
DATE TESTED	06-09-05 SKL	06-09-05 SKL	06-09-05 SKL	06-09-05 SKL	06-09-05 SKL
SAMPLE DESCRIPTION	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.
MASS/UNIT AREA DETERMINATIONS					
Sample Length (in)	8.010	8.010	7.990	8.010	7.980
Sample Width (in)	3.960	4.010	3.980	3.970	3.960
Sample Area (cm²)	204.64	207.23	205.16	205.16	203.88
Mass/Unit Area (gms/m²)	265.8	246.1	263.2	289.5	289.9
Mass of Sample (gms)	5.44	5.10	5.40	5.94	5.91

Average Mass/Unit Area (5 Samples) (gms/m²) **270.9**
Average Mass/Unit Area (5 Samples) (oz/yd²) **8.0**

Data entered by: SR Date: 06/09/2005
Data checked by: SRL Date: 6/9/05
FileName: TTMANG24 ADVANCED TERRA TESTING, INC.

323

MASS/UNIT AREA (GEOTEXTILE)
ASTM D 5261

CLIENT: Tetra Tech-RMC **JOB NO.:** 2617-11
LOCATION: Rocky Flats ULF **PROJECT:**

ROLL NO.	NG0986659	NG0986659	NG0986659	NG0986659	NG0986659
DATE SAMPLED	06-14-05 RW	06-14-05 RW	06-14-05 RW	06-14-05 RW	06-14-05 RW
SAMPLE NO.	1	2	3	4	5
ROLL IDENTIFICATION	Re-Test	Re-Test	Re-Test	Re-Test	Re-Test
DATE TESTED	06-16-05 JTR	06-16-05 JTR	06-16-05 JTR	06-16-05 JTR	06-16-05 JTR
SAMPLE DESCRIPTION	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.
MASS/UNIT AREA DETERMINATIONS					
Sample Length (in)	7.980	8.000	7.970	7.980	8.000
Sample Width (in)	4.000	3.980	4.000	3.970	4.000
Sample Area (cm²)	205.94	205.42	205.68	204.39	206.45
Mass/Unit Area (gms/m²)	278.2	257.5	256.7	246.6	255.3
Mass of Sample (gms)	5.73	5.29	5.28	5.04	5.27

Average Mass/Unit Area (5 Samples) (gms/m²) **258.9**
Average Mass/Unit Area (5 Samples) (oz/yd²) **7.6**

ROLL NO.	2.41487	2.41487	2.41487	2.41487	2.41487
DATE SAMPLED	06-14-05 RW	06-14-05 RW	06-14-05 RW	06-14-05 RW	06-14-05 RW
SAMPLE NO.	1	2	3	4	5
ROLL IDENTIFICATION	Re-Test	Re-Test	Re-Test	Re-Test	Re-Test
DATE TESTED	06-16-05 JTR	06-16-05 JTR	06-16-05 JTR	06-16-05 JTR	06-16-05 JTR
SAMPLE DESCRIPTION	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.	Non-Woven G.T.
MASS/UNIT AREA DETERMINATIONS					
Sample Length (in)	7.990	8.000	8.000	7.970	8.000
Sample Width (in)	3.990	3.980	3.970	4.000	4.000
Sample Area (cm²)	205.68	205.42	204.90	205.68	206.45
Mass/Unit Area (gms/m²)	247.0	228.3	244.0	253.3	273.2
Mass of Sample (gms)	5.08	4.69	5.00	5.21	5.64

Average Mass/Unit Area (5 Samples) (gms/m²) **249.2**
Average Mass/Unit Area (5 Samples) (oz/yd²) **7.3**

Data entered by: SR Date: 06/16/2005
Data checked by: JTR Date: 6/21/05
FileName: TTMANG2R

ADVANCED TERRA TESTING, INC.

MASS/UNIT AREA (GEOTEXTILE)
ASTM D 5261

CLIENT: Tetra Tech-RMC **JOB NO.:** 2617-11

ROLL NO.	1.76780	1.76780	1.76780	1.76780	1.76780
LOT NO.					
SAMPLE NO.	1	2	3	4	5
ROLL IDENTIFICATION					
DATE TESTED	06-24-05 JTR	06-24-05 JTR	06-24-05 JTR	06-24-05 JTR	06-24-05 JTR
SAMPLE DESCRIPTION					
MASS/UNIT AREA DETERMINATIONS					
Sample Length (in)	7.990	7.990	7.960	7.950	7.960
Sample Width (in)	4.000	4.000	3.980	3.990	4.000
Sample Area (cm^2)	206.19	206.19	204.39	204.65	205.42
Mass/Unit Area (gms/m^2)	251.7	270.6	292.1	270.7	303.3
Mass of Sample (gms)	5.19	5.58	5.97	5.54	6.23

Average Mass/Unit Area (5 Samples) (gms/m^2)	**277.7**
Average Mass/Unit Area (5 Samples) (oz/yd^2)	**8.2**

Data entered by: SR Date: 06/24/2005
Data checked by: JTR Date: 6/24/05
FileName: TTMA1767 ADVANCED TERRA TESTING, INC.

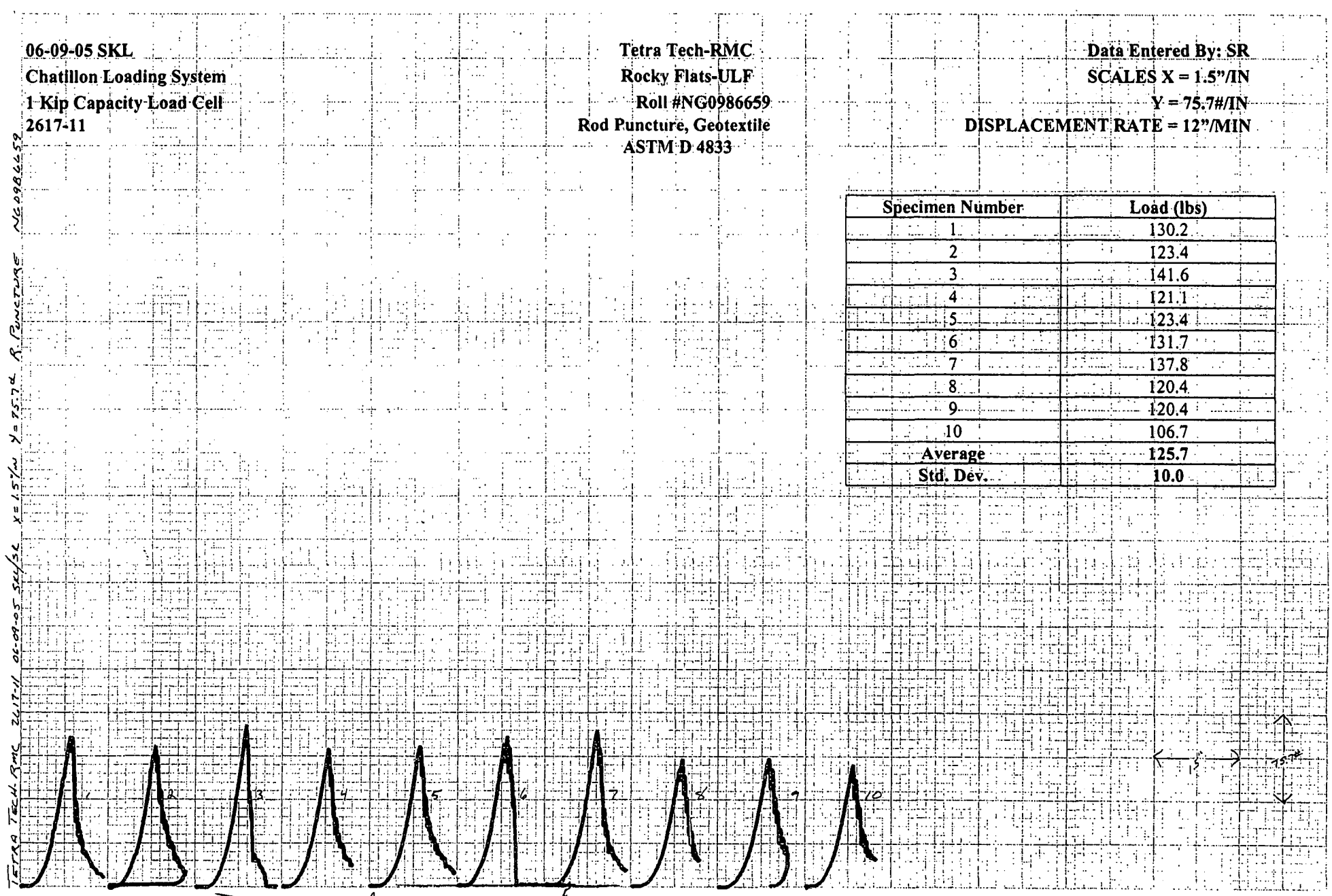
324

06-09-05 SKL
Chatillon Loading System
1 Kip Capacity Load Cell
2617-11

Tetra Tech-RMC
Rocky Flats-ULF
Roll #NG0986659
Rod Puncture, Geotextile
ASTM D 4833

Data Entered By: SR
SCALES X = 1.5"/IN
Y = 75.7#/IN
DISPLACEMENT RATE = 12"/MIN

Specimen Number	Load (lbs)
1	130.2
2	123.4
3	141.6
4	121.1
5	123.4
6	131.7
7	137.8
8	120.4
9	120.4
10	106.7
Average	**125.7**
Std. Dev.	**10.0**



Data Checked By: SKL Date: 6/9/05
Filename: K:/TT2617/TTRPNG09.lwp

ADVANCED TERRA TESTING, inc

325

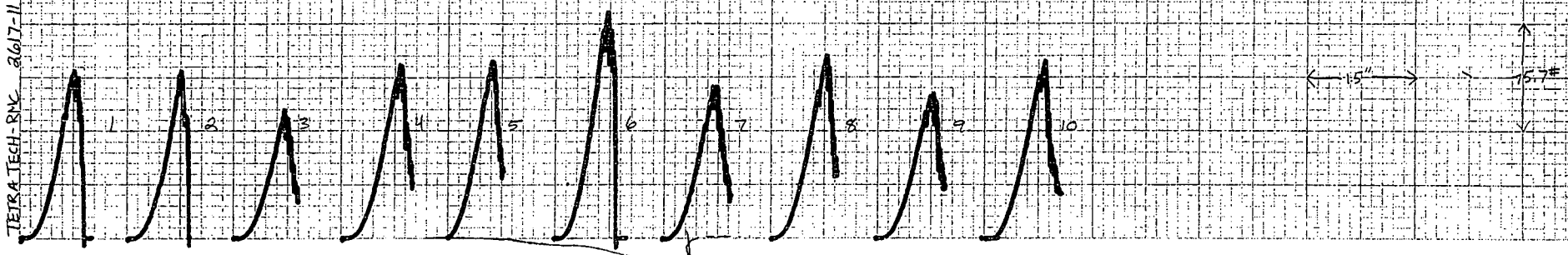
06-09-05 SKL
Chatillon Loading System
1 Kip Capacity Load Cell
2617-11

Tetra Tech-RMC
Rocky Flats-ULF
Roll #2.41487
Rod Puncture, Geotextile
ASTM D 4833

Data Entered By: SR
SCALES X = 1.5"/IN
Y = 75.7#/IN
DISPLACEMENT RATE = 12"/MIN

Specimen Number	Load (lbs)
1	120.4
2	120.4
3	92.4
4	123.4
5	126.0
6	161.2
7	108.3
8	130.2
9	103.7
10	127.2
Average	**121.9**
Std. Dev.	**17.9**

TETRA TECH-RMC 2617-11 6-09-05 SK/SR X=1.5"/IN Y=75.7# R. PUNCTURE 2.41487



Data Checked By: SKL Date: 6/9/05
Filename: K:/TT2617/TTRP2414.lwp

ADVANCED TERRA TESTING, inc

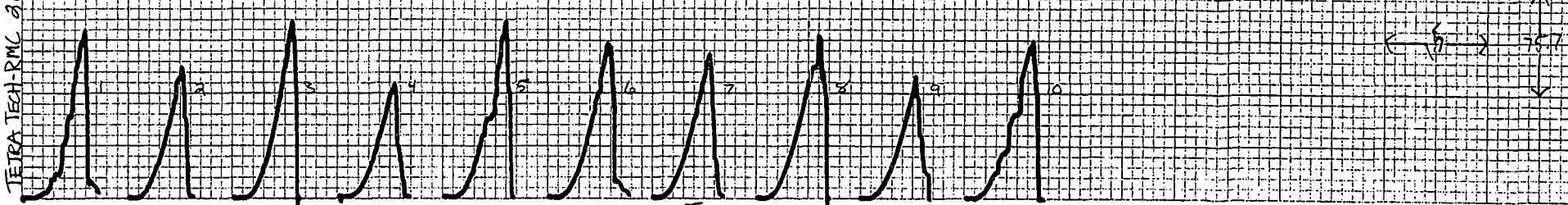
06-21-05 SKL
Chatillon Loading System
1 Kip Capacity Load Cell
2617-11

Tetra Tech-RMC
Rocky Flats-ULF
Roll #NG0986659 (RE-TEST)
Rod Puncture; Geotextile
ASTM D 4833

Data Entered By: SR
SCALES X = 1.5"/IN
Y = 75.7#/IN
DISPLACEMENT RATE = 12"/MIN

Specimen Number	Load (lbs)
1	122.6
2	95.4
3	128.7
4	84.0
5	128.7
6	113.6
7	105.6
8	118.9
9	89.3
10	114.3
Average	110.1
Std. Dev.	16.0

TETRA TECH-RMC 2617-11 6-21-05 SKL NG0986659 X=1.5"/min Y=75.7# R. PUNCTURE



Data Checked By: JTR Date: 6/21/05
Filename: K:/TT2617/TTRPNG0.lwp

ADVANCED TERRA TESTING, Inc

06-21-05 SKL
Chatillon Loading System
1 Kip Capacity Load Cell
2617-11

Tetra Tech-RMC
Rocky Flats-ULF
Roll #2.41487 (RE-TEST)
Rod Puncture, Geotextile
ASTM D 4833

Data Entered By: SR
SCALES X = 1.5"/IN
Y = 75.7#/IN
DISPLACEMENT RATE = 12"/MIN

Specimen Number	Load (lbs)
1	140.8
2	123.4
3	146.9
4	122.6
5	106.7
6	127.2
7	119.6
8	113.6
9	109.0
10	128.7
Average	123.9
Std. Dev.	12.9

Data Checked By: JTR Date: 6/21/05
Filename: K:/TT2617/TTRP414.lwp

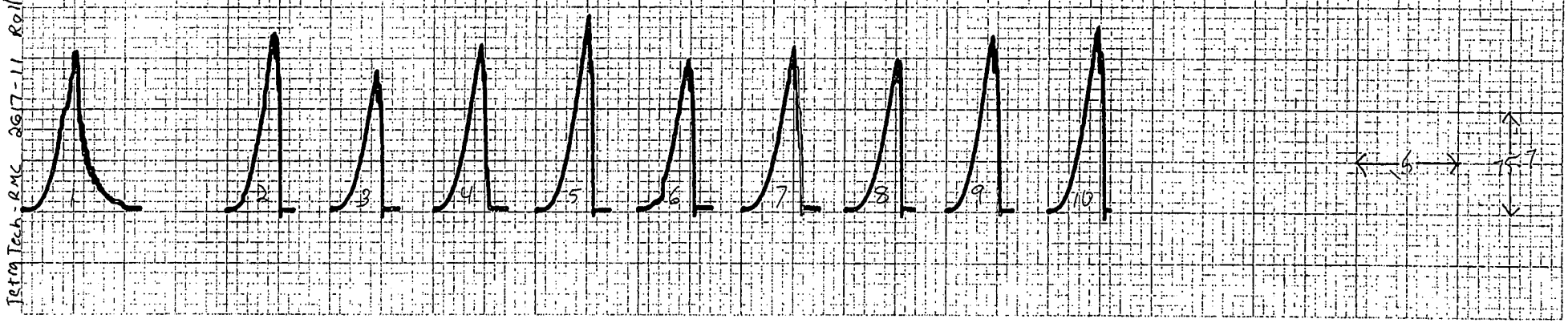
ADVANCED TERRA TESTING, Inc

06-24-05 JTR
Chatillon Loading System
1 Kip Capacity Load Cell
2617-11

Tetra Tech-RMC
Roll #1.76780
Rod Puncture, Geotextile
ASTM D 4833

Data Entered By: SR
SCALES X = 1.5"/IN
Y = 75.7#/IN
DISPLACEMENT RATE = 12"/MIN

Specimen Number	Load (lbs)
1	119.6
2	133.2
3	106.0
4	124.1
5	146.1
6	113.6
7	122.6
8	113.6
9	131.7
10	138.5
Average	**124.9**
Std. Dev.	**12.5**



Tetra Tech-RMC 2617-11 Roll # 1.76780 ASTM D4833 Rod Puncture X=1.5"/in Y=75.7#/in

JTR 6/24/05

Data Checked By: JTR Date: 6/24/05
Filename: K:/TT2617/TTRP1767.lwp

ADVANCED TERRA TESTING, inc

ISO 9001 - 2000

Precision Geosynthetic Laboratories

CLIENT: ADVANCED TERRA TESTING INC.
PROJECT: *RFETS Off Construction QA 2617-11*

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G050522)

MATERIAL DESCRIPTION: Nonwoven Geotextile

SAMPLE(S) SENT BY: Advanced Terra Testing Inc.

DATE RECEIVED: June 16, 2005 **DATE REPORTED:** June 17, 2005

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
R#NG0986659	09319
R#241487	09320

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D4491	Permeability/Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Table(s) 1 & 2. The units in which the data are reported are included on these tables.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP
Initials: ME #: 013
Date: 6/15/05

Maria Espitia
Quality Assurance

Cora B. Queja
Vice President

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637
DC#2000 Record#281

ISO 9001 - 2000

Precision Geosynthetic Laboratories

June 17, 2005

Sharon Roberts
ADVANCED TERRA TESTING INC.
833 Parfet Street
Lakewood, CO 80215

Dear Ms. Roberts: ***RE: RFETS Olf Construction QA 2617-11***

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of two (2) Nonwoven Geotextile sample(s) received June 16, 2005.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence, not to be reproduced except in full and disclosed to other parties with the authorization of the client.

It is a company policy to keep the physical records of each job for 2 years since the receipt of the samples and keep the electronic file for 7 years. ***Failed seam samples are kept for 7 years; good seam samples are disposed after 2 weeks and conformance samples are disposed after 1 month.*** Should you need us to keep them longer, please advise us in writing.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Maria Espitia
Quality Assurance

Cora B. Queja
Vice President

Enclosure: (Job No. G050522)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637
DC#2000 Record#281

327

328

TABLE

MATERIAL PROPERTIES

CLIENT: ADVANCED TERRA TESTING

PROJECT: RFETS Olf Construction QA 2617-11

Date Received: **6/16/2005**
Date Reported: **6/17/2005**
Client Sample ID: **R#NG0986659**
Material Description: **Non-woven Geotextile**

QC'd By: ME
PGL Job No.: **G050522**
PGL Control No.: **9319**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs.
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Specimens were tested as directed in Test Method D4491 using the Constant Head method.*															
		2.32	2.51	2.32	2.23							2.35	0.12	2.23	2.51	
	Permeability (cm./ sec.)															
		0.37	0.35	0.35	0.37							0.36	0.01	0.35	0.37	
	Flow Rate (gpm/ ft.^{2})															
		174	188	173	168							175	9	166	188	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															
		70-100	70-100	70-100	70-100	70-100						70-100	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															
		0.161	0.170	0.159	0.152	0.183						0.165	0.012	0.152	0.183	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1991 Record#272

Precision Geosynthetic Laboratories

TABLE 2.

MATERIAL PROPERTIES

CLIENT: Advanced Terra Testing

PROJECT: RFETS Olf Construction QA 2617-11

Date Received: **6/16/2005**
Date Reported: **6/17/2005**
Client Sample ID: **R#241487**
Material Description: **Non-woven Geotextile**

QC'd By: ME
PGL Job No.: **G050522**
PGL Control No.: **9320**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs.
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Specimens were tested as directed in Test Method D4491 using the Constant Head method.*															
		2.08	1.95	1.91	2.14							2.02	0.10	1.91	2.14	
	Permeability (cm./ sec.)															
		0.34	0.34	0.34	0.33							0.34	0.01	0.33	0.34	
	Flow Rate (gpm/ ft.^{2})															
		154	146	143	160							151	8	143	160	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															
		100-140	100-140	100-140	100-140	100-140						100-140	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751. Type of sieve shaker used is W.S. Tyler Rotap.															
		0.144	0.147	0.149	0.149	0.149						0.148	0.002	0.144	0.149	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1991 Record#272

Precision Geosynthetic Laboratories

ISO 9001 - 2000

Precision Geosynthetic Laboratories

June 23, 2005

Sharon Roberts
ADVANCED TERRA TESTING INC.
833 Parfet Street
Lakewood, CO 80215

Dear Ms. Roberts: ***RE: Rocky Flats ULF – Proj #2617-11***

Thank you for consulting Precision Geosynthetic Laboratories for your material testing needs.

Enclosed is the ***final*** laboratory report for the testing of two (2) Nonwoven Geotextile sample(s) received June 21, 2005.

It should be noted that the test specimen and test sample used for this report was believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practice as well as the test method listed. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the final use and purpose of the material.

By accepting the data and results represented on this report, Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims arising out of the use of this data to the cost for the respective test(s) represented in this report, and Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liability in excess of the aforementioned limit.

The test data and all associated project information shall be held in confidence, not to be reproduced except in full and disclosed to other parties with the authorization of the client.

It is a company policy to keep the physical records of each job for 2 years since the receipt of the samples and keep the electronic file for 7 years. ***Failed seam samples are kept for 7 years; good seam samples are disposed after 2 weeks and conformance samples are disposed after 1 month.*** Should you need us to keep them longer, please advise us in writing.

If you have any questions or if we may be of further service, please do not hesitate to call at 800-522-4599.

Sincerely,

PRECISION GEOSYNTHETIC LABORATORIES

Maria Espitia
Quality Assurance

Cora B. Queja
Vice President

Enclosure: (Job No. G050544)

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637
DC#2000 Record#281

329

ISO 9001 - 2000

Precision Geosynthetic Laboratories

CLIENT: ADVANCED TERRA TESTING INC.
PROJECT: ***Rocky Flats ULF – Proj # 2617-11***

VERIFICATION OF MATERIAL PROPERTIES
(PGL Job No. G050544)

MATERIAL DESCRIPTION: Nonwoven Geotextile

SAMPLE(S) SENT BY: Advanced Terra Testing Inc.

DATE RECEIVED: June 21, 2005 **DATE REPORTED:** June 23, 2005

SAMPLE IDENTIFICATIONS:

SAMPLE ID	PRECISION CONTROL NUMBER
R#241487	09394
R#NG0986659	09395

TESTS REQUIRED:

TEST METHOD	DESCRIPTION
ASTM D4491	Permeability/Permittivity
ASTM D4751	Apparent Opening Size

TEST CONDITIONS: The samples were conditioned for a minimum one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

TEST RESULTS:

The test results are summarized in Table(s) 1 & 2. The units in which the data are reported are included on these tables.

PRECISION GEOSYNTHETIC LABORATORIES

GAI-LAP
Initials: [illegible]
Date: [illegible]

Maria Espitia
Quality Assurance

Cora B. Queja
Vice President

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637
DC#2000 Record#281

330

TABLE

MATERIAL PROPERTIES

CLIENT: ADVANCED TERRA TESTING

PROJECT: ROCKY FLATS ULF Proj #2617-11

Date Received: **6/21/05**
Date Reported: **6/23/05**
Client Sample ID: **R#241487**
Material Description: **Non-woven Geotextile**

QC'd By: ME
PGL Job No.: **G050544**
PGL Control No.: **9394**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs.
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Specimens were tested as directed in Test Method D4491 using the Constant Head method.*															
		2.01	1.93	2.03	2.05							2.01	0.05	1.93	2.05	
	Permeability (cm./ sec.)															
		0.39	0.38	0.39	0.39							0.39	0.00	0.38	0.39	
	Flow Rate (gpm/ ft.^{2})															
		151	145	151	153							150	4	145	153	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		100-140	100-140	100-140	100-140	100-140						100-140	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.147	0.147	0.146	0.147	0.149						0.147	0.001	0.146	0.149	

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION
DC#1991 Record#272

TABLE 2.

MATERIAL PROPERTIES

CLIENT: ADVANCED TERRA TESTING

PROJECT: ROCKY FLATS ULF Proj #2617-11

Date Received: **6/21/05**
Date Reported: **6/23/05**
Client Sample ID: **R#NG0986659**
Material Description: **Non-woven Geotextile**

QC'd By: ME
PGL Job No.: **G050544**
PGL Control No.: **9395**

METHOD	DESCRIPTION	SPECIMENS 1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Proj. Specs.
ASTM D4491	Permittivity (sec.$^{-1}$)															
Constant Head	*Specimens were tested as directed in Test Method D4491 using the Constant Head method.*															
		2.16	2.22	2.04	2.08							2.13	0.08	2.04	2.22	
	Permeability (cm./ sec.)															
		0.37	0.37	0.39	0.40							0.38	0.01	0.37	0.40	
	Flow Rate (gpm/ ft.^{2})															
		162	166	153	155							159	6	153	166	
ASTM D4751	Apparent Opening Size (U.S. standard sieve size)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		100-140	100-140	100-140	100-140	100-140						100-140	N/A	N/A	N/A	
ASTM D4751	Apparent Opening Size (mm)															
	Specimens were tested as directed in Test Method D4751.Type of sieve shaker used is W.S. Tyler Rotap.															
		0.150	0.149	0.150	0.150	0.150						0.150	0.000	0.149	0.150	

MD - MACHINE DIRECTION
TD - TRA[illegible]ERSE DIRECTION
DC#199[illegible]rd#272

SAMPLE QA-DR-01

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

331

GRAIN SIZE ANALYSIS

3 Inch to #200 Sieve

ASTM D 422

332

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D-422

CLIENT Tetra Tech-RMC

JOB NO. 2617-13

BORING NO.
DEPTH
SAMPLE NO. QA-DR-01
SOIL DESCR. Gravel
LOCATION Project #19-4886.002.00
Old Landfill

SAMPLED
DATE TESTED 06-17-05 RS
WASH SIEVE Yes
DRY SIEVE No

WASH SIEVE ANALYSIS

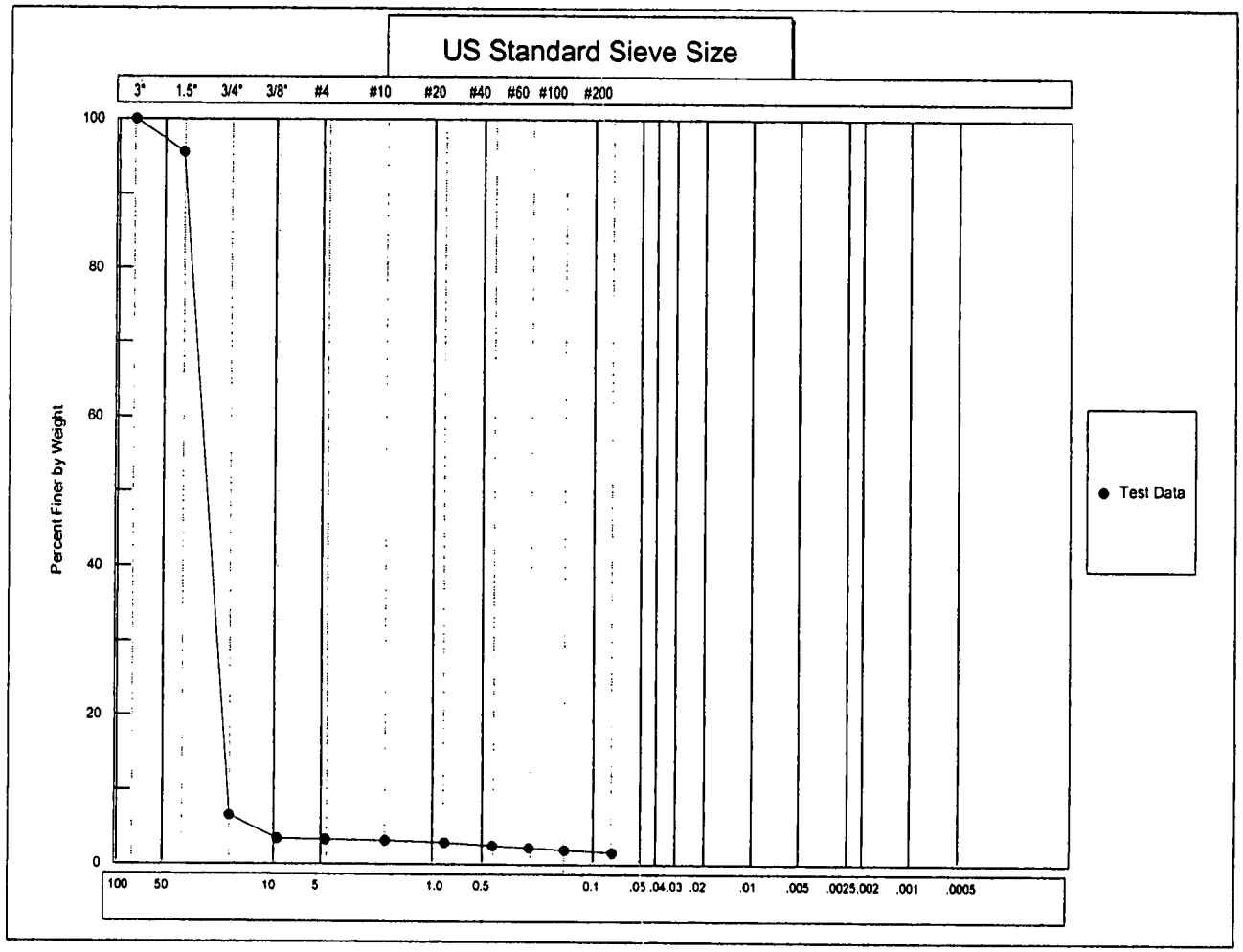
Wt. Wet Soil & Pan Before Washing (g)	3487.4
Wt. Dry Soil & Pan Before Washing (g)	3476.0
Weight of Pan (g)	34.8
Wt. of Dry Soil Before Washing	3441.3
Wt. Dry Soil & Pan After Washing (g)	3421.6
Wt. of Dry Soil After Washing (g)	3386.9
-#200 Wash. Out %	1.6

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	3.62	157.31	153.69	153.69	4.5	95.5
3/4"	34.75	3098.90	3064.15	3217.84	93.5	6.5
3/8"	3.71	111.46	107.75	3325.59	96.6	3.4
#4	2.38	5.16	2.78	3328.37	96.7	3.3
#10	2.28	5.92	3.64	3332.01	96.8	3.2
#20	2.37	11.64	9.27	3341.28	97.1	2.9
#40	2.35	16.81	14.46	3355.74	97.5	2.5
#60	2.36	12.56	10.20	3365.94	97.8	2.2
#100	2.32	12.00	9.68	3375.62	98.1	1.9
#200	3.69	14.95	11.26	3386.88	98.4	1.6

Data entered by: SR Date: 06/20/2005
Data checked by: RS Date: 6/20/05
FileName: TTS0GRAV

ADVANCED TERRA TESTING, INC.

333



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Tetra Tech-RMC
Job Number: 2617-13
Classification_____

Boring No.: QA-DR-01
Depth:

Sample No.: Gravel

Advanced Terra Testing, Inc.

PERMEABILITY - CONSTANT HEAD
ASTM D 2434

334

PERMEABILITY - CONSTANT HEAD
ASTM D 2434

CLIENT	Tetra Tech-RMC	JOB NO.	2617-13
BORING NO.	Gravel QA-OR-01	SAMPLED	
DEPTH		TEST STARTED	06-20-05 DPM
SAMPLE NO.		TEST FINISHED	06-20-05 DPM
SOIL DESCR.	Project #19-4886.002.00	SETUP DESCR.	12" Cell
LOCATION	Old Landfill	SURCHARGE (psf)	100
NOTES			

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Wet Soil & Pan (g)	22544.0	30369.0
Wt. Wet Soil (g)	21318.6	29143.6
Wt. Dry Soil & Pan (g)	22474.0	22474.0
Wt. Lost Moisture (g)	70.0	7895.0
Wt. of Pan Only (g)	1225.4	1225.4
Wt. of Dry Soil (g)	21248.6	21248.6
Moisture Content %	0.3	37.2
Wt. of Entire Sample (g)	21318.00	29143.00
Wt. of Entire Sample (lb)	47.00	64.25
Wet Density PCF	82.0	113.3
Dry Density PCF	81.7	82.6

Sample Diameter	30.175	cm	11.880	in
Initial Height	22.708	cm	8.940	in
Final Height	22.454	cm	8.840	in
Sample Area	715.139	sq. cm	110.847	sq. in

Porosity (%)	49.166
Temperature (C)	19.6
Temperature Correction	1.006

TRIAL 1

HEAD cm.	ELAPSED TIME min.	sec.	VOLUME cc	PERCOLATION RATE DETERMINATIONS k @ Test Temp. cm/sec	k @ 20 deg C cm/sec
3.18	1.15	69	18119	2.6E+00	2.6E+00
	1.15	69	14322	2.1E+00	2.1E+00
	1.15	69	13714	2.0E+00	2.0E+00
	1.15	69	13484	1.9E+00	1.9E+00
	1.15	69	13820	2.0E+00	2.0E+00
Average of values					**2.1E+00**

Data Entered By: SR Date: 06/22/2005
Date Checked By: RB Date: 6/22/05
Filename: TTCHGRAV

ADVANCED TERRA TESTING, INC.

335

PERMEABILITY - CONSTANT HEAD
ASTM D 2434

CLIENT	Tetra Tech-RMC	JOB NO.	2617-13
BORING NO.	Gravel QA-DR-01	SAMPLED	
DEPTH		TEST STARTED	06-20-05 DPM
SAMPLE NO.		TEST FINISHED	06-20-05 DPM
SOIL DESCR.	Project #19-4886.002.00	SETUP DESCR.	12" Cell
LOCATION	Old Landfill	SURCHARGE (psf)	100
NOTES			

Sample Diameter	30.175	cm	11.880	in
Initial Height	22.454	cm	8.840	in
Final Height	22.454	cm	8.840	in
Sample Area	715.139	sq. cm	110.847	sq. in

	BEFORE TEST	AFTER TEST
Wet Density PCF	82.9	113.3
Dry Density PCF	82.6	82.6
Porosity (%)	49.166	
Temperature (C)	19.6	
Temperature Correction	1.006	

TRIAL 2

HEAD cm.	ELAPSED TIME min.	sec.	VOLUME cc	PERCOLATION RATE DETERMINATIONS k @ Test Temp. cm/sec	k @ 20 deg C cm/sec
4.24	0.75	45	15580	2.6E+00	2.6E+00
	0.75	45	15812	2.6E+00	2.6E+00
	0.75	45	15874	2.6E+00	2.6E+00

Average of values **2.6E+00**

Data Entered By: SR Date: 06/22/2005
Date Checked By: RB Date: 6/22/05
Filename: TTCHGRAV

ADVANCED TERRA TESTING, INC.

PERMEABILITY - CONSTANT HEAD
ASTM D 2434

CLIENT	Tetra Tech-RMC	JOB NO.	2617-13
BORING NO.	Gravel QA-DR-01	SAMPLED	
DEPTH		TEST STARTED	06-20-05 DPM
SAMPLE NO.		TEST FINISHED	06-20-05 DPM
SOIL DESCR.	Project #19-4886.002.00	SETUP DESCR.	12" Cell
LOCATION	Old Landfill	SURCHARGE (psf)	100
NOTES			

Sample Diameter	30.175	cm	11.880	in
Initial Height	22.454	cm	8.840	in
Final Height	22.454	cm	8.840	in
Sample Area	715.139	sq. cm	110.847	sq. in

	BEFORE TEST	AFTER TEST
Wet Density PCF	82.9	113.3
Dry Density PCF	82.6	82.6
Porosity (%)	49.166	
Temperature (C)	19.6	
Temperature Correction	1.006	

TRIAL 3

HEAD cm.	ELAPSED TIME min.	sec.	VOLUME cc	PERCOLATION RATE DETERMINATIONS k @ Test Temp. cm/sec	k @ 20 deg C cm/sec
2.29	1.75	105	14281	1.9E+00	1.9E+00
	1.75	105	14216	1.9E+00	1.9E+00
	1.75	105	14108	1.8E+00	1.9E+00
Average of values					**1.9E+00**

Data Entered By: SR Date: 06/22/2005
Date Checked By: RD Date: 6/22/05
Filename: TTCHGRAV

ADVANCED TERRA TESTING, INC.

336

SAMPLE QA-RF-01

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

337

ATTERBERG LIMITS
ASTM D 4318

338

ATTERBERG LIMITS TEST
ASTM D 4318

CLIENT	Tetra Tech-RMC	JOB NO.	2617-13
BORING NO.		DATE SAMPLED	
DEPTH		DATE TESTED	06-17-05 SKL
SAMPLE NO.	Pit Fines QA-RF-1		
SOIL DESCR.	Project #19-4886.002.00		
LOCATION	Old Landfill		

Plastic Limit Determination

	1	2	3
Wt Dish & Wet Soil	6.17	6.39	6.44
Wt Dish & Dry Soil	5.53	5.71	5.76
Wt of Moisture	0.64	0.68	0.68
Wt of Dish	0.82	0.81	0.81
Wt of Dry Soil	4.71	4.90	4.95
Moisture Content	13.59	13.88	13.74

Liquid Limit Determination — Device Number 0966

	1	2	3	4
Number of Blows	18	22	28	33
Wt Dish & Wet Soil	12.35	12.81	12.66	12.86
Wt Dish & Dry Soil	9.59	9.98	9.91	10.09
Wt of Moisture	2.76	2.83	2.75	2.77
Wt of Dish	0.81	0.81	0.81	0.81
Wt of Dry Soil	8.78	9.17	9.10	9.28
Moisture Content	31.44	30.86	30.22	29.85

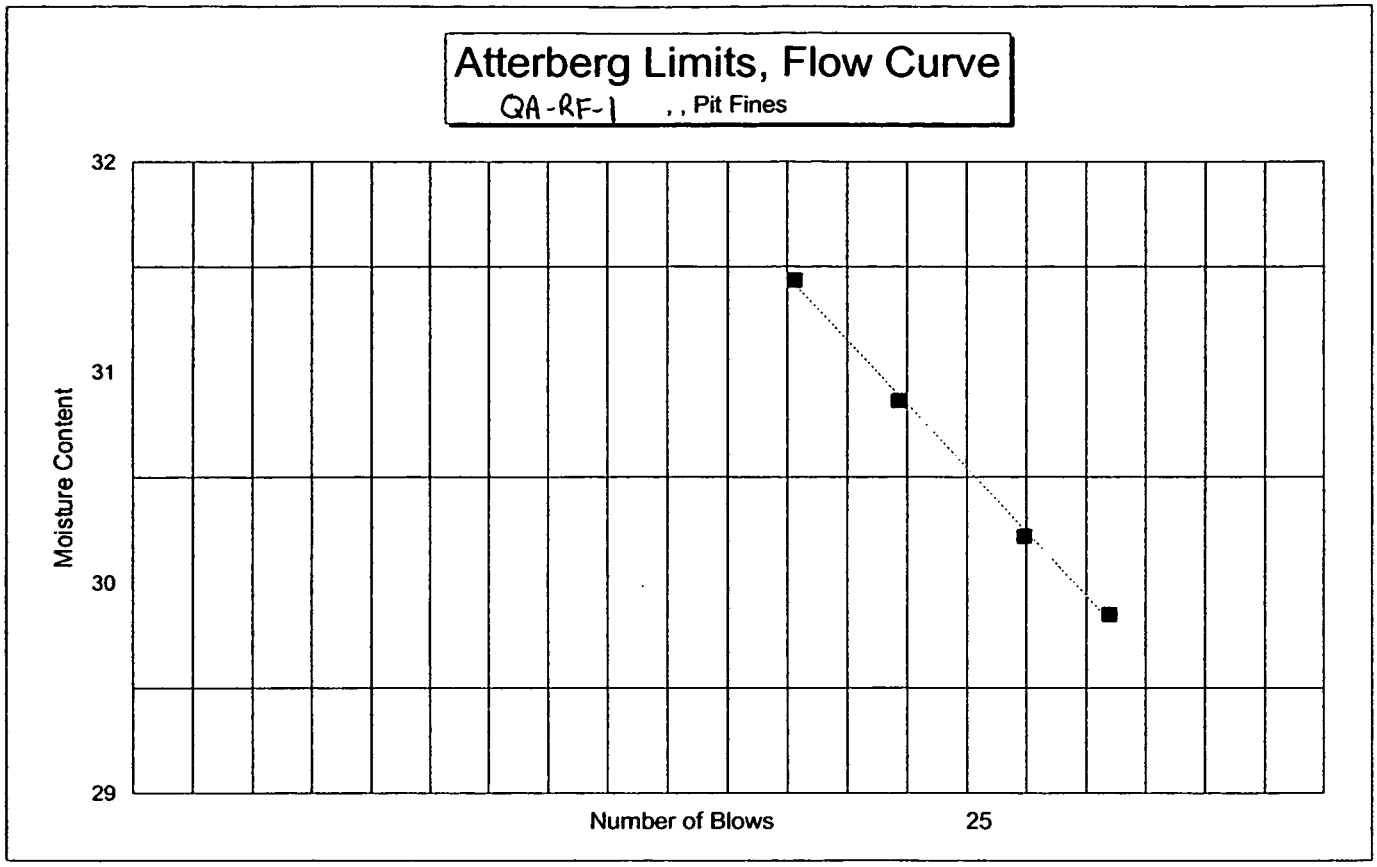
Liquid Limit	30.5
Plastic Limit	13.7
Plasticity Index	16.8

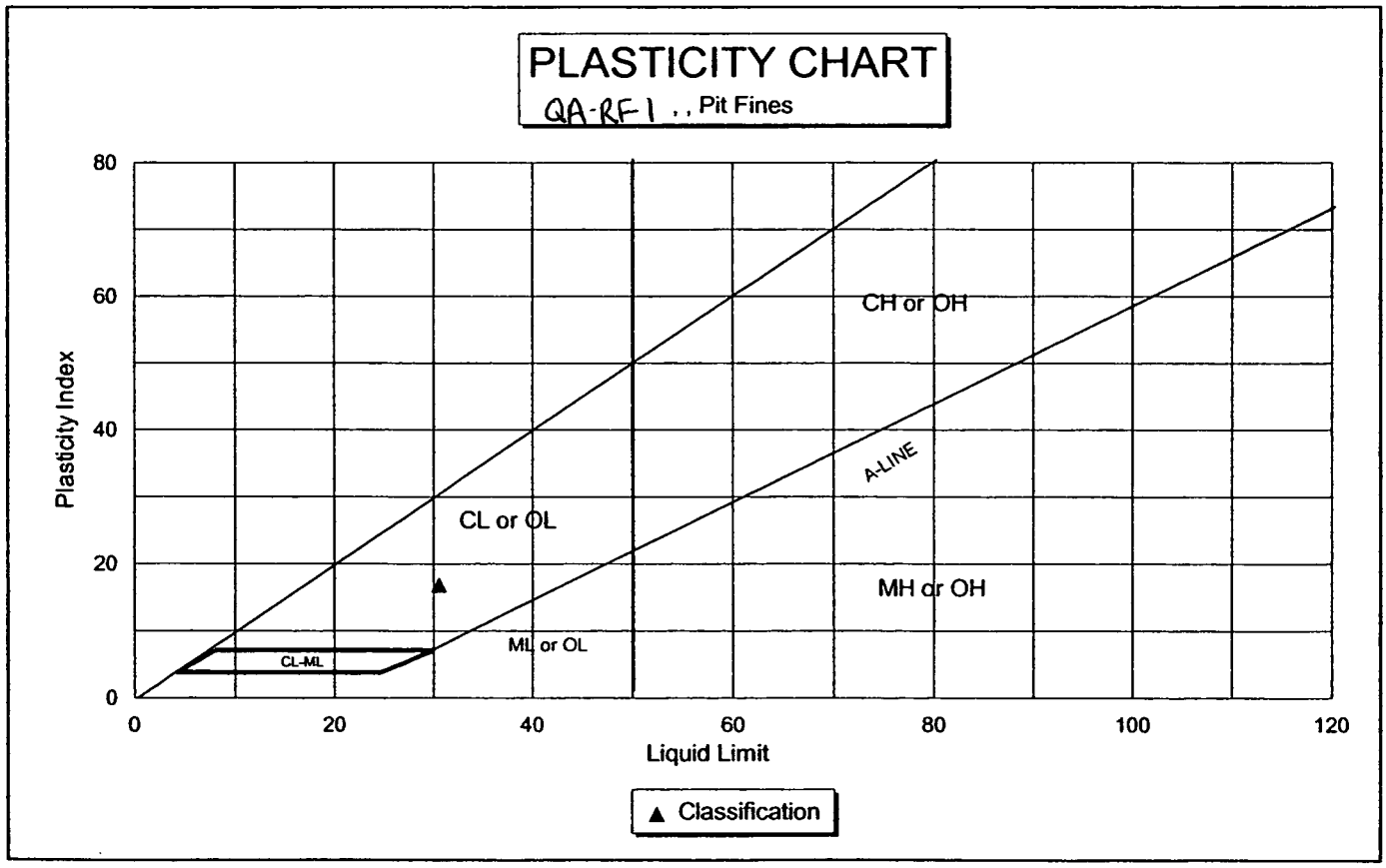
Atterberg Classification CL

Data entry by: SR Date: 06/20/2005
Checked by: RS Date: 6/20/05
FileName: TTG0PITF

ADVANCED TERRA TESTING, INC.

339


Atterberg Limits, Flow Curve
QA-RF-1 , , Pit Fines
32
31
30
29
Moisture Content
Number of Blows
25


PLASTICITY CHART
QA-RF-1 , , Pit Fines
80
60
40
20
0
Plasticity Index
CH or OH
A-LINE
CL or OL
MH or OH
ML or OL
CL-ML
0
20
40
60
80
100
120
Liquid Limit
▲ Classification

HYDROMETER ANALYSIS
WITH MECHANICAL GRAIN SIZE ANALYSIS
ASTM D 422

340

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-13
BORING NO.		SAMPLED	
DEPTH		DATE TESTED	06-21-05 RS
SAMPLE NO.	Pit Fines QA-RF-1	WASH SIEVE	Yes
SOIL DESCR.	Project #19-4886.002.00	DRY SIEVE	No
LOCATION	Old Landfill		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	72.43
Wt. Dry Soil & Pan (g)	70.48
Wt. Lost Moisture (g)	1.95
Wt. of Pan Only (g)	3.68
Wt. of Dry Soil (g)	66.80
Moisture Content %	2.9
Wt. Hydrom. Sample Wet (g)	57.37
Wt. Hydrom. Sample Dry (g)	55.74

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	914.86
Weight of + #10 Before Washing (g)	258.56
Weight of + #10 After Washing (g)	187.78
Weight of - #10 Wet (g)	656.30
Weight of - #10 Dry (g)	706.46
Wt. Total Sample Dry (g)	894.24
Calc. Wt. "W" (g)	70.56
Calc. Mass + #10	14.82

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	52.72	52.72	52.72	5.9	94.1
#10	0.00	135.06	135.06	187.78	21.0	79.0
#20	2.31	10.80	8.49	8.49	33.0	67.0
#40	2.30	11.58	9.28	17.77	46.2	53.8
#60	2.37	10.39	8.02	25.79	57.6	42.4
#100	2.30	8.55	6.25	32.04	66.4	33.6
#200	2.37	8.18	5.81	37.85	74.6	25.4

Data entered by: SR Date: 06/28/2005
Data checked by: RB Date: 6/28/05
FileName: TTH0PIFI

ADVANCED TERRA TESTING, INC.

341

HYDROMETER ANALYSIS - SEDIMENTATION DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-13
BORING NO.		SAMPLED	
DEPTH		DATE TESTED	06-21-05 RS
SAMPLE NO.	Pit Fines QA-RF-1	WASH SIEVE	Yes
SOIL DESCR.	Project #19-4886.002.00	DRY SIEVE	No
LOCATION	Old Landfill		

Hydrometer #	ASTM 152 H	Temp., Deg. C	24.2
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01298
Value of "alpha"	1.00	Wt. Dry Sample "W"	70.556
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

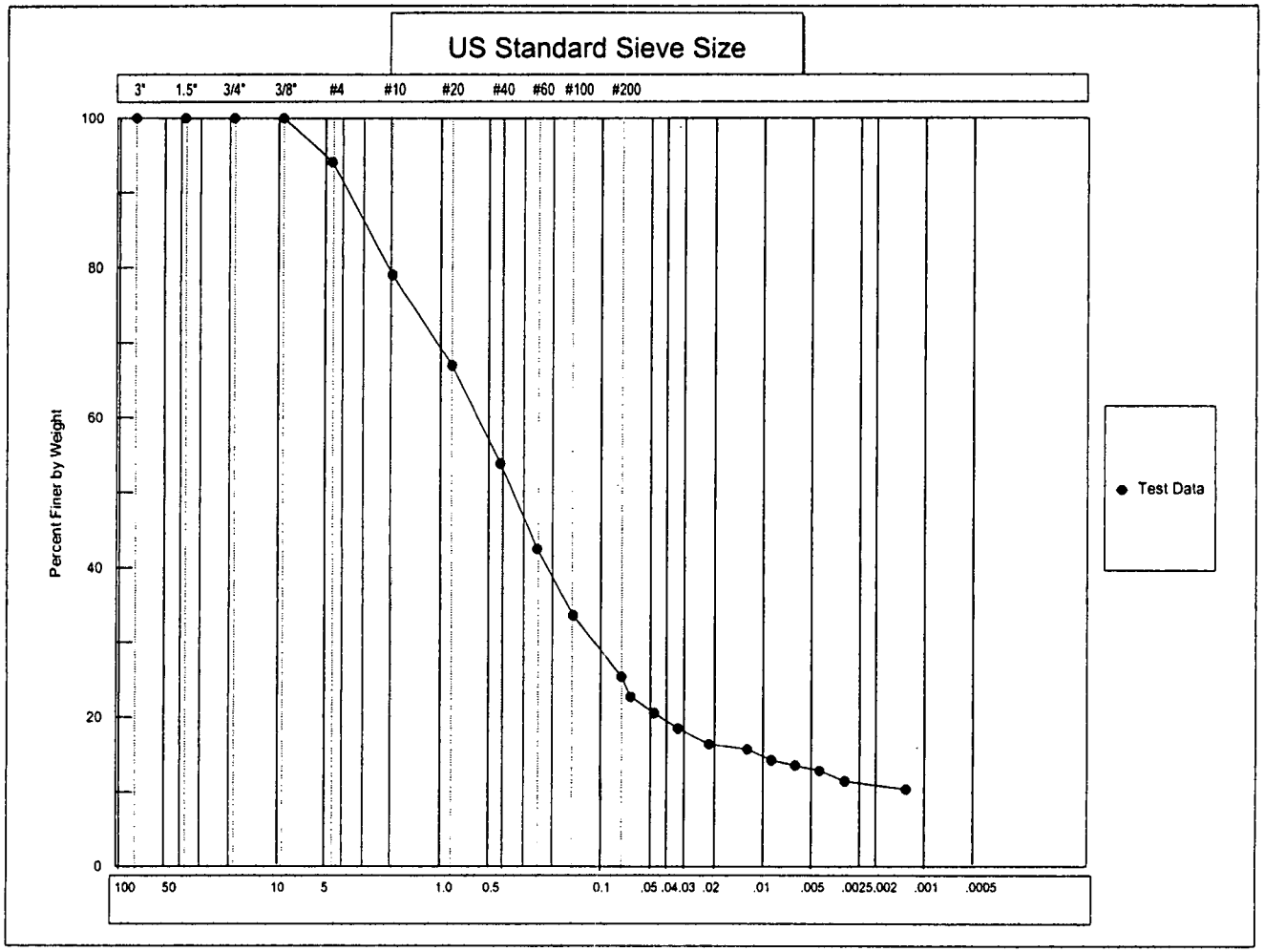
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	21.00	16.00	22.7	22.7	12.85	0.0658
1.0	19.50	14.50	20.6	20.6	13.09	0.0470
2.0	18.00	13.00	18.4	18.4	13.34	0.0335
5.0	16.50	11.50	16.3	16.3	13.58	0.0214
15.0	16.00	11.00	15.6	15.6	13.67	0.0124
30.0	15.00	10.00	14.2	14.2	13.83	0.0088
60.0	14.50	9.50	13.5	13.5	13.91	0.0063
120.0	14.00	9.00	12.8	12.8	13.99	0.0044
250.0	13.00	8.00	11.3	11.3	14.16	0.0031
1440.0	12.25	7.25	10.3	10.3	14.28	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: SR Date: 06/28/2005
Data checked by: RS Date: 6/28/05
FileName: TTH0PIFI

ADVANCED TERRA TESTING, INC.

342



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Tetra Tech-RMC Boring No.: QA-RF-1 Sample No.: Pit Fines
Job Number: 2617-13 Depth:
Classification: **Classification Not Performed**

Advanced Terra Testing, Inc.

SAMPLE QA-RF-02

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

343

HYDROMETER ANALYSIS
WITH MECHANICAL GRAIN SIZE ANALYSIS
ASTM D 422

344

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM 5519 & ASTM D 422

CLIENT Tetra Tech - RMC

JOB NO. 2617-12

BORING NO.	QA-RF-2	SAMPLED	6/17/05 RS/CW/KR
DEPTH		DATE TESTED	6/17/05 RS/CW/KR
SAMPLE NO.	Rocky Flats Alluvium	WASH SIEVE	Yes on -3" Material
SOIL DESCR.	Composite Grain Size	DRY SIEVE	Yes on +3" Material
LOCATION	Old Landfill		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	100.81
Wt. Dry Soil & Pan (g)	97.22
Wt. Lost Moisture (g)	3.59
Wt. of Pan Only (g)	3.68
Wt. of Dry Soil (g)	93.54
Moisture Content %	3.8

Wt. Hydrom. Sample Wet (g)	50.68
Wt. Hydrom. Sample Dry (g)	48.81

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1168768.08
Weight of + #10 Before Washing (g)	787313.68
Weight of + #10 After Washing (g)	787313.38
Weight of - #10 Wet (g)	381454.40
Weight of - #10 Dry (g)	367355.84
Wt. Total Sample Dry (g)	1154669.22

Calc. Wt. "W" (g)	153.42
Calc. Mass + #10	104.61

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
6"	0.00	79378.25	79378.25	79378.25	6.9	93.1
3"	0.00	125984.62	125984.62	205362.87	17.8	82.2
1 1/2"	0.00	120649.04	120649.04	326011.91	28.2	71.8
3/4"	0.00	171771.18	171771.18	497783.09	43.1	56.9
3/8"	0.00	129579.26	129579.26	627362.35	54.3	45.7
#4	0.00	90435.87	90435.87	717798.23	62.2	37.8
#10	0.00	69515.15	69515.15	787313.38	68.2	31.8
#20	2.34	12.60	10.26	10.26	74.9	25.1
#40	2.36	12.29	9.93	20.19	81.3	18.7
#60	2.36	7.32	4.96	25.15	84.6	15.4
#100	2.32	5.87	3.55	28.70	86.9	13.1
#200	2.37	5.78	3.41	32.11	89.1	10.9

Data entered by: RS Date: 06/23/2005
Data checked by: CJ Date: 06/23/05
FileName: TTH0QARF

ADVANCED TERRA TESTING, INC.

345

HYDROMETER ANALYSIS - SEDIMENTATION DATA
ASTM 5519 & ASTM D 422

CLIENT	Tetra Tech - RMC	JOB NO.	2617-12
BORING NO.	QA-RF-2	SAMPLED	6/17/05 RS/CW/KR
DEPTH		DATE TESTED	6/17/05 RS/CW/KR
SAMPLE NO.	Rocky Flats Alluvium	WASH SIEVE	Yes on -3" Material
SOIL DESCR.	Composite Grain Size	DRY SIEVE	Yes on +3" Material
LOCATION	Old Landfill		

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.8
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01304
Value of "alpha"	1.00	Wt. Dry Sample "W"	153.418
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

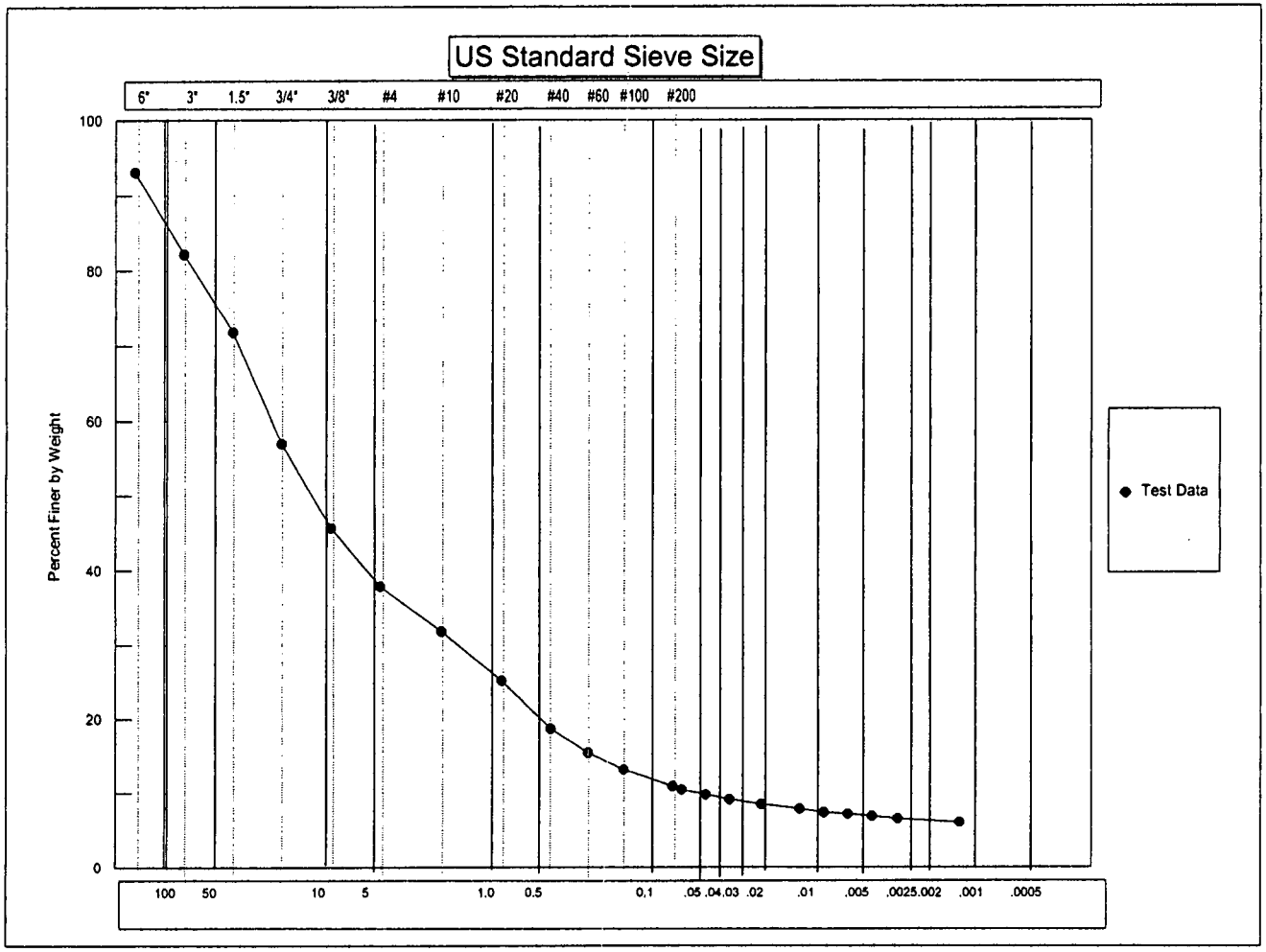
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	21.00	16.00	10.4	10.4	12.85	0.0661
1.0	20.00	15.00	9.8	9.8	13.01	0.0470
2.0	19.00	14.00	9.1	9.1	13.17	0.0335
5.0	18.00	13.00	8.5	8.5	13.34	0.0213
15.0	17.00	12.00	7.8	7.8	13.50	0.0124
30.0	16.25	11.25	7.3	7.3	13.63	0.0088
60.0	16.00	11.00	7.2	7.2	13.67	0.0062
120.0	15.50	10.50	6.8	6.8	13.75	0.0044
250.0	15.00	10.00	6.5	6.5	13.83	0.0031
1440.0	14.25	9.25	6.0	6.0	13.95	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: RS Date: 06/23/2005
Data checked by: CW Date: 06/23/05
FileName: TTH0QARF

ADVANCED TERRA TESTING, INC.

346



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Tetra Tech - RMC Boring No.: QA-RF-2 Sample No.: Rocky Flats Alluvium
Job Number: 2617-12 Depth: Soil Descr.: Composite Grain Size
Classification: **GC, Clayey gravel with sand (-3" fraction only)** Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Tetra Tech - RMC	JOB NO.	2617-12
BORING NO.	QA-RF-2	SAMPLED	6/17/05 RS/CW/KR
DEPTH		DATE TESTED	6/21/05 RS
SAMPLE NO.	Rocky Flats Alluvium	WASH SIEVE	Yes
SOIL DESCR.	-3" Fraction Only	DRY SIEVE	No
LOCATION	Old Landfill		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	100.81
Wt. Dry Soil & Pan (g)	97.22
Wt. Lost Moisture (g)	3.59
Wt. of Pan Only (g)	3.68
Wt. of Dry Soil (g)	93.54
Moisture Content %	3.8
Wt. Hydrom. Sample Wet (g)	50.68
Wt. Hydrom. Sample Dry (g)	48.81

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	4920.47
Weight of + #10 Before Washing (g)	3493.54
Weight of + #10 After Washing (g)	2972.24
Weight of - #10 Wet (g)	1426.93
Weight of - #10 Dry (g)	1876.22
Wt. Total Sample Dry (g)	4848.46
Calc. Wt. "W" (g)	126.13
Calc. Mass + #10	77.32

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	616.20	616.20	616.20	12.7	87.3
3/4"	0.00	877.30	877.30	1493.50	30.8	69.2
3/8"	0.00	661.81	661.81	2155.31	44.5	55.5
#4	0.00	461.89	461.89	2617.20	54.0	46.0
#10	0.00	355.04	355.04	2972.24	61.3	38.7
#20	2.34	12.60	10.26	10.26	69.4	30.6
#40	2.36	12.29	9.93	20.19	77.3	22.7
#60	2.36	7.32	4.96	25.15	81.2	18.8
#100	2.32	5.87	3.55	28.70	84.1	15.9
#200	2.37	5.78	3.41	32.11	86.8	13.2

Data entered by: RS Date: 06/23/2005
Data checked by: CJ Date: 06/23/05
FileName: TTH0RF3I

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA
ASTM D 422

CLIENT	Tetra Tech - RMC	JOB NO.	2617-12
BORING NO.	QA-RF-2	SAMPLED	6/17/05 RS/CW/KR
DEPTH		DATE TESTED	6/21/05 RS
SAMPLE NO.	Rocky Flats Alluvium	WASH SIEVE	Yes
SOIL DESCR.	-3" Fraction Only	DRY SIEVE	No
LOCATION	Old Landfill		

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.8
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01304
Value of "alpha"	1.00	Wt. Dry Sample "W"	126.132
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

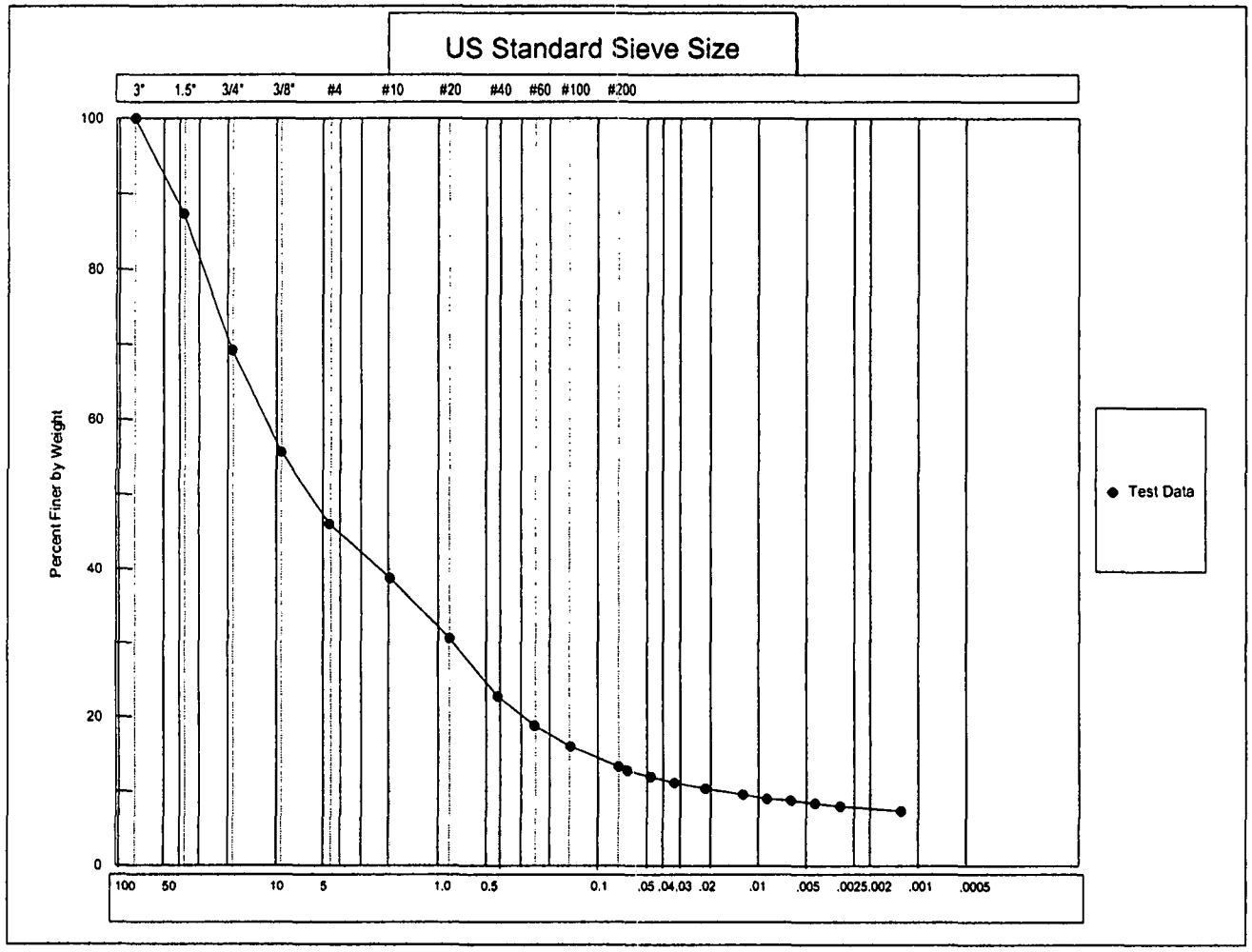
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	21.00	16.00	12.7	12.7	12.85	0.0661
1.0	20.00	15.00	11.9	11.9	13.01	0.0470
2.0	19.00	14.00	11.1	11.1	13.17	0.0335
5.0	18.00	13.00	10.3	10.3	13.34	0.0213
15.0	17.00	12.00	9.5	9.5	13.50	0.0124
30.0	16.25	11.25	8.9	8.9	13.63	0.0088
60.0	16.00	11.00	8.7	8.7	13.67	0.0062
120.0	15.50	10.50	8.3	8.3	13.75	0.0044
250.0	15.00	10.00	7.9	7.9	13.83	0.0031
1440.0	14.25	9.25	7.3	7.3	13.95	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: RS Date: 06/23/2005
Data checked by: CJ Date: 06/23/05
FileName: TTH0RF3I

ADVANCED TERRA TESTING, INC.

347



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Tetra Tech - RMC
Job Number: 2617-12
Classification: **GC, Clayey gravel with sand**

Boring No.: QA-RF-2
Depth:

Sample No.: Rocky Flats Alluvium
Soil Descr.: -3" Fraction Only

Advanced Terra Testing, Inc.

ATTERBERG LIMITS
ASTM D 4318

348

ATTERBERG LIMITS TEST
ASTM D 4318

CLIENT	Tetra Tech-RMC	JOB NO.	2617-12
BORING NO.	QA-RF-2	DATE SAMPLED	
DEPTH		DATE TESTED	06-21-05 SKL
SAMPLE NO.			
SOIL DESCR.	Project #19-4886.002.00		
LOCATION	Old Landfill		

Plastic Limit Determination

	1	2	3
Wt Dish & Wet Soil	6.74	6.59	6.89
Wt Dish & Dry Soil	6.01	5.88	6.15
Wt of Moisture	0.73	0.71	0.74
Wt of Dish	0.73	0.76	0.82
Wt of Dry Soil	5.28	5.12	5.33
Moisture Content	13.83	13.87	13.88

Liquid Limit Determination — Device Number 0966

	1	2	3
Number of Blows	21	24	32
Wt Dish & Wet Soil	14.26	13.12	14.32
Wt Dish & Dry Soil	10.26	9.52	10.56
Wt of Moisture	4.00	3.60	3.76
Wt of Dish	0.75	0.81	0.82
Wt of Dry Soil	9.51	8.71	9.74
Moisture Content	42.06	41.33	38.60

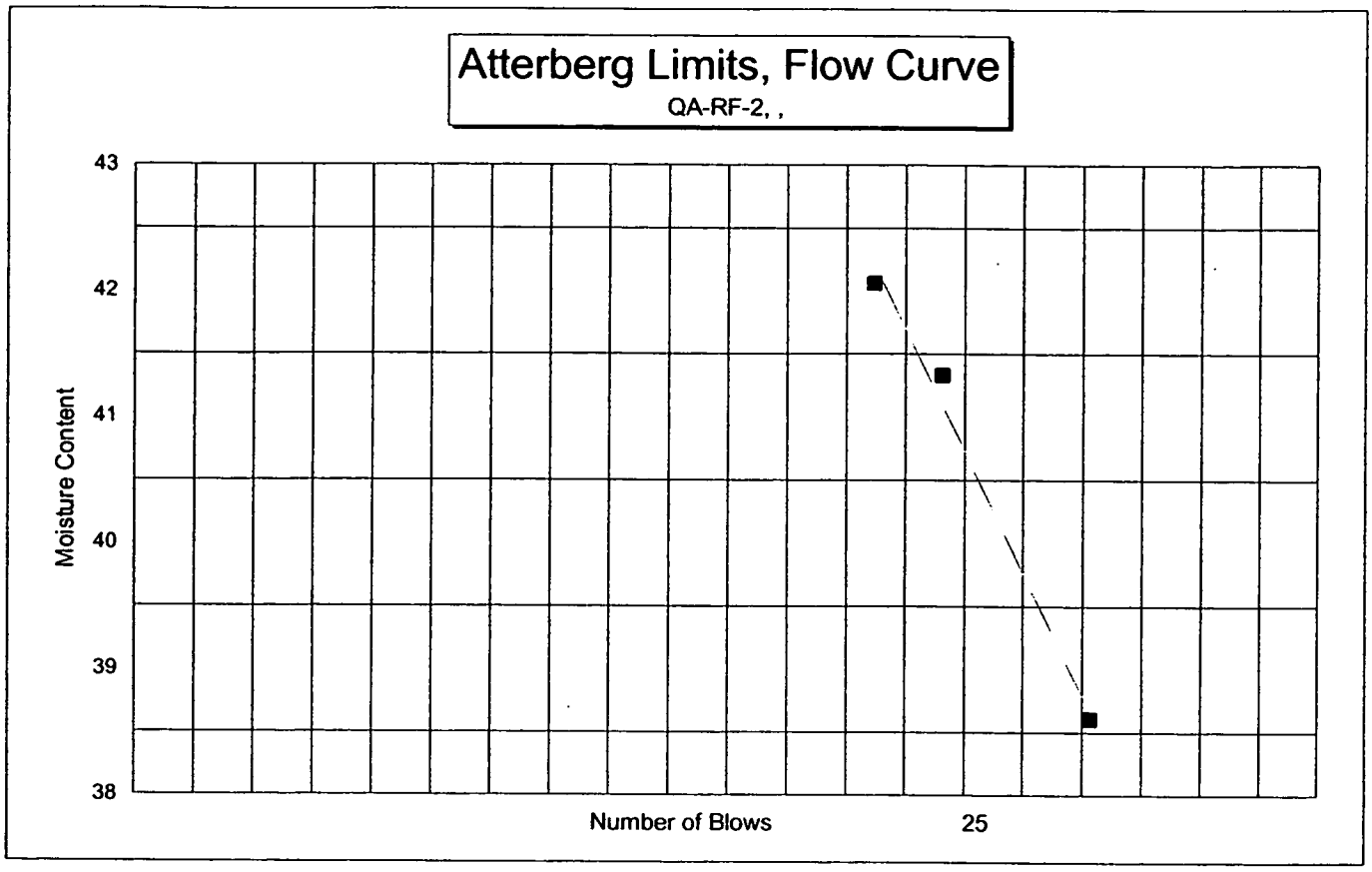
Liquid Limit	40.8
Plastic Limit	13.9
Plasticity Index	26.9

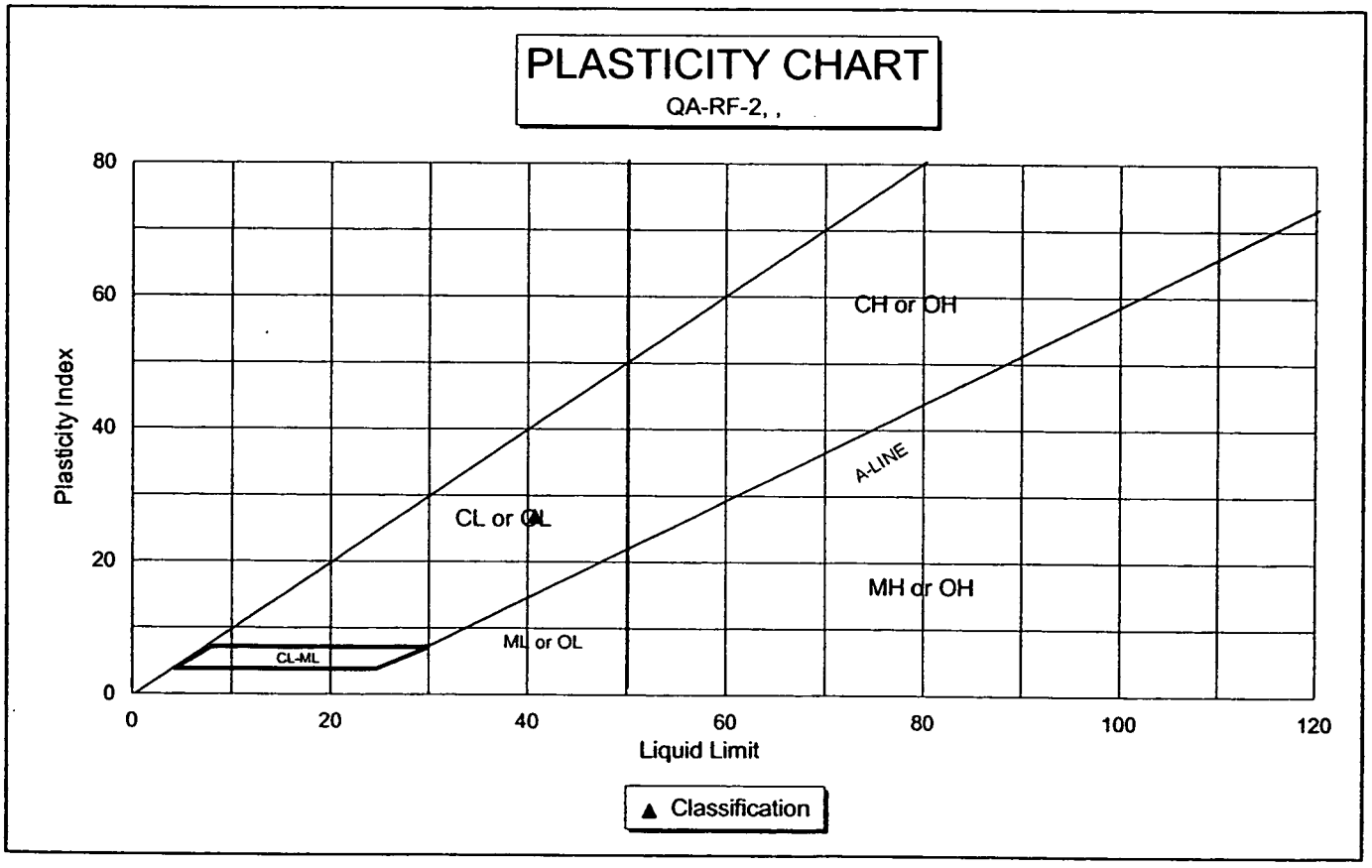
Atterberg Classification CL

Data entry by: SR Date: 06/22/2005
Checked by: RB Date: 6/23/05
FileName: TTG0ARF2

ADVANCED TERRA TESTING, INC.

349


Atterberg Limits, Flow Curve
QA-RF-2, ,
43
42
41
40
39
38
Moisture Content
Number of Blows
25


PLASTICITY CHART
QA-RF-2, ,
80
60
40
20
0
Plasticity Index
CH or OH
A-LINE
CL or OL
MH or OH
ML or OL
CL-ML
0
20
40
60
80
100
120
Liquid Limit
Classification

SAMPLE QA-BF-01

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

350

ATTERBERG LIMITS
ASTM D 4318

351

ATTERBERG LIMITS TEST
ASTM D 4318

CLIENT	Tetra Tech-RMC	JOB NO.	2617-14
BORING NO.	QABF-01	DATE SAMPLED	
DEPTH		DATE TESTED	06-20-05 RS
SAMPLE NO.	Centennial Pit Fines		
SOIL DESCR.	Project #19-4886.002.00		
LOCATION	Old Landfill		

Plastic Limit Determination

	1	2	3
Wt Dish & Wet Soil	5.15	5.39	5.55
Wt Dish & Dry Soil	4.59	4.80	4.92
Wt of Moisture	0.56	0.59	0.63
Wt of Dish	0.81	0.81	0.75
Wt of Dry Soil	3.78	3.99	4.17
Moisture Content	14.81	14.79	15.11

Liquid Limit Determination — Device Number 0860

	1	2	3	4
Number of Blows	30	32	23	18
Wt Dish & Wet Soil	10.82	10.26	10.30	12.49
Wt Dish & Dry Soil	7.84	7.45	7.43	8.89
Wt of Moisture	2.98	2.81	2.87	3.60
Wt of Dish	0.82	0.81	0.81	0.81
Wt of Dry Soil	7.02	6.64	6.62	8.08
Moisture Content	42.45	42.32	43.35	44.55

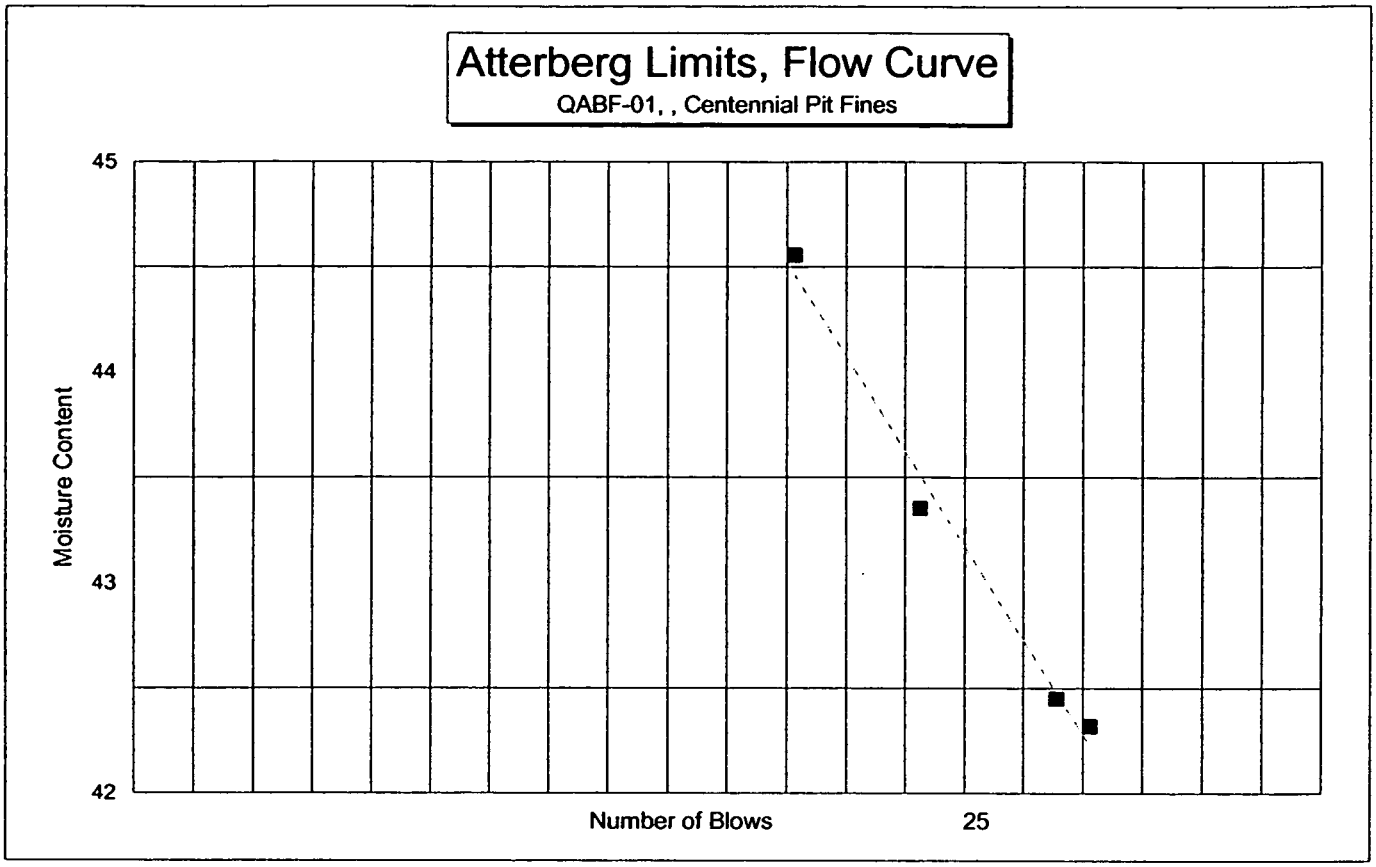
Liquid Limit	43.2
Plastic Limit	14.9
Plasticity Index	28.3

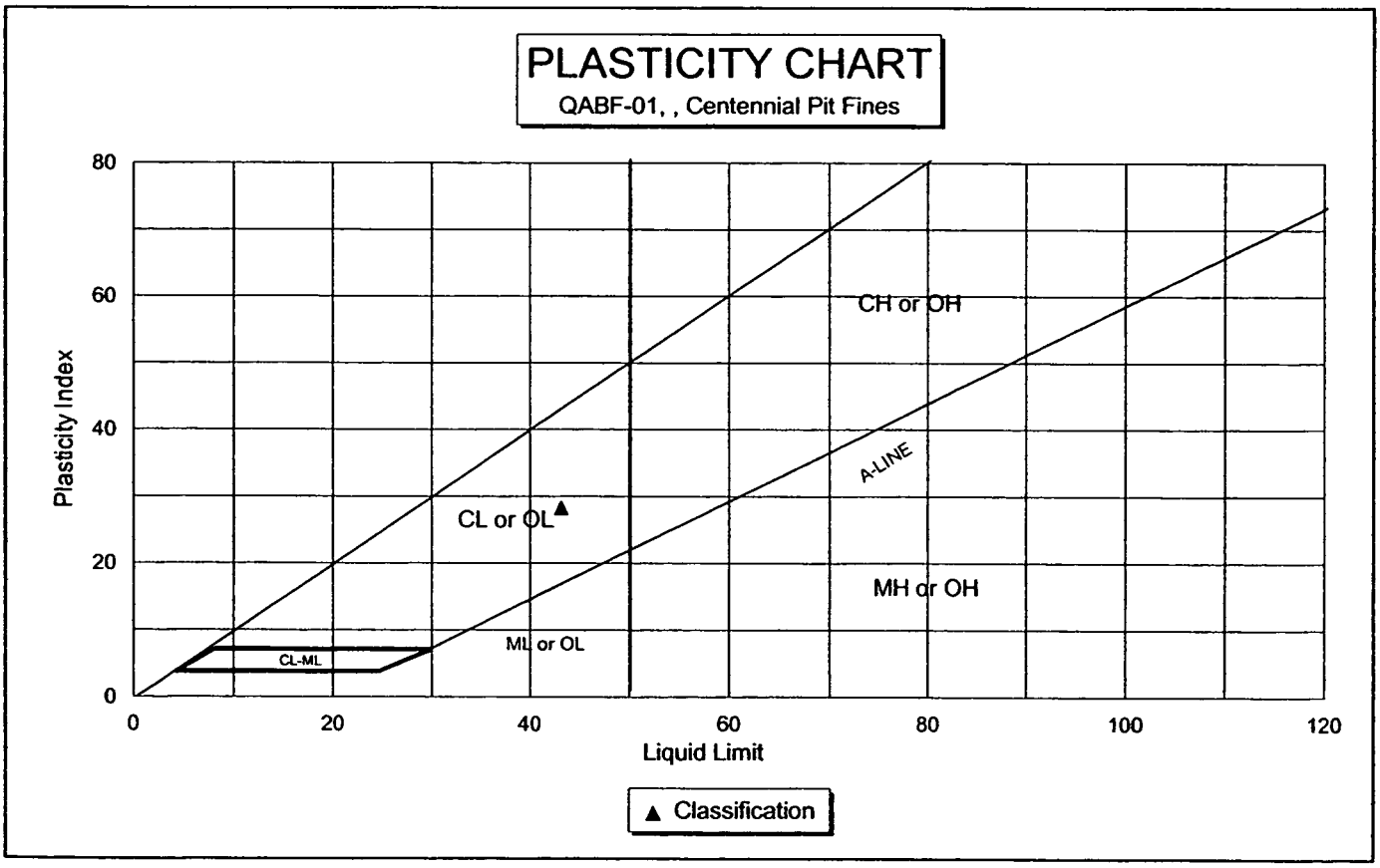
Atterberg Classification CL

Data entry by: RB SR Date: 06/28/2005
Checked by: RB Date: 6/28/05
FileName: TTG0QABF

ADVANCED TERRA TESTING, INC.

352


Atterberg Limits, Flow Curve
QABF-01, , Centennial Pit Fines
Moisture Content
45
44
43
42
Number of Blows
25


PLASTICITY CHART
QABF-01, , Centennial Pit Fines
Plasticity Index
80
60
40
20
0
CH or OH
A-LINE
CL or OL▲
MH or OH
ML or OL
CL-ML
0
20
40
60
80
100
120
Liquid Limit
▲ Classification

HYDROMETER ANALYSIS
WITH MECHANICAL GRAIN SIZE ANALYSIS
ASTM D 422

353

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-14
BORING NO.	QABF-01	SAMPLED	
DEPTH		DATE TESTED	06-21-05 RS
SAMPLE NO.	Centennial Pit Fines	WASH SIEVE	Yes
SOIL DESCR.	Project #19-4886.002.00	DRY SIEVE	No
LOCATION	Old Landfill		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	39.96
Wt. Dry Soil & Pan (g)	39.27
Wt. Lost Moisture (g)	0.69
Wt. of Pan Only (g)	3.65
Wt. of Dry Soil (g)	35.62
Moisture Content %	1.9
Wt. Hydrom. Sample Wet (g)	59.03
Wt. Hydrom. Sample Dry (g)	57.91

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	679.61
Weight of + #10 Before Washing (g)	179.43
Weight of + #10 After Washing (g)	174.31
Weight of - #10 Wet (g)	500.18
Weight of - #10 Dry (g)	495.70
Wt. Total Sample Dry (g)	670.01
Calc. Wt. "W" (g)	78.27
Calc. Mass + #10	20.36

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	4.51	4.51	4.51	0.7	99.3
#4	0.00	91.64	91.64	96.15	14.4	85.6
#10	0.00	78.16	78.16	174.31	26.0	74.0
#20	2.30	15.60	13.30	13.30	43.0	57.0
#40	2.35	12.04	9.69	22.99	55.4	44.6
#60	2.32	8.08	5.76	28.75	62.7	37.3
#100	2.35	6.58	4.23	32.98	68.2	31.8
#200	2.36	6.75	4.39	37.37	73.8	26.2

Data entered by: SR Date: 06/28/2005
Data checked by: RS Date: 6/28/05
FileName: TTH0BF01

ADVANCED TERRA TESTING, INC.

354

HYDROMETER ANALYSIS - SEDIMENTATION DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-14
BORING NO.	QABF-01	SAMPLED	
DEPTH		DATE TESTED	06-21-05 RS
SAMPLE NO.	Centennial Pit Fines	WASH SIEVE	Yes
SOIL DESCR.	Project #19-4886.002.00	DRY SIEVE	No
LOCATION	Old Landfill		

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.8
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01304
Value of "alpha"	1.00	Wt. Dry Sample "W"	78.267
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

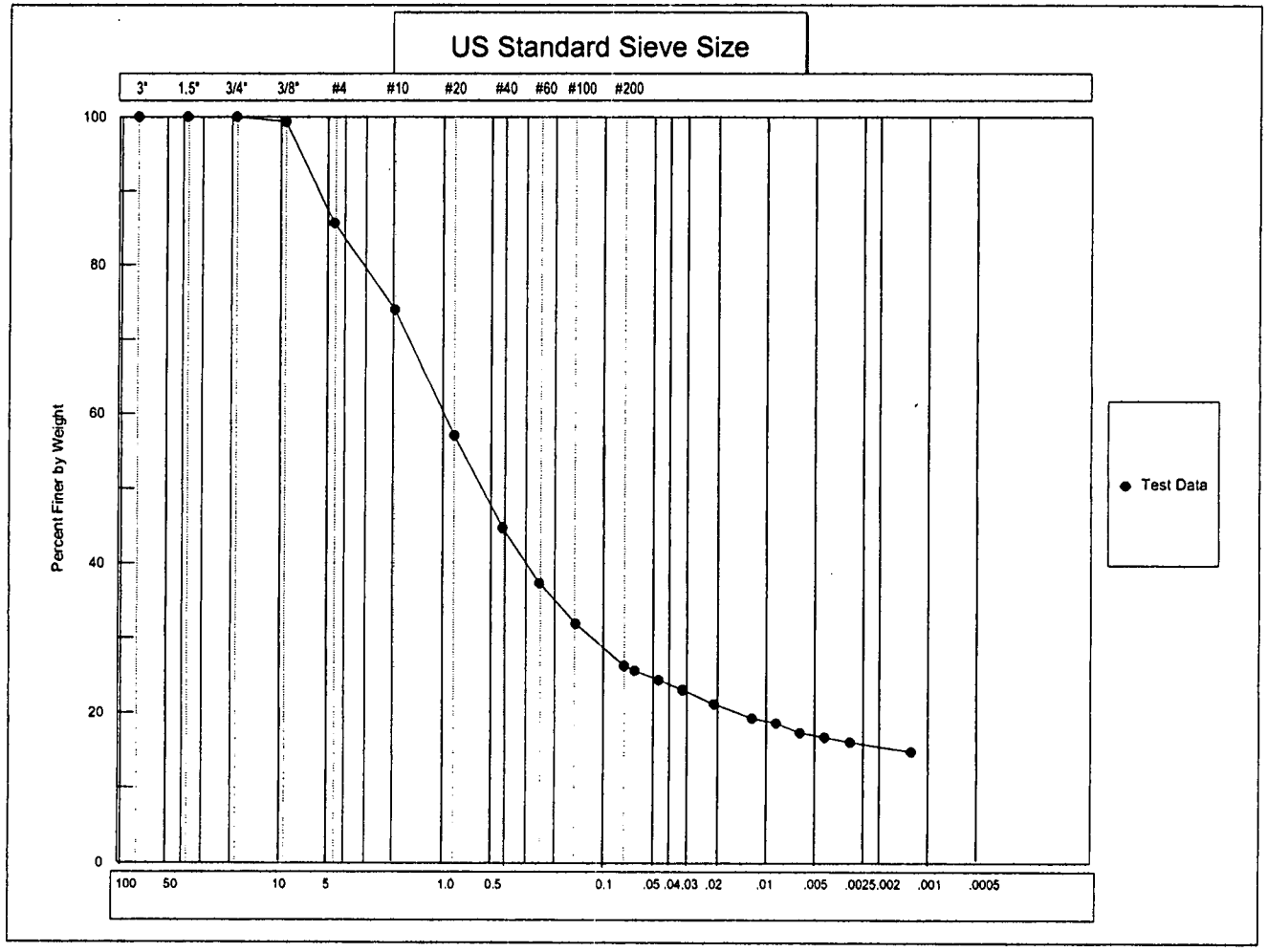
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	25.00	20.00	25.6	25.6	12.19	0.0644
1.0	24.00	19.00	24.3	24.3	12.35	0.0458
2.0	23.00	18.00	23.0	23.0	12.52	0.0326
5.0	21.50	16.50	21.1	21.1	12.76	0.0208
15.0	20.00	15.00	19.2	19.2	13.01	0.0121
30.0	19.50	14.50	18.5	18.5	13.09	0.0086
60.0	18.50	13.50	17.2	17.2	13.26	0.0061
120.0	18.00	13.00	16.6	16.6	13.34	0.0043
250.0	17.50	12.50	16.0	16.0	13.42	0.0030
1440.0	16.50	11.50	14.7	14.7	13.58	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: SR Date: 06/28/2005
Data checked by: RS Date: 6/28/05
FileName: TTH0BF01

ADVANCED TERRA TESTING, INC.

355



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Tetra Tech-RMC Boring No.: QABF-01 Sample No.: Centennial Pit Fines
Job Number: 2617-14 Depth:
Classification: **Classification Not Performed**

Advanced Terra Testing, Inc.

STANDARD PROCTOR COMPACTION TEST
METHOD A, B or C
ASTM D 698

356

COMPACTION TEST
ASTM D 698 B

CLIENT:	Tetra Tech - RMC	JOB NO.	2617-14
BORING NO.	QABF-01	DATE SAMPLED	
DEPTH		DATE TESTED	6/18,19&20/05 RS
SAMPLE NO.	Centennial Pit Fines	LOCATION	Old Landfill
SOIL DESCR.	Project #19-4886.002.00		

Moisture Determination	1	2	3	4	5
Wt of Moisture added (ml)	240.00	200.00	160.00	120.00	320.00
Wt. of soil & dish (g)	334.25	483.40	422.75	354.63	486.09
Dry wt. soil & dish (g)	293.45	431.44	382.40	326.17	418.80
Net loss of moisture (g)	40.80	51.96	40.35	28.46	67.29
Wt. of dish (g)	8.05	8.20	8.36	7.66	7.84
Net wt. of dry soil (g)	285.40	423.24	374.04	318.51	410.96
Moisture Content (%)	14.30	12.28	10.79	8.94	16.37
Corrected Moisture Content					
Density determination					
Wt of soil & mold (lb)	14.79	14.79	14.64	14.45	14.70
Wt. of mold (lb)	10.31	10.31	10.31	10.31	10.31
Net wt. of wet soil (lb)	4.48	4.48	4.33	4.14	4.39
Net wt of dry soil (lb)	3.92	3.99	3.91	3.80	3.77
Dry Density, (pcf)	117.59	119.70	117.25	114.01	113.17
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

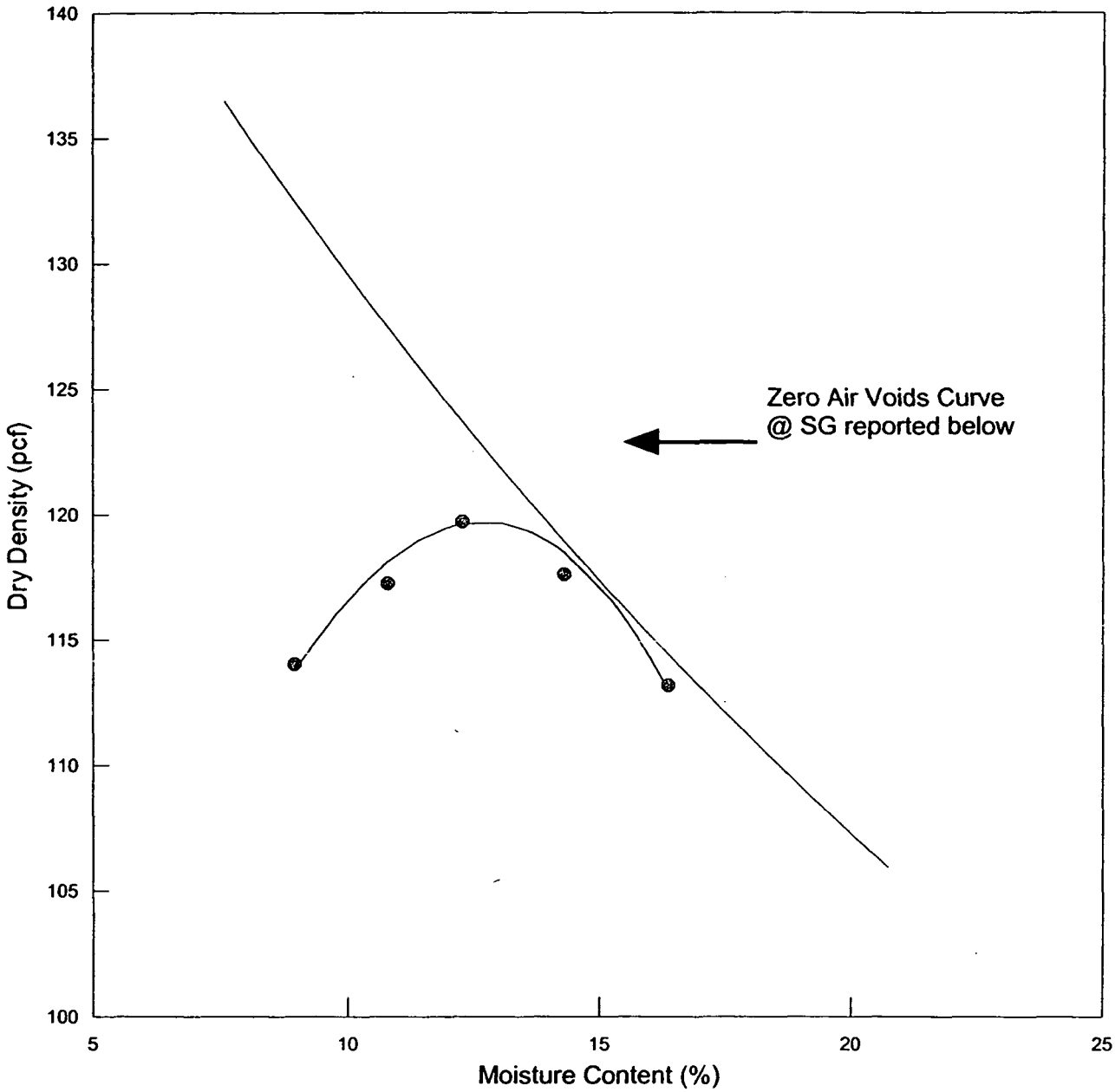
Data entered by: RS Date: 06/21/2005
Data checked by: KR Date: 6/21/05
FileName: TTPRCPF

ADVANCED TERRA TESTING, INC.

357

Proctor Compaction Test

QABF-01, , Centennial Pit Fines



Best Fit Curve | Actual Data | Zero Air VoidsCurve @ SG = 2.62

OPTIMUM MOISTURE CONTENT = 12.7 MAXIMUM DRY DENSITY = 119.7
ASTM D 698 B, Rock correction applied? N

ADVANCED TERRA TESTING, INC.

SAMPLE QA-BF-02

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

358

MOISTURE CONTENT
ASTM D 2216

Moisture Content Determinations
ASTM D 2216

CLIENT: Tetra Tech-RMC
LOCATION: Old Landfill

JOB NO.: 2617-15

BORING	QA-BF-02
SAMPLE DEPTH	
SAMPLE NO.	LaFarge Pit Fines
DATE SAMPLED	
DATE TESTED	06-24-05 RS
SOIL DESCRIPTION	

MOISTURE DETERMINATIONS	
Wt. of Wet Soil & Dish (gms)	1181.02
Wt. of Dry Soil & Dish (gms)	1082.93
Net Loss of Moisture (gms)	98.09
Wt. of Dish (gms)	15.05
Wt. of Dry Soil (gms)	1067.88
Moisture Content (%)	9.2

Data entered by: SR Date: 06/28/2005
Data checked by: RS Date: 6/28/05
FileName: TTN0BF02

ADVANCED TERRA TESTING, INC

360

ATTERBERG LIMITS
ASTM D 4318

361

ATTERBERG LIMITS TEST
ASTM D 4318

CLIENT	Tetra Tech-RMC	JOB NO.	2617-15
BORING NO.	QA-BF-02	DATE SAMPLED	
DEPTH		DATE TESTED	06-28-05 SKL
SAMPLE NO.	LaFarge Pit Fines		
SOIL DESCR.			
LOCATION	Old Landfill		

Plastic Limit Determination

	1	2	3
Wt Dish & Wet Soil	6.23	6.23	6.09
Wt Dish & Dry Soil	5.61	5.59	5.49
Wt of Moisture	0.62	0.64	0.60
Wt of Dish	0.82	0.81	0.75
Wt of Dry Soil	4.79	4.78	4.74
Moisture Content	12.94	13.39	12.66

Liquid Limit Determination — Device Number 0966

	1	2	3	4	5
Number of Blows	16	20	25	28	32
Wt Dish & Wet Soil	12.60	11.89	12.65	11.79	11.28
Wt Dish & Dry Soil	8.93	8.50	9.12	8.56	8.23
Wt of Moisture	3.67	3.39	3.53	3.23	3.05
Wt of Dish	0.81	0.82	0.82	0.76	0.77
Wt of Dry Soil	8.12	7.68	8.30	7.80	7.46
Moisture Content	45.20	44.14	42.53	41.41	40.88

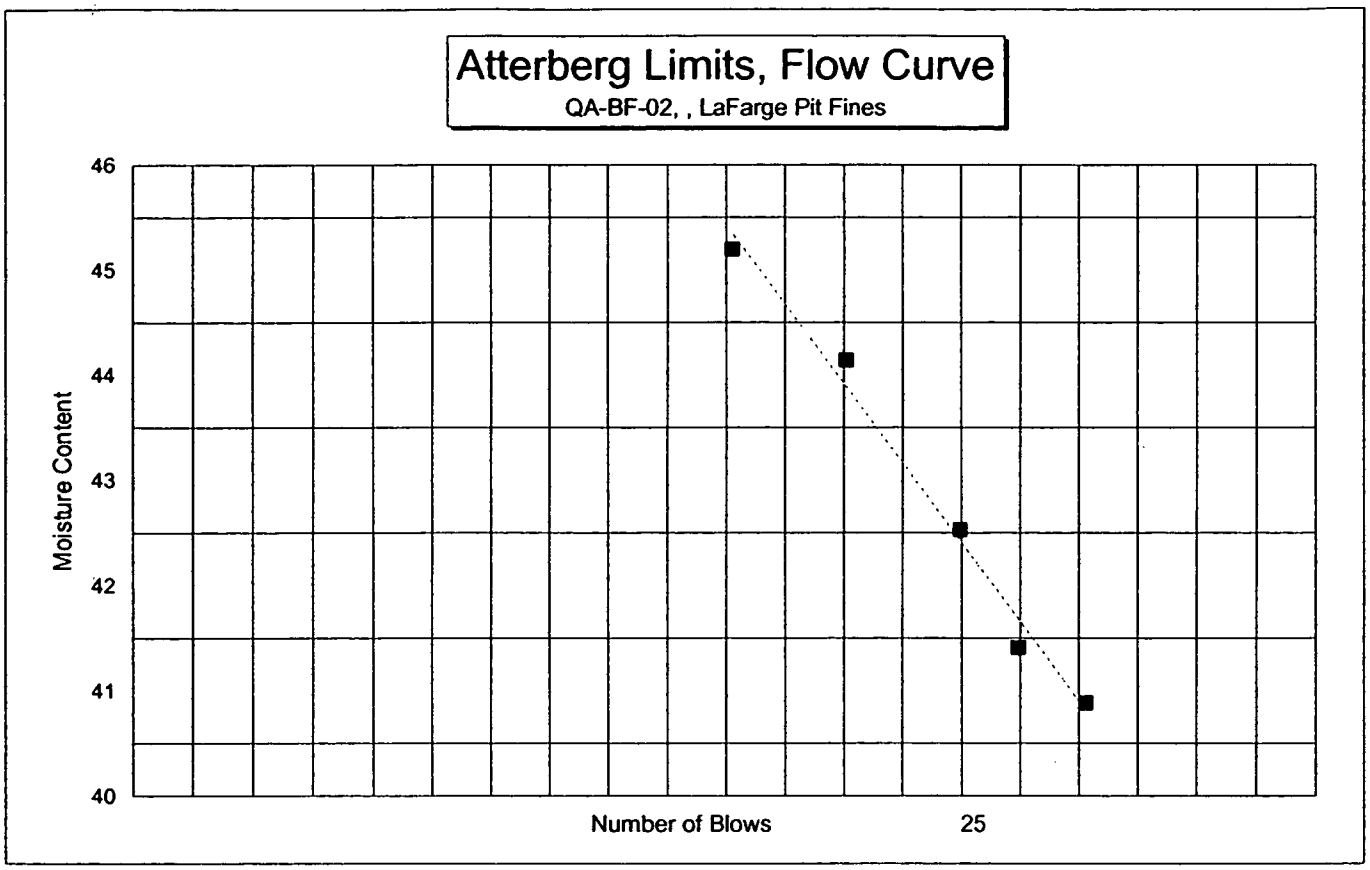
Liquid Limit	42.4
Plastic Limit	13.0
Plasticity Index	29.4

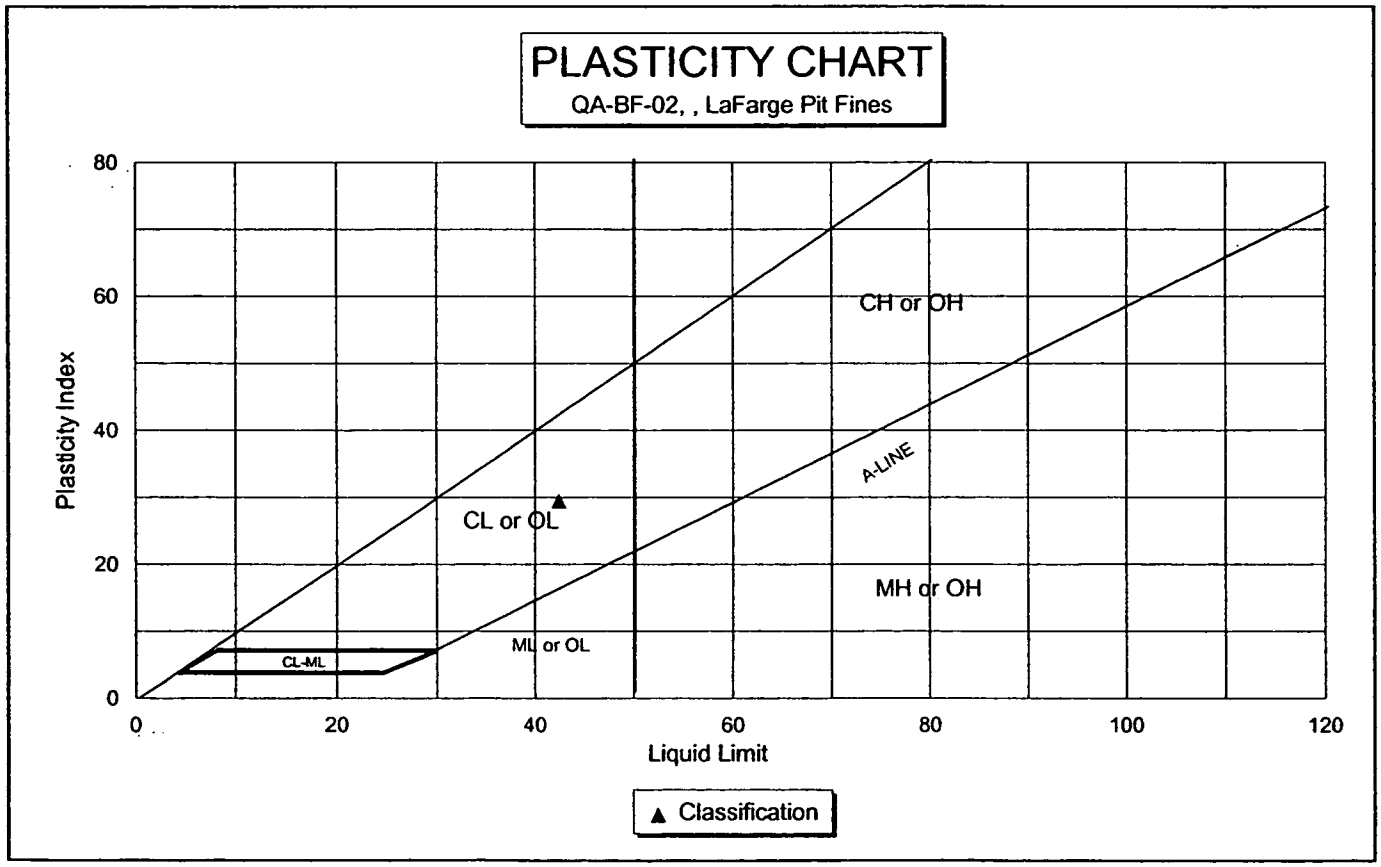
Atterberg Classification CL

Data entry by: SR Date: 06/29/2005
Checked by: SDL Date: 6/29/05
FileName: TTG0BF02

ADVANCED TERRA TESTING, INC.

362


Atterberg Limits, Flow Curve
QA-BF-02, , LaFarge Pit Fines
Moisture Content
46
45
44
43
42
41
40
Number of Blows
25


PLASTICITY CHART
QA-BF-02, , LaFarge Pit Fines
Plasticity Index
80
60
40
20
0
CH or OH
A-LINE
CL or OL
MH or OH
ML or OL
CL-ML
0
20
40
60
80
100
120
Liquid Limit
▲ Classification

HYDROMETER ANALYSIS
WITH MECHANICAL GRAIN SIZE ANALYSIS
ASTM D 422

363

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-15
BORING NO.	QA-BF-02	SAMPLED	
DEPTH		DATE TESTED	06-28-05 RS
SAMPLE NO.	LaFarge Pit Fines	WASH SIEVE	Yes
SOIL DESCR.		DRY SIEVE	No
LOCATION	Old Landfill		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan (g)		76.19
Wt. Dry Soil & Pan (g)		74.65
Wt. Lost Moisture (g)		1.54
Wt. of Pan Only (g)		3.62
Wt. of Dry Soil (g)		71.03
Moisture Content %		2.2
Wt. Hydrom. Sample Wet (g)		58.28
Wt. Hydrom. Sample Dry (g)		57.04

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2396.53
Weight of + #10 Before Washing (g)	811.24
Weight of + #10 After Washing (g)	771.04
Weight of - #10 Wet (g)	1585.29
Weight of - #10 Dry (g)	1591.00
Wt. Total Sample Dry (g)	2362.04
Calc. Wt. "W" (g)	84.69
Calc. Mass + #10	27.64

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	101.71	101.71	101.71	4.3	95.7
#4	0.00	364.40	364.40	466.11	19.7	80.3
#10	0.00	304.93	304.93	771.04	32.6	67.4
#20	2.35	12.91	10.56	10.56	45.1	54.9
#40	2.36	12.70	10.34	20.90	57.3	42.7
#60	2.36	9.09	6.73	27.63	65.3	34.7
#100	2.30	7.21	4.91	32.54	71.1	28.9
#200	3.59	8.53	4.94	37.48	76.9	23.1

Data entered by: SR Date: 06/30/2005
Data checked by: QS Date: 6/30/05
FileName: TTH0BF02

ADVANCED TERRA TESTING, INC.

364

HYDROMETER ANALYSIS - SEDIMENTATION DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-15
BORING NO.	QA-BF-02	SAMPLED	
DEPTH		DATE TESTED	06-28-05 RS
SAMPLE NO.	LaFarge Pit Fines	WASH SIEVE	Yes
SOIL DESCR.		DRY SIEVE	No
LOCATION	Old Landfill		

Hydrometer #	ASTM 152 H	Temp., Deg. C	24.4
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01295
Value of "alpha"	1.00	Wt. Dry Sample "W"	84.687
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

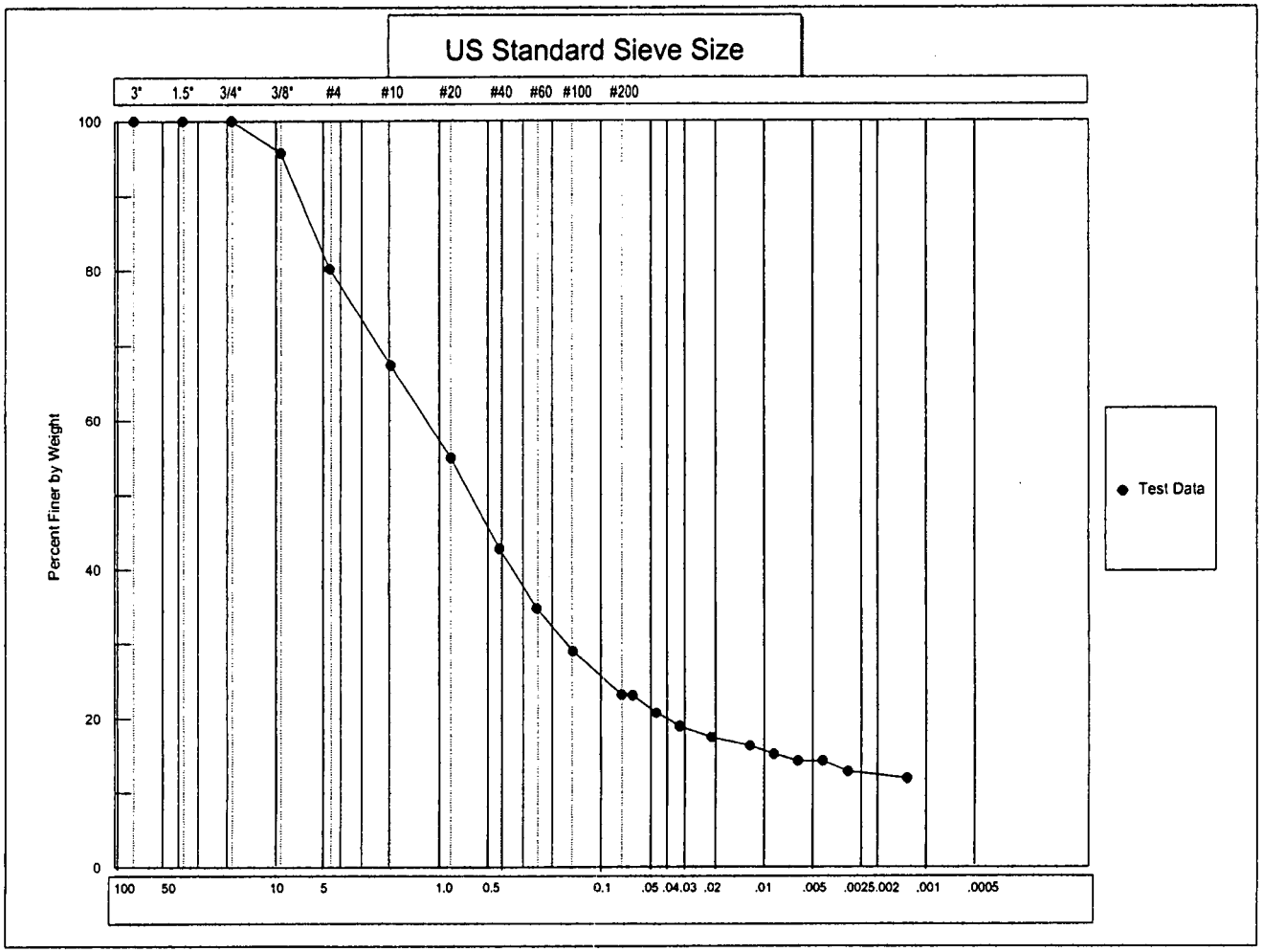
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	24.50	19.50	23.0	23.0	12.27	0.0642
1.0	22.50	17.50	20.7	20.7	12.60	0.0460
2.0	21.00	16.00	18.9	18.9	12.85	0.0328
5.0	19.75	14.75	17.4	17.4	13.05	0.0209
15.0	18.75	13.75	16.2	16.2	13.22	0.0122
30.0	17.75	12.75	15.1	15.1	13.38	0.0086
60.0	17.00	12.00	14.2	14.2	13.50	0.0061
120.0	17.00	12.00	14.2	14.2	13.50	0.0043
250.0	15.75	10.75	12.7	12.7	13.71	0.0030
1365.0	15.00	10.00	11.8	11.8	13.83	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: SR Date: 06/30/2005
Data checked by: ag Date: 6/30/05
FileName: TTH0BF02

ADVANCED TERRA TESTING, INC.

365



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Tetra Tech-RMC Boring No.: QA-BF-02 Sample No.: LaFarge Pit Fines
Job Number: 2617-15 Depth:
Classification: **Classification Not Performed** Advanced Terra Testing, Inc.

STANDARD PROCTOR COMPACTION TEST
METHOD A, B or C
ASTM D 698

366

COMPACTION TEST
ASTM D 698 B

CLIENT:	Tetra Tech - RMC	JOB NO.	2617-15
BORING NO.	QA-BF-02	DATE SAMPLED	
DEPTH		DATE TESTED	6/28/05 RS
SAMPLE NO.	LaFarge Pit Fines	LOCATION	Old Landfill
SOIL DESCR.			

Moisture Determination	1	2	3	4	5
Wt of Moisture added (ml)	240.00	160.00	280.00	320.00	200.00
Wt. of soil & dish (g)	290.02	398.30	390.01	287.93	513.86
Dry wt. soil & dish (g)	259.90	367.13	343.60	249.52	467.49
Net loss of moisture (g)	30.12	31.17	46.41	38.41	46.37
Wt. of dish (g)	8.38	8.23	7.86	8.65	8.12
Net wt. of dry soil (g)	251.52	358.90	335.74	240.87	459.37
Moisture Content (%)	11.98	8.68	13.82	15.95	10.09
Corrected Moisture Content					
Density determination					
Wt of soil & mold (lb)	14.89	14.63	14.77	14.66	14.82
Wt. of mold (lb)	10.31	10.31	10.31	10.31	10.31
Net wt. of wet soil (lb)	4.58	4.32	4.46	4.35	4.51
Net wt of dry soil (lb)	4.09	3.97	3.92	3.75	4.10
Dry Density, (pcf)	122.71	119.24	117.55	112.55	122.89
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

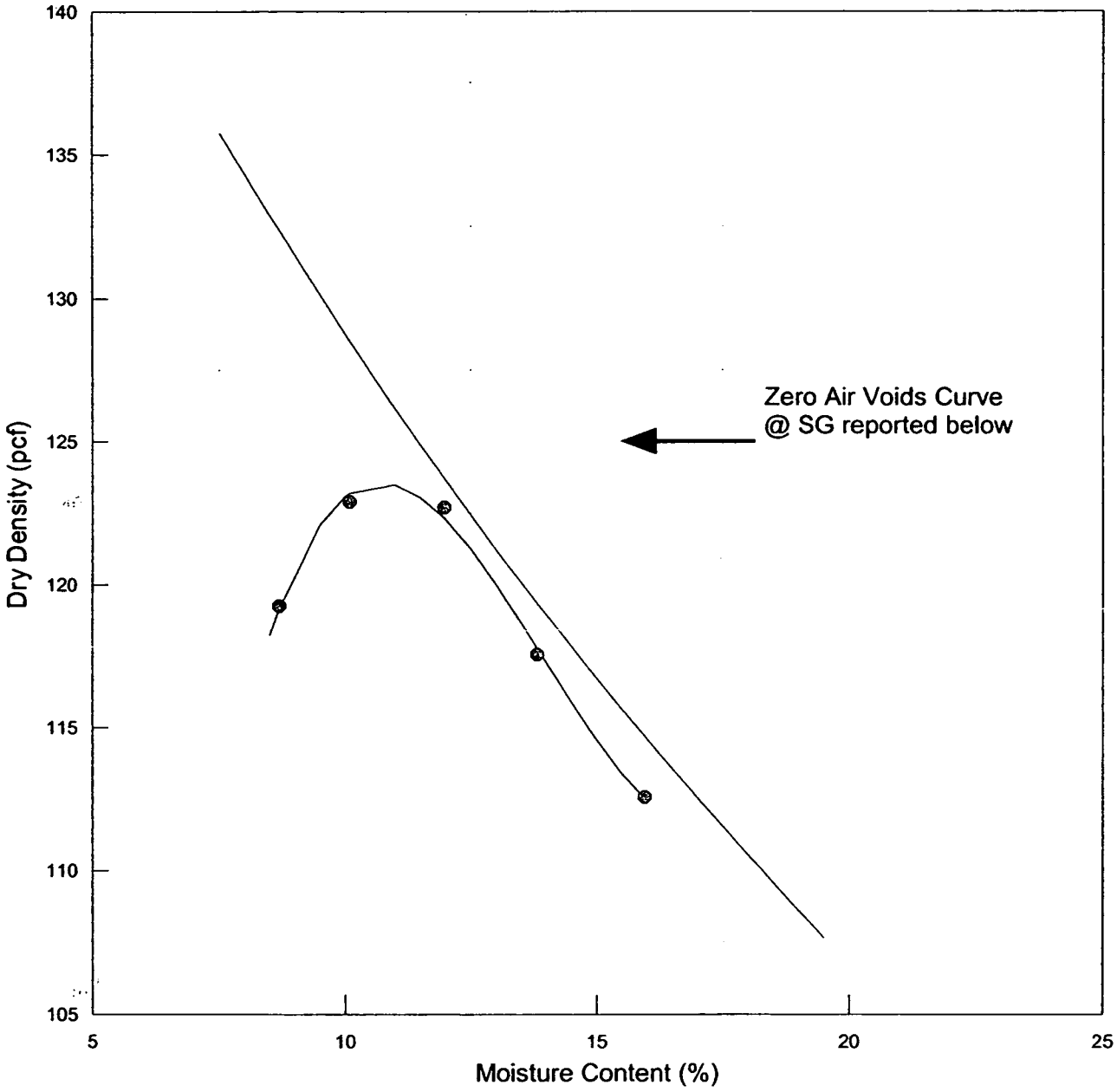
Data entered by: RS Date: 06/30/2005
Data checked by: VR Date: 6/30/05
FileName: TTPRLAFG

ADVANCED TERRA TESTING, INC.

367

Proctor Compaction Test

QA-BF-02, , LaFarge Pit Fines



- Best Fit Curve ● Actual Data - Zero Air VoidsCurve @ SG = 2.60

OPTIMUM MOISTURE CONTENT = 10.7 MAXIMUM DRY DENSITY = 123.5
ASTM D 698 B, Rock correction applied? N

ADVANCED TERRA TESTING, INC.

SAMPLE QA-BF-03

ADVANCED TERRA TESTING, Inc.
ATT
833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

368

ATTERBERG LIMITS
ASTM D 4318

369

ATTERBERG LIMITS TEST
ASTM D 4318

CLIENT	Tetra Tech-RMC	JOB NO.	2617-16
BORING NO.		DATE SAMPLED	
DEPTH		DATE TESTED	07-22-05 SKL
SAMPLE NO.	QA-BF-03		
SOIL DESCR.			
LOCATION			

Plastic Limit Determination

	1	2	3
Wt Dish & Wet Soil	6.97	7.00	6.93
Wt Dish & Dry Soil	6.21	6.26	6.20
Wt of Moisture	0.76	0.74	0.73
Wt of Dish	0.75	0.81	0.73
Wt of Dry Soil	5.46	5.45	5.47
Moisture Content	13.92	13.58	13.35

Liquid Limit Determination — Device Number 0860

	1	2	3
Number of Blows	17	20	32
Wt Dish & Wet Soil	11.50	12.63	11.98
Wt Dish & Dry Soil	8.53	9.43	9.06
Wt of Moisture	2.97	3.20	2.92
Wt of Dish	0.76	0.82	0.82
Wt of Dry Soil	7.77	8.61	8.24
Moisture Content	38.22	37.17	35.44

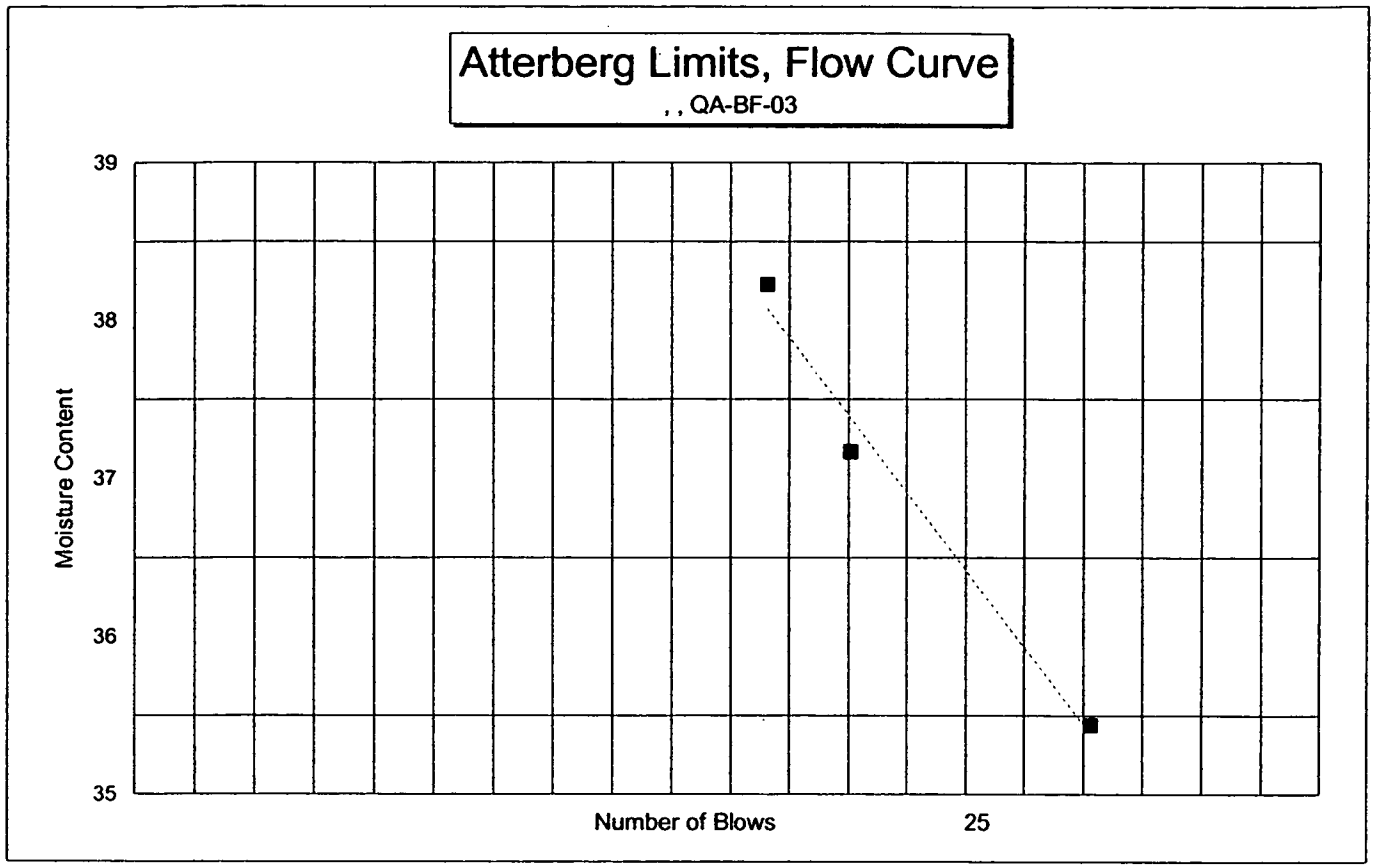
Liquid Limit	36.4
Plastic Limit	13.6
Plasticity Index	22.8

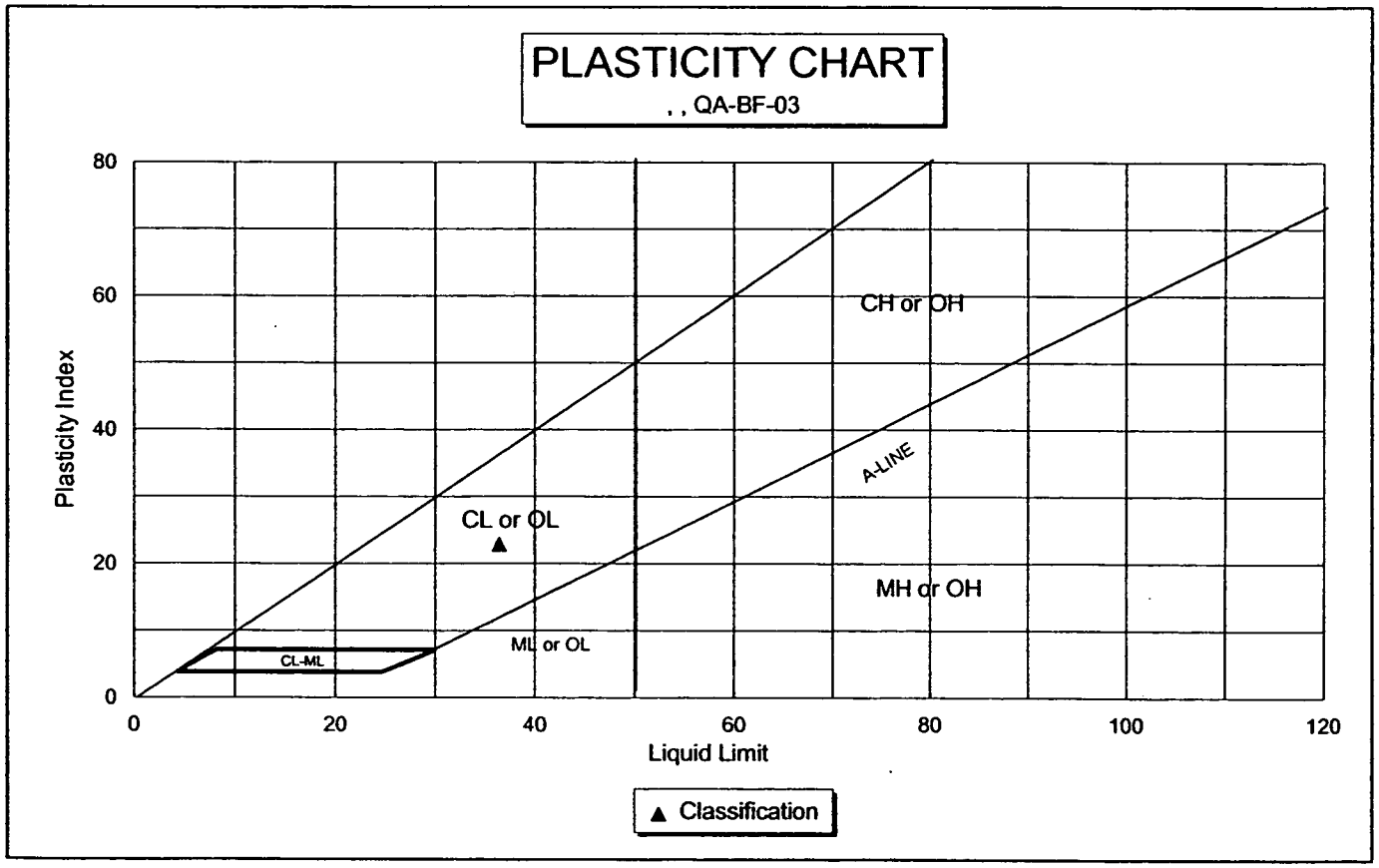
Atterberg Classification CL

Data entry by: SR Date: 07/25/2005
Checked by: SR Date: 7/25/05
FileName: TTG0BF03

ADVANCED TERRA TESTING, INC.

370


Atterberg Limits, Flow Curve
, , QA-BF-03
39
38
37
36
35
Moisture Content
Number of Blows
25


PLASTICITY CHART
, , QA-BF-03
80
60
40
20
0
Plasticity Index
CH or OH
A-LINE
CL or OL
MH or OH
ML or OL
CL-ML
0
20
40
60
80
100
120
Liquid Limit
▲ Classification

GRAIN SIZE ANALYSIS
3 Inch To - #200
ASTM D 422

371

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Tetra Tech-RMC	JOB NO.	2617-16
BORING NO.		SAMPLED	
DEPTH		DATE TESTED	07-21-05 AG
SAMPLE NO.	QA-BF-03	WASH SIEVE	Yes
SOIL DESCR.		DRY SIEVE	No
LOCATION			

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	69.05
Wt. Dry Soil & Pan (g)	66.90
Wt. Lost Moisture (g)	2.15
Wt. of Pan Only (g)	3.63
Wt. of Dry Soil (g)	63.27
Moisture Content %	3.4

Wt. Hydrom. Sample Wet (g)	205.18
Wt. Hydrom. Sample Dry (g)	198.44

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	3122.36
Weight of + #10 Before Washing (g)	823.06
Weight of + #10 After Washing (g)	696.82
Weight of - #10 Wet (g)	2299.30
Weight of - #10 Dry (g)	2345.83
Wt. Total Sample Dry (g)	3042.65

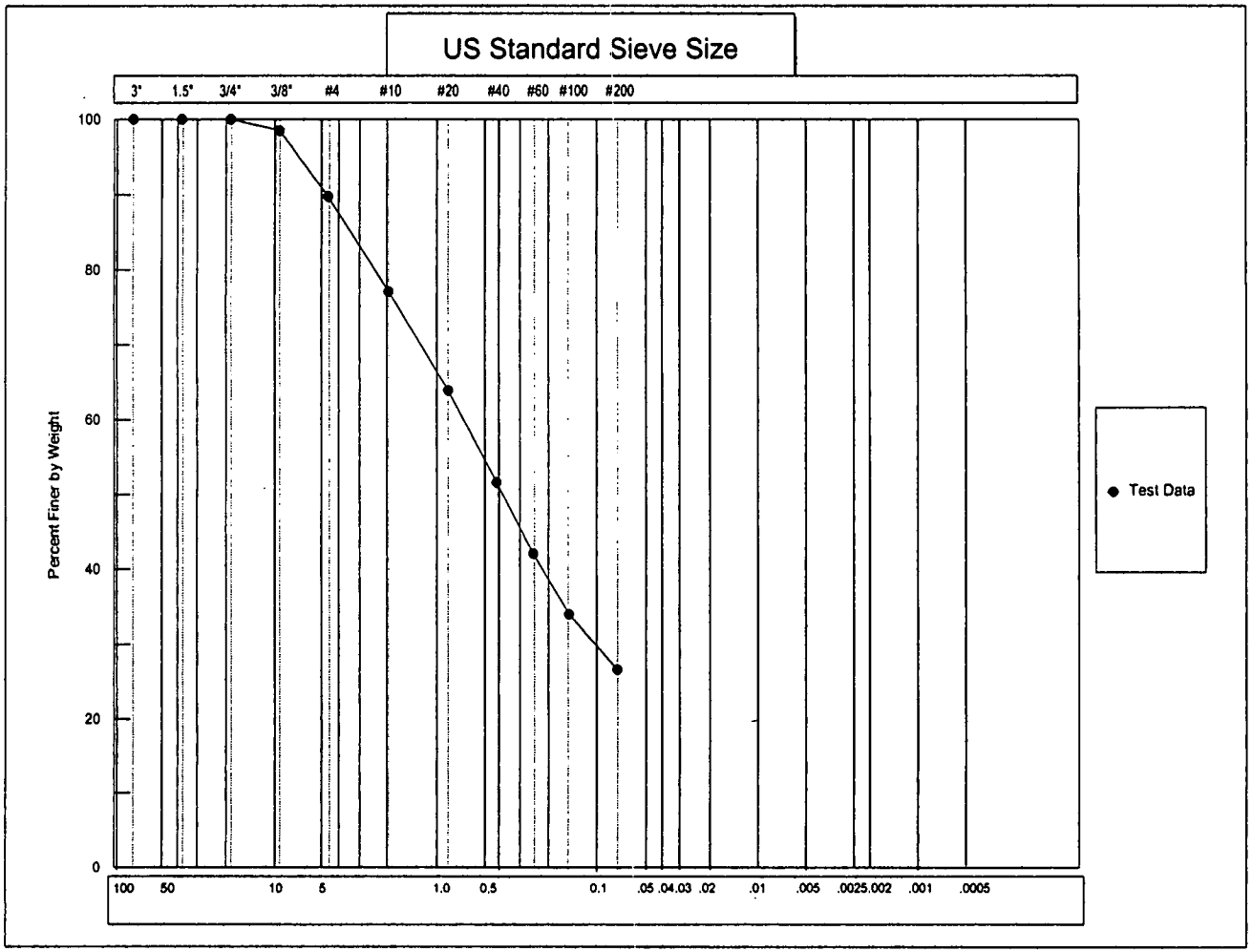
Calc. Wt. "W" (g)	257.38
Calc. Mass + #10	58.95

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	45.57	45.57	45.57	1.5	98.5
#4	0.00	264.67	264.67	310.24	10.2	89.8
#10	0.00	386.58	386.58	696.82	22.9	77.1
#20	3.66	37.78	34.12	34.12	36.2	63.8
#40	3.62	35.26	31.64	65.76	48.5	51.5
#60	3.69	28.24	24.55	90.31	58.0	42.0
#100	3.68	24.45	20.77	111.08	66.1	33.9
#200	3.60	22.52	18.92	130.00	73.4	26.6

Data entered by: SR Date: 07/22/2005
Data checked by: DPA Date: 7/22/05
FileName: TTM0BF03

ADVANCED TERRA TESTING, INC.

372



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Tetra Tech-RMC Boring No.: Sample No.: QA-BF-03
Job Number: 2617-16 Depth:
Classification: **Classification Not Performed**

Advanced Terra Testing, Inc.

STANDARD PROCTOR COMPACTION TEST
METHOD A, B or C
ASTM D 698

373

COMPACTION TEST
ASTM D 698 B

CLIENT: Tetra Tech - RMC JOB NO. 2617-16

BORING NO. QA-BF-03 DATE SAMPLED
DEPTH DATE TESTED 7/22/05 RS
SAMPLE NO. LOCATION
SOIL DESCR.

Moisture Determination

	1	2	3	4	5
Wt of Moisture added (ml)	280.00	240.00	200.00	160.00	120.00
Wt. of soil & dish (g)	366.42	316.50	392.85	426.16	381.52
Dry wt. soil & dish (g)	319.41	280.25	352.93	388.76	352.99
Net loss of moisture (g)	47.01	36.25	39.92	37.40	28.53
Wt. of dish (g)	8.31	8.21	8.34	8.65	7.84
Net wt. of dry soil (g)	311.10	272.04	344.59	380.11	345.15
Moisture Content (%)	15.11	13.33	11.58	9.84	8.27
Corrected Moisture Content					

Density determination

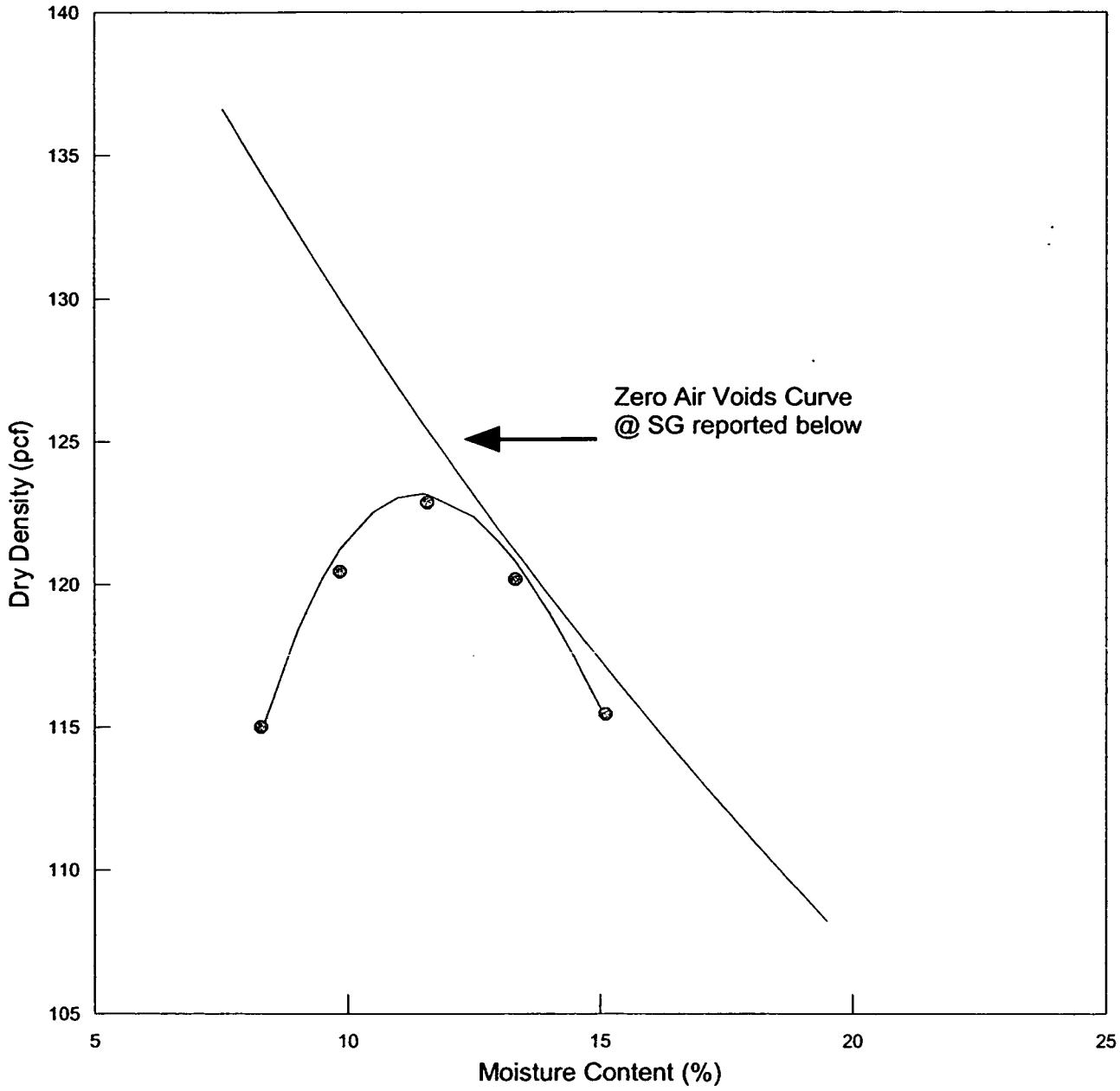
Wt of soil & mold (lb)	14.74	14.85	14.88	14.72	14.46
Wt. of mold (lb)	10.31	10.31	10.31	10.31	10.31
Net wt. of wet soil (lb)	4.43	4.54	4.57	4.41	4.15
Net wt of dry soil (lb)	3.85	4.01	4.10	4.01	3.83
Dry Density, (pcf)	115.45	120.19	122.87	120.45	114.99
Corrected Dry Density (pcf)					
Volume Factor	30	30	30	30	30

Data entered by: RS Date: 07/25/2005
Data checked by: [illegible] Date: 7/25/05
FileName: TTPRQB07 ADVANCED TERRA TESTING, INC.

374

Proctor Compaction Test

QA-BF-03, ,



- Best Fit Curve ● Actual Data - Zero Air VoidsCurve @ SG = 2.62

OPTIMUM MOISTURE CONTENT = 11.4 MAXIMUM DRY DENSITY = 123.2
ASTM D 698 B, Rock correction applied? N

ADVANCED TERRA TESTING, INC.

APPENDIX H

FINAL AS-BUILT RECORD SURVEYS OF THE OLF (SUBGRADE 1 AND 2, BUTTRESS AND COVER SOIL)

375

FINAL RECORD DRAWINGS
TABLE OF CONTENTS

SHEET 1: COVER SHEET

SHEET 2: FINISHED GRADE TO SUBGRADE 2 COMPARISON

SHEET 3: DIVERSION BERMS, SEEPS, AND EROSION MATTING LOCATIONS

SHEET 4: BUTTRESS TOPOGRAPHY SURVEY

SHEET 5: BUTTRESS DRAIN ROCK THICKNESS

SHEET 6: BUTTRESS SUBGRADE TOPOGRAPHY

SHEET 7: ORIGINAL LANDFILL FIELD DENSITY SAMPLE LOCATIONS

3716

APPENDIX I
AIR MONITORING DATA

ENVIROCON

MEMO

To: Mike Keating

From: Peter Holmyard, Envirocon H&S Manager, RFETS

Date: 6/24/05

Subject: **RFETS Original Landfill Project Air Sampling Results**

The attached report contains results from both personnel and area integrated air samples collected between May 19th and June 10th 2005 at the RFETS Original Landfill Project. Personnel samples were collected inside the cabs of equipment operators working in level C PPE with full face APR respirators equipped with P100/chemical cartridges, tyvek coveralls, booties, and nitrile gloves. Area samples were collected at the landfill exclusion zone (EZ) boundary. All samples were analyzed at a certified off-site industrial hygiene laboratory for metals.

The report includes:

- IH Sample Logs which describe when, where and for how long samples were collected
- A Summary of Laboratory Data, with calculated exposure Time-Weighted Averages for metals
- DataChem laboratory reports with sample analytical data, laboratory QA/QC data, and chain of custody forms.

All results were below both site and regulatory exposure limits for the metals analyzed.

If you have any questions, please call me at 303 994 3907.

385

ORIGINAL LANDFILL IH SAMPLING LOGS

386

ORIGINAL LANDFILL IH SAMPLE LOG

460- Date -00-xxx

DATE	SAMPLE NO.	LOCATION/ EMPLOYEE	PRE-FLOW L/MIN.	POST-FLOW L/MIN.	TIME ON	TIME TOTAL MIN.	
5-19-05	001	Ron Wood	2.530	2.642	0854	416	
5-19-05	002	Downwind of E.Z. West Boundry	2.523	2.613	0854	418	
5-20-05	003	Ron Wood	2.513	2.583	0848	470	
5-20-05	004	Downwind West Boundry	2.530	2.591	0848	447	
5-23-05	005	Ron Wood Excavator	2.487	2.551	05.52	543	
5-23-05	006	Downwind east boundary	2.512	2.590	08.00	414	
5-23-05	007	Brent Kessler In D-9	2.520	2.403	1842	392	
5-23-05	008	Downwind N.E. corner	2.522	2.410	1842	372	X
5-24-05	009	Downwind East Perimeter	2.514	2.443	10.10	927	- 1600 moved to west end
5-24-05	010	Ron Wood D-9	2.462	2.495	09.20	350	X
5-24-05	011	Brent Kessler D-9	2.513	2.457	1729	403	
5-26-05	012	Justin Turner on D9	2.494	~~2.494~~ 2.519	06.35	518	
5-26-05	013	Upwind North Perimeter	2.423	2.401	06.57	917	
5-26-05	014	Downwind South Perimeter	2.436	2.420	09.05	928	
5-26-05	015	Brent Kessler D-9	2.511	2.374	1540	584	
5-27-05	016	Justin Turner D9	2.484	cuts 2.431	06.40	526	
5-27-05	017	Downwind South Perimeter (west)	2.420	2.429	06.55	810	
BLANK 5-27-05	~~018~~	~~Ron Wood Excavator~~	~~2.478~~		~~09.50~~		Pump failed prior
5-27-05	019	South Perimeter (East)	2.459	2.479	09.50	634	
→ 5-27-05	020	Gabe Velasquez 825 compactor	2.510	2.475	1540	217	Pump accidently on hold
5-27-05	021	Brent Kessler D-9	2.514	2.455	1540	607	
5-31-05	022	Justin Turner D-9	2.511	2.462	0722	475	
5-31-05	023	David Nobbs 825 compactor	2.529	2.517	0734	478	
5-31-05	024	West Boundry Downwind	2.513	2.496 ~~2.512~~ Bwis	0723	471	
6-1-05	025	N. East Corner Boundry	2.519	2.510	0706	487	
6-1-05	026	North Boundry	2.507	2.486	0708	485	
~~6/1/05~~	027	Blank					
	~~028~~						
	~~029~~						
	~~030~~						

387

ORIGINAL LANDFILL IH SAMPLE LOG

DATE	SAMPLE NO.	LOCATION/ EMPLOYEE	PRE-FLOW L/MIN.	POST-FLOW L/MIN.	TIME	
					ON	TOTAL MIN.
6.6.05	001	JUSTIN TURNER	2.500	2.583	05.25	602
6.6.05	002	S.W. PERIMETER downwind	2.463	2.557	07.05	523
6.7.05	003	North Permeter downwind	2.440	2.489	06.50	516
6-8-05	004	Justin Turner D-9	2.518	2.557	0532	587
6-8-05	005	Forwood Excavator	2.503	2.548	0558	553
6-8-05	006	North Perimeter	2.505	2.511	0553	560
6-8-05	007	South Permeter adjacent to haul road	2.492	2.644	08.21	462
6-9-05	008	Justin Turner D-9	2.507	2.472	0632	524
6-9-05	009	N. Perimeter	2.497	2.485	0634	517
6-9-05	010	S. Perimeter	2.507	2.505	0642	505
6-10-05	011	Justin Turner	2.491	2.564	0531	806
6-10-05	012	David Hobbs	2.492	2.624	0537	866
6-10-05	013	Blank	Make	up 2	Blanks	+ Sent in
6-10-05	014					
	015					
	016					
	017					
	018					
	019					
	020					
	021					
	022					
	023					
	024					
	025					
	026					
	027					
	028					
	029					
	030					

ORIGINAL LANDFILL SUMMARY OF LABORATORY RESULTS

388

389

Summary of Laboratory Data on Integrated Air Samples Collected at Original Landfill Project, RFETS, from 5/19/05-6/10/05

Date	Individual/ Location	Results Expressed as Time-Weighted Average (TWA)												
		Arsenic µg/m³	Beryllium µg/m³	Cadmium µg/m³	Chromium µg/m³	Cobalt µg/m³	Copper µg/m³	Lead µg/m³	Molyb-denum µg/m³	Nickel µg/m³	Selenium µg/m³	Silver µg/m³	Tellurium µg/m³	Vanadium µg/m³
5/19/05	Ron Wood	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/19/05	West EZ Boundary	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/20/05	Ron Wood	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/20/05	West EZ Boundary	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/23/05	Ron Wood	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/23/05	East EZ Boundary	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/23/05	Brent Kesler	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/23/05	NE EZ Boundary	<8	<0.04	<0.12	<0.8	<0.2	<0.4	<1.0	<0.8	<0.2	<6	<0.2	<4	<0.1
5/24/05	East EZ Perimeter	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/24/05	Ron Wood	<8	<0.04	<0.12	<0.8	<0.2	<0.4	<1.0	<0.8	<0.2	<6	<0.2	<4	<0.1
5/24/05	Brent Kesler	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/26/05	Justin Turner	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/26/05	North EZ Perimeter	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/26/05	South EZ Perimeter	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/26/05	Brent Kesler	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/27/05	Justin Turner	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/27/05	SW EZ Perimeter	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/27/05	SE EZ Perimeter	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/27/05	Gabe Velasquez	<8	<0.04	<0.12	<0.8	<0.2	<0.4	<1.0	<0.8	<0.2	<6	<0.2	<4	<0.1
5/27/05	Brent Kesler	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05

Regulatory or Site Exposure Limits: Arsenic-10 µg/m³; Beryllium-0.1 µg/m³; Cadmium-5 µg/m³; Chromium-10µg/m³; Cobalt-20µg/m³; Copper-1000µg/m³; Lead-50µg/m³; Molybedenum-50µg/m³; Nickel-100µg/m³; Selenium-200µg/m³; Silver-10µg/m³;Tellurium-100µg/m³; Vanadium-50µg/m³

Summary of Laboratory Data on Integrated Air Samples Collected at Original Landfill Project, RFETS, from 5/19/05-6/10/05

Date	Individual/ Location	Results Expressed as Time-Weighted Average (TWA)												
		Arsenic µg/m³	Beryllium µg/m³	Cadmium µg/m³	Chromium µg/m³	Cobalt µg/m³	Copper µg/m³	Lead µg/m³	Molyb-denum µg/m³	Nickel µg/m³	Selenium µg/m³	Silver µg/m³	Tellurium µg/m³	Vanadium µg/m³
5/31/05	Justin Turner	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/31/05	David Hobbs	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
5/31/05	West EZ Boundary	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
6/1/05	NE EZ Boundary	<4	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
6/1/05	North EZ Boundary	<4	<0.02	<0.06	<0.4	<0.1	<0.2	<0.5	<0.4	<0.1	<3	<0.1	<2	<0.05
6/6/05	Justin Turner	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/6/05	SW EZ Perimeter	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/7/05	N EZ Perimeter	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/8/05	Justin Turner	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/8/05	Ron Wood	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/8/05	N EZ Perimeter	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/8/05	S EZ Perimeter	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/9/05	Justin Turner	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/9/05	N EZ Perimeter	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/9/05	S EZ Perimeter	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/10/05	Justin Turner	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05
6/10/05	David Hobbs	<3	<0.02	<0.06	<0.4	<0.08	<0.2	<0.5	<0.3	<0.1	<3	<0.1	<1	<0.05

Regulatory or Site Exposure Limits: Arsenic-10 µg/m³; Beryllium-0.1 µg/m³; Cadmium-5 µg/m³; Chromium-10µg/m³; Cobalt-20µg/m³; Copper-1000µg/m³; Lead-50µg/m³; Molybedenum-50µg/m³; Nickel-100µg/m³; Selenium-200µg/m³; Silver-10µg/m³;Tellurium-100µg/m³; Vanadium-50µg/m³

Summary of Laboratory Data on Integrated Air Samples Collected at Original Landfill Project, RFETS, From 5/19/05-6/10/05

Date	Individual/ Location	Results Expressed as Time-Weighted Average (TWA)				
		Aluminum mg/m^3	Calcium mg/m^3	Iron mg/m^3	Magnesium mg/m^3	Manganese mg/m^3
5/19/05	Ron Wood	<0.1	<0.1	<0.1	<0.1	<0.1
5/19/05	West EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
5/20/05	Ron Wood	<0.1	<0.1	<0.1	<0.1	<0.1
5/20/05	West EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
5/23/05	Ron Wood	<0.1	<0.1	<0.1	<0.1	<0.1
5/23/05	East EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
5/23/05	Brent Kesler	<0.1	<0.1	<0.1	<0.1	<0.1
5/23/05	NE EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
5/24/05	East EZ Perimeter	<0.1	<0.1	<0.1	<0.1	<0.1
5/24/05	Ron Wood	<0.1	<0.1	<0.1	<0.1	<0.1
5/24/05	Brent Kesler	<0.1	<0.1	<0.1	<0.1	<0.1
5/26/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
5/26/05	North EZ Perimeter	<0.1	<0.1	<0.1	<0.1	<0.1
5/26/05	South EZ Perimeter	<0.1	<0.1	<0.1	<0.1	<0.1
5/26/05	Brent Kesler	<0.1	<0.1	<0.1	<0.1	<0.1
5/27/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
5/27/05	SW EZ Perimeter	<0.1	<0.1	<0.1	<0.1	<0.1
5/27/05	SE EZ Perimeter	<0.1	<0.1	<0.1	<0.1	<0.1
5/27/05	Gabe Velasquez	<0.1	<0.1	<0.1	<0.1	<0.1
5/27/05	Brent Kesler	<0.1	<0.1	<0.1	<0.1	<0.1
5/31/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
5/31/05	David Hobbs	<0.1	<0.1	<0.1	<0.1	<0.1
5/31/05	West EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/1/05	NE EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/1/05	North EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/6/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
6/6/05	SW EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/7/05	N EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/8/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
6/8/05	Ron Wood	<0.1	<0.1	<0.1	<0.1	<0.1
6/8/05	N EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1

Regulatory or Site Exposure Limits: Aluminum-2mg/m^3; Calcium-2mg/m^3 ; Iron-5mg/m^3 ; Magnesium-10mg/m^3 ; Manganese-0.2mg/m^3

390

Summary of Laboratory Data on Integrated Air Samples Collected at Original Landfill Project, RFETS, From 5/19/05-6/10/05

Date	Individual/ Location	Results Expressed as Time-Weighted Average (TWA)				
		Aluminum mg/m^3	Calcium mg/m^3	Iron mg/m^3	Magnesium mg/m^3	Manganese mg/m^3
6/8/05	S EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/9/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
6/9/05	N EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/9/05	S EZ Boundary	<0.1	<0.1	<0.1	<0.1	<0.1
6/10/05	Justin Turner	<0.1	<0.1	<0.1	<0.1	<0.1
6/10/05	David Hobbs	<0.1	<0.1	<0.1	<0.1	<0.1

Regulatory or Site Exposure Limits: Aluminum-2mg/m^3; Calcium-2mg/m^3 ; Iron-5mg/m^3 ; Magnesium-10mg/m^3 ; Manganese-0.2mg/m^3

DATACHEM LABORATORY REPORTS

391

DATA CHEM LABORATORIES

Cover Page

Report Identification Number: 05K-0014-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: HIEBERT, DOUG
Laboratory Identification Number: DCHM
RIN: 05B0121
Purchase Order/Charge Code: GR861900

Sample Information

Bottle Number	Customer Sample Number	Laboratory Sample Number	Line Item Code (LIC)	Analytical Batch Identification	Sample Matrix
05B0121-001.001	460-05192005-00-001	05K00207	IH01D123	G055600L	IH
05B0121-002.001	460-05192005-00-002	05K00208	IH01D123	G055600L	IH
05B0121-003.001	460-05202005-00-003	05K00209	IH01D123	G055600L	IH
05B0121-004.001	460-05202005-00-004	05K00210	IH01D123	G055600L	IH
05B0121-005.001	460-05232005-00-005	05K00211	IH01D123	G055600L	IH
05B0121-006.001	460-05232005-00-006	05K00212	IH01D123	G055600L	IH
05B0121-007.001	460-05232005-00-007	05K00213	IH01D123	G055600L	IH
05B0121-008.001	460-05232005-00-008	05K00214	IH01D123	G055600L	IH
05B0121-009.001	460-05242005-00-009	05K00215	IH01D123	G055600L	IH
05B0121-010.001	460-05242005-00-010	05K00216	IH01D123	G055600L	IH
05B0121-011.001	460-05242005-00-011	05K00217	IH01D123	G055600L	IH
05B0121-012.001	460-05262005-00-012	05K00218	IH01D123	G055600L	IH
05B0121-013.001	460-05262005-00-013	05K00219	IH01D123	G055600L	IH
05B0121-014.001	460-05262005-00-014	05K00220	IH01D123	G055600L	IH
05B0121-015.001	460-05262005-00-015	05K00221	IH01D123	G055600L	IH
05B0121-016.001	460-05272005-00-016	05K00222	IH01D123	G055600L	IH
05B0121-017.001	460-05272005-00-017	05K00223	IH01D123	G055600L	IH
05B0121-018.001	460-05272005-00-018	05K00224	IH01D123	G055600L	IH
05B0121-019.001	460-05272005-00-019	05K00225	IH01D123	G055600L	IH
05B0121-020.001	460-05272005-00-020	05K00226	IH01D123	G055600L	IH
05B0121-021.001	460-05272005-00-021	05K00227	IH01D123	G055600L	IH
05B0121-022.001	460-05312005-00-022	05K00228	IH01D123	G055600L	IH
05B0121-023.001	460-05312005-00-023	05K00229	IH01D123	G055600L	IH
05B0121-024.001	460-05312005-00-024	05K00230	IH01D123	G055600L	IH
05B0121-025.001	460-06012005-00-025	05K00231	IH01D123	G055600L	IH
05B0121-026.001	460-06012005-00-026	05K00232	IH01D123	G055600L	IH
05B0121-027.001	460-06012005-00-027	05K00233	IH01D123	G055600L	IH

I certify that this electronic image and all hardcopies produced from this image accurately represent the data and are in compliance with the RFETS specific requirements, both technically and for completeness, other

Cover Page

than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager or the Manager's designee.

The Delivery and receipt of this Data Deliverable constitutes an invoice for payment for this Data Deliverable.

Name: Michelle Paradise
Title: Chemist
Date: June 08, 2005

DATA CHEM LABORATORIES

Case Narrative Page

Report Identification Number: 05K-0014-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: HIEBERT, DOUG
Laboratory Identification Number: DCHM
RIN: 05B0121
Purchase Order/Charge Code: GR861900

General Set Information: There are 27 samples in RIN# 05B0121. The samples were analyzed for 20 metals on MCE filter by ICP. No problems were encountered with the receipt of these samples and no contact with the CTR was required.

Method Summary: Samples were transferred to 50 ml centrifuge tubes and digested in the presence of 10 mL of 1:1 (v/v) nitric acid. Samples were digested in a hot block set at 110°C (thermometer reading at 82.6°C) for 40 minutes. Samples were then diluted to a 25 mL volume with ASTM Type II Water. Samples were shaken and delivered for ICP analysis.

Sample Preparation: All samples were prepared in accordance with DCL SOP "IH-AN-021" and NIOSH method NMAM 7300 modified for hot block digestion.

Holding Times: The holding times were met for both sample preparation and analysis.

Instrument Calibration: Instrument calibration was performed in accordance with NIOSH method NMAM 7300.

Initial and Continuing Calibration Verification Analysis: Analyte recoveries in all Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples are within the quality control limits of ± 10%.

Initial and Continuing Calibration Blank Analysis: No analyte results were found in the Initial Calibration Blank (ICB) or Continuing Calibration Blanks (CCB) at levels above the Contract Required Detection Limits (CRDL).

Method Blank Analysis: None of the analytes in the media blank samples are above the Contract Required Detection Limits (CRDL).

Dilution(s): None of the samples were diluted.

Laboratory Control Sample and Duplicate Analysis: Two Laboratory Control Samples (LCS) and two Laboratory Control Sample Duplicates (LCSD) were prepared and analyzed with the sample batch. The LCSs results are within control limits of ± 20% except for iron in QC-232431-1 at 131% recovery. The Relative Percent Differences (RPD) between the LCSs and LCSDs are within the control limit of 20%.

Case Narrative Page

Replicate Analysis: Three samples in this batch were replicated. The RPDs between the samples and the replicates are within the control limit of 20%. If the result of the sample or replicate is below the CRDL, replicate analysis is negligible.

Flagging Codes:

U - Analyte not detected above the Method Detection Limit (MDL).

J - Analyte result is reported above the Method Detection Limit (MDL) ug/sample, but below the Contract Required Detection Limit (CRDL).

Nonconformance/Corrective Action Report (NC/CAR): None.

Sample Calculation: The final results are calculated by the following equation:

Final result for aqueous samples (µg/sample) = (A) x (B) x (C)

Where:

A = Analyte concentration from instrument determination (µg/L)

B = Concentration factor from sample preparation

$$= \frac{\text{Final Volume of Digestate (L)}}{\text{Sample}}$$

C = Dilution performed at time of analysis

Example Calculation: (1 µg/L) x (0.025 L/sample) x (1) = 0.025 µg/sample

Miscellaneous Comments: See report for limits.

DATA CHEM LABORATORIES

Report Page

Report Identification Number: 05K-0014-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: HIEBERT, DOUG
Laboratory Identification Number: DCHM
RIN: 05B0121
Purchase Order/Charge Code: GR861900

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Aluminum µg/sample		Arsenic µg/sample		Beryllium µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	2.8		<4.	U	<0.02	U
460-05192005-00-002	05K00208	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05202005-00-003	05K00209	07 Jun 2005	4.8		<4.	U	<0.02	U
460-05202005-00-004	05K00210	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05232005-00-005	05K00211	07 Jun 2005	6.2		<4.	U	<0.02	U
460-05232005-00-006	05K00212	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05232005-00-007	05K00213	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05232005-00-008	05K00214	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05242005-00-009	05K00215	07 Jun 2005	2.2		<4.	U	<0.02	U
460-05242005-00-010	05K00216	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05242005-00-011	05K00217	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05262005-00-012	05K00218	07 Jun 2005	3.5		<4.	U	<0.02	U
460-05262005-00-013	05K00219	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05262005-00-014	05K00220	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05262005-00-015	05K00221	07 Jun 2005	4.0		<4.	U	<0.02	U
460-05272005-00-016	05K00222	07 Jun 2005	8.4		<4.	U	<0.02	U
460-05272005-00-017	05K00223	07 Jun 2005	4.5		<4.	U	<0.02	U
460-05272005-00-018	05K00224	07 Jun 2005	<2.	U	<4.	U	<0.02	U
460-05272005-00-019	05K00225	07 Jun 2005	3.8		<4.	U	<0.02	U
460-05272005-00-020	05K00226	07 Jun 2005	2.8		<4.	U	<0.02	U
460-05272005-00-021	05K00227	07 Jun 2005	5.4		<4.	U	<0.02	U
460-05312005-00-022	05K00228	07 Jun 2005	2.1		<4.	U	<0.02	U
460-05312005-00-023	05K00229	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-05312005-00-024	05K00230	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-06012005-00-025	05K00231	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-06012005-00-026	05K00232	07 Jun 2005	<2.	J	<4.	U	<0.02	U
460-06012005-00-027	05K00233	07 Jun 2005	<2.	U	<4.	U	<0.02	U
		Limit of Detection (LOD)	0.5		1.		0.004	
		Required Detection Limit (RDL)	2.		4.		0.02	

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

394

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Cadmium µg/sample		Calcium µg/sample		Chromium µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	<0.06	U	5.6		<0.4	J
460-05192005-00-002	05K00208	07 Jun 2005	<0.06	U	3.2		<0.4	J
460-05202005-00-003	05K00209	07 Jun 2005	<0.06	U	6.5		<0.4	J
460-05202005-00-004	05K00210	07 Jun 2005	<0.06	U	<2.	J	<0.4	J
460-05232005-00-005	05K00211	07 Jun 2005	<0.06	U	9.3		<0.4	J
460-05232005-00-006	05K00212	07 Jun 2005	<0.06	U	3.0		<0.4	J
460-05232005-00-007	05K00213	07 Jun 2005	<0.06	U	3.3		<0.4	J
460-05232005-00-008	05K00214	07 Jun 2005	<0.06	U	2.3		<0.4	J
460-05242005-00-009	05K00215	07 Jun 2005	<0.06	U	4.1		<0.4	J
460-05242005-00-010	05K00216	07 Jun 2005	<0.06	U	3.2		<0.4	J
460-05242005-00-011	05K00217	07 Jun 2005	<0.06	U	2.5		<0.4	J
460-05262005-00-012	05K00218	07 Jun 2005	<0.06	U	5.2		<0.4	J
460-05262005-00-013	05K00219	07 Jun 2005	<0.06	U	3.2		<0.4	J
460-05262005-00-014	05K00220	07 Jun 2005	<0.06	U	3.2		<0.4	J
460-05262005-00-015	05K00221	07 Jun 2005	<0.06	U	7.0		<0.4	J
460-05272005-00-016	05K00222	07 Jun 2005	<0.06	U	19.		<0.4	J
460-05272005-00-017	05K00223	07 Jun 2005	<0.06	U	7.6		<0.4	J
460-05272005-00-018	05K00224	07 Jun 2005	<0.06	U	<2.	J	<0.4	J
460-05272005-00-019	05K00225	07 Jun 2005	<0.06	U	8.7		<0.4	J
460-05272005-00-020	05K00226	07 Jun 2005	<0.06	U	4.7		<0.4	J
460-05272005-00-021	05K00227	07 Jun 2005	<0.06	U	8.9		<0.4	J
460-05312005-00-022	05K00228	07 Jun 2005	<0.06	U	4.3		<0.4	J
460-05312005-00-023	05K00229	07 Jun 2005	<0.06	U	3.6		<0.4	J
460-05312005-00-024	05K00230	07 Jun 2005	<0.06	U	3.1		<0.4	J
460-06012005-00-025	05K00231	07 Jun 2005	<0.06	U	3.0		<0.4	J
460-06012005-00-026	05K00232	07 Jun 2005	<0.06	U	2.6		<0.4	J
460-06012005-00-027	05K00233	07 Jun 2005	<0.06	U	<2.	J	<0.4	J
Limit of Detection (LOD)			0.6		0.02		0.1	
Required Detection Limit (RDL)			0.06		2.		0.4	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Cobalt µg/sample		Copper µg/sample		Iron µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	<0.08	U	<0.2	U	4.1	
460-05192005-00-002	05K00208	07 Jun 2005	<0.08	U	<0.2	U	2.3	
460-05202005-00-003	05K00209	07 Jun 2005	<0.08	U	<0.2	U	7.2	
460-05202005-00-004	05K00210	07 Jun 2005	<0.08	U	<0.2	U	1.7	

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Cobalt µg/sample		Copper µg/sample		Iron µg/sample	
460-05232005-00-005	05K00211	07 Jun 2005	<0.08	U	<0.2	J	14.	
460-05232005-00-006	05K00212	07 Jun 2005	<0.08	U	<0.2	U	2.0	
460-05232005-00-007	05K00213	07 Jun 2005	<0.08	U	<0.2	U	2.5	
460-05232005-00-008	05K00214	07 Jun 2005	<0.08	U	<0.2	U	2.6	
460-05242005-00-009	05K00215	07 Jun 2005	<0.08	U	<0.2	U	2.8	
460-05242005-00-010	05K00216	07 Jun 2005	<0.08	U	<0.2	U	8.2	
460-05242005-00-011	05K00217	07 Jun 2005	<0.08	U	<0.2	U	3.1	
460-05262005-00-012	05K00218	07 Jun 2005	<0.08	U	<0.2	U	4.4	
460-05262005-00-013	05K00219	07 Jun 2005	<0.08	U	<0.2	U	2.4	
460-05262005-00-014	05K00220	07 Jun 2005	<0.08	U	<0.2	U	4.2	
460-05262005-00-015	05K00221	07 Jun 2005	<0.08	U	<0.2	U	5.1	
460-05272005-00-016	05K00222	07 Jun 2005	<0.08	U	<0.2	U	12.	
460-05272005-00-017	05K00223	07 Jun 2005	<0.08	U	<0.2	U	7.4	
460-05272005-00-018	05K00224	07 Jun 2005	<0.08	U	<0.2	U	<1.	J
460-05272005-00-019	05K00225	07 Jun 2005	<0.08	U	<0.2	U	7.0	
460-05272005-00-020	05K00226	07 Jun 2005	<0.08	U	<0.2	U	3.6	
460-05272005-00-021	05K00227	07 Jun 2005	<0.08	U	<0.2	U	7.3	
460-05312005-00-022	05K00228	07 Jun 2005	<0.08	U	<0.2	U	3.6	
460-05312005-00-023	05K00229	07 Jun 2005	<0.08	U	<0.2	U	1.4	
460-05312005-00-024	05K00230	07 Jun 2005	<0.08	U	<0.2	U	6.7	
460-06012005-00-025	05K00231	07 Jun 2005	<0.08	U	<0.2	U	3.6	
460-06012005-00-026	05K00232	07 Jun 2005	<0.08	U	<0.2	U	2.0	
460-06012005-00-027	05K00233	07 Jun 2005	<0.08	U	<0.2	U	<1.	U
Limit of Detection (LOD)			0.03		0.05		0.4	
Required Detection Limit (RDL)			0.08		0.2		1.	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Lead µg/sample		Magnesium µg/sample		Manganese µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	<0.5	U	1.5		0.086	
460-05192005-00-002	05K00208	07 Jun 2005	<0.5	U	1.1		<0.08	J
460-05202005-00-003	05K00209	07 Jun 2005	<0.5	U	2.1		0.14	
460-05202005-00-004	05K00210	07 Jun 2005	<0.5	U	0.79		<0.08	J
460-05232005-00-005	05K00211	07 Jun 2005	<0.5	U	2.3		0.22	
460-05232005-00-006	05K00212	07 Jun 2005	<0.5	U	1.1		<0.08	J
460-05232005-00-007	05K00213	07 Jun 2005	<0.5	U	1.0		<0.08	J
460-05232005-00-008	05K00214	07 Jun 2005	<0.5	U	1.1		<0.08	J

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Lead µg/sample		Magnesium µg/sample		Manganese µg/sample	
460-05242005-00-009	05K00215	07 Jun 2005	<0.5	U	1.3		<0.08	J
460-05242005-00-010	05K00216	07 Jun 2005	<0.5	U	1.0		<0.08	J
460-05242005-00-011	05K00217	07 Jun 2005	<0.5	U	0.91		<0.08	J
460-05262005-00-012	05K00218	07 Jun 2005	<0.5	U	1.5		<0.08	J
460-05262005-00-013	05K00219	07 Jun 2005	<0.5	U	1.9		<0.08	J
460-05262005-00-014	05K00220	07 Jun 2005	<0.5	U	1.1		<0.08	J
460-05262005-00-015	05K00221	07 Jun 2005	<0.5	U	1.7		0.092	
460-05272005-00-016	05K00222	07 Jun 2005	<0.5	U	2.7		0.20	
460-05272005-00-017	05K00223	07 Jun 2005	<0.5	U	2.0		0.16	
460-05272005-00-018	05K00224	07 Jun 2005	<0.5	U	0.71		<0.08	U
460-05272005-00-019	05K00225	07 Jun 2005	<0.5	U	1.7		0.18	
460-05272005-00-020	05K00226	07 Jun 2005	<0.5	U	1.2		<0.08	J
460-05272005-00-021	05K00227	07 Jun 2005	<0.5	U	1.7		0.14	
460-05312005-00-022	05K00228	07 Jun 2005	<0.5	U	0.89		<0.08	J
460-05312005-00-023	05K00229	07 Jun 2005	<0.5	U	0.84		<0.08	J
460-05312005-00-024	05K00230	07 Jun 2005	<0.5	U	0.98		<0.08	J
460-06012005-00-025	05K00231	07 Jun 2005	<0.5	U	1.0		<0.08	J
460-06012005-00-026	05K00232	07 Jun 2005	<0.5	U	0.97		<0.08	J
460-06012005-00-027	05K00233	07 Jun 2005	<0.5	U	0.67		<0.08	U
Limit of Detection (LOD)			0.2		0.06		0.02	
Required Detection Limit (RDL)			0.5		0.2		0.08	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Molybdenum µg/sample		Nickel µg/sample		Selenium µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05192005-00-002	05K00208	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05202005-00-003	05K00209	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05202005-00-004	05K00210	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05232005-00-005	05K00211	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05232005-00-006	05K00212	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05232005-00-007	05K00213	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05232005-00-008	05K00214	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05242005-00-009	05K00215	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05242005-00-010	05K00216	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05242005-00-011	05K00217	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05262005-00-012	05K00218	07 Jun 2005	<0.4	U	<0.1	J	<3.	U

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Molybdenum µg/sample		Nickel µg/sample		Selenium µg/sample	
460-05262005-00-013	05K00219	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05262005-00-014	05K00220	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05262005-00-015	05K00221	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05272005-00-016	05K00222	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05272005-00-017	05K00223	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05272005-00-018	05K00224	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05272005-00-019	05K00225	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-05272005-00-020	05K00226	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05272005-00-021	05K00227	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05312005-00-022	05K00228	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05312005-00-023	05K00229	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-05312005-00-024	05K00230	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-06012005-00-025	05K00231	07 Jun 2005	<0.4	U	<0.1	J	<3.	U
460-06012005-00-026	05K00232	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
460-06012005-00-027	05K00233	07 Jun 2005	<0.4	U	<0.1	U	<3.	U
Limit of Detection (LOD)			0.1		0.04		0.9	
Required Detection Limit (RDL)			0.4		0.1		3.	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Silver µg/sample		Sodium µg/sample		Tellurium µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	<0.1	U	15.		<2.	U
460-05192005-00-002	05K00208	07 Jun 2005	<0.1	U	14.		<2.	U
460-05202005-00-003	05K00209	07 Jun 2005	<0.1	U	16.		<2.	U
460-05202005-00-004	05K00210	07 Jun 2005	<0.1	U	8.1		<2.	U
460-05232005-00-005	05K00211	07 Jun 2005	<0.1	U	14.		<2.	U
460-05232005-00-006	05K00212	07 Jun 2005	<0.1	U	14.		<2.	U
460-05232005-00-007	05K00213	07 Jun 2005	<0.1	U	14.		<2.	U
460-05232005-00-008	05K00214	07 Jun 2005	<0.1	U	14.		<2.	U
460-05242005-00-009	05K00215	07 Jun 2005	<0.1	U	14.		<2.	U
460-05242005-00-010	05K00216	07 Jun 2005	<0.1	U	14.		<2.	U
460-05242005-00-011	05K00217	07 Jun 2005	<0.1	U	8.3		<2.	U
460-05262005-00-012	05K00218	07 Jun 2005	<0.1	U	8.4		<2.	U
460-05262005-00-013	05K00219	07 Jun 2005	<0.1	U	13.		<2.	U
460-05262005-00-014	05K00220	07 Jun 2005	<0.1	U	8.8		<2.	U
460-05262005-00-015	05K00221	07 Jun 2005	<0.1	U	14.		<2.	U
460-05272005-00-016	05K00222	07 Jun 2005	<0.1	U	14.		<2.	U

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Silver µg/sample		Sodium µg/sample		Tellurium µg/sample	
460-05272005-00-017	05K00223	07 Jun 2005	<0.1	U	13.		<2.	U
460-05272005-00-018	05K00224	07 Jun 2005	<0.1	U	13.		<2.	U
460-05272005-00-019	05K00225	07 Jun 2005	<0.1	U	9.1		<2.	U
460-05272005-00-020	05K00226	07 Jun 2005	<0.1	U	8.9		<2.	U
460-05272005-00-021	05K00227	07 Jun 2005	<0.1	U	8.9		<2.	U
460-05312005-00-022	05K00228	07 Jun 2005	<0.1	U	8.0		<2.	U
460-05312005-00-023	05K00229	07 Jun 2005	<0.1	U	13.		<2.	U
460-05312005-00-024	05K00230	07 Jun 2005	<0.1	U	13.		<2.	U
460-06012005-00-025	05K00231	07 Jun 2005	<0.1	U	14.		<2.	U
460-06012005-00-026	05K00232	07 Jun 2005	<0.1	U	14.		<2.	U
460-06012005-00-027	05K00233	07 Jun 2005	<0.1	U	13.		<2.	U
Limit of Detection (LOD)			0.04		1.		0.4	
Required Detection Limit (RDL)			0.1		5.		2.	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Vanadium µg/sample		Zinc µg/sample	
460-05192005-00-001	05K00207	07 Jun 2005	<0.05	J	<0.5	J
460-05192005-00-002	05K00208	07 Jun 2005	<0.05	J	<0.5	J
460-05202005-00-003	05K00209	07 Jun 2005	<0.05	J	<0.5	J
460-05202005-00-004	05K00210	07 Jun 2005	<0.05	U	<0.5	J
460-05232005-00-005	05K00211	07 Jun 2005	<0.05	J	0.62	
460-05232005-00-006	05K00212	07 Jun 2005	<0.05	U	<0.5	J
460-05232005-00-007	05K00213	07 Jun 2005	<0.05	U	<0.5	J
460-05232005-00-008	05K00214	07 Jun 2005	<0.05	U	<0.5	J
460-05242005-00-009	05K00215	07 Jun 2005	<0.05	J	<0.5	J
460-05242005-00-010	05K00216	07 Jun 2005	<0.05	U	0.76	
460-05242005-00-011	05K00217	07 Jun 2005	<0.05	U	<0.5	J
460-05262005-00-012	05K00218	07 Jun 2005	<0.05	J	<0.5	J
460-05262005-00-013	05K00219	07 Jun 2005	<0.05	U	<0.5	J
460-05262005-00-014	05K00220	07 Jun 2005	<0.05	U	<0.5	J
460-05262005-00-015	05K00221	07 Jun 2005	<0.05	U	<0.5	J
460-05272005-00-016	05K00222	07 Jun 2005	<0.05	J	<0.5	J
460-05272005-00-017	05K00223	07 Jun 2005	<0.05	J	<0.5	J
460-05272005-00-018	05K00224	07 Jun 2005	<0.05	U	<0.5	J
460-05272005-00-019	05K00225	07 Jun 2005	<0.05	U	<0.5	J
460-05272005-00-020	05K00226	07 Jun 2005	<0.05	J	<0.5	J

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Vanadium µg/sample		Zinc µg/sample	
460-05272005-00-021	05K00227	07 Jun 2005	<0.05	J	<0.5	J
460-05312005-00-022	05K00228	07 Jun 2005	<0.05	U	<0.5	J
460-05312005-00-023	05K00229	07 Jun 2005	<0.05	U	<0.5	J
460-05312005-00-024	05K00230	07 Jun 2005	<0.05	U	<0.5	J
460-06012005-00-025	05K00231	07 Jun 2005	<0.05	U	<0.5	J
460-06012005-00-026	05K00232	07 Jun 2005	<0.05	U	<0.5	J
460-06012005-00-027	05K00233	07 Jun 2005	<0.05	U	<0.5	J
Limit of Detection (LOD)			0.01		0.1	
Required Detection Limit (RDL)			0.05		0.5	

U - Parameter not detected above LOD.
J - Parameter between LOD and RDL.

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

397

DATA CHEM LABORATORIES

QC Summary Page

Report Identification Number: 05K-0014-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: HIEBERT, DOUG
Laboratory Identification Number: DCHM
RIN: 05B0121
Purchase Order/Charge Code: GR861900

Batch ID: G055600L

QC Sample ID	QC Type	Analyte	Units	Result	Parent Result	Target	Percent Rec.	Relative Percent Diff.
BL-232431-1	MB	Aluminum	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Arsenic	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Beryllium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Cadmium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Calcium	µg/sample	1.	NA	NA	NA	NA
BL-232431-1	MB	Chromium	µg/sample	0.1	NA	NA	NA	NA
BL-232431-1	MB	Cobalt	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Copper	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Iron	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Lead	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Magnesium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Manganese	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Molybdenum	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Nickel	µg/sample	0.09	NA	NA	NA	NA
BL-232431-1	MB	Selenium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Silver	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Sodium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Tellurium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Vanadium	µg/sample	ND	NA	NA	NA	NA
BL-232431-1	MB	Zinc	µg/sample	ND	NA	NA	NA	NA
QC-232431-1	LCS	Aluminum	µg/sample	40.1	NA	0.00	0.00	NA
QC-232431-1	LCS	Arsenic	µg/sample	35.6	NA	40.0	89.0	NA
QC-232431-1	LCS	Beryllium	µg/sample	10.2	NA	10.0	102.	NA
QC-232431-1	LCS	Cadmium	µg/sample	10.5	NA	10.0	105.	NA
QC-232431-1	LCS	Calcium	µg/sample	42.9	NA	40.0	107.	NA
QC-232431-1	LCS	Chromium	µg/sample	10.6	NA	10.0	106.	NA
QC-232431-1	LCS	Cobalt	µg/sample	10.6	NA	10.0	106.	NA
QC-232431-1	LCS	Copper	µg/sample	11.1	NA	10.0	111.	NA
QC-232431-1	LCS	Iron	µg/sample	26.1	NA	20.0	131.	NA

DATA CHEM LABORATORIES

QC Summary Page

QC-232431-1	LCS	Lead	µg/sample	41.0	NA	40.0	102.	NA
QC-232431-1	LCS	Magnesium	µg/sample	40.8	NA	40.0	102.	NA
QC-232431-1	LCS	Manganese	µg/sample	10.5	NA	10.0	105.	NA
QC-232431-1	LCS	Molybdenum	µg/sample	41.3	NA	40.0	103.	NA
QC-232431-1	LCS	Nickel	µg/sample	10.5	NA	10.0	105.	NA
QC-232431-1	LCS	Selenium	µg/sample	39.5	NA	40.0	98.6	NA
QC-232431-1	LCS	Silver	µg/sample	10.6	NA	10.0	106.	NA
QC-232431-1	LCS	Sodium	µg/sample	208.	NA	200.	104.	NA
QC-232431-1	LCS	Tellurium	µg/sample	0.00	NA	0.00		NA
QC-232431-1	LCS	Vanadium	µg/sample	10.5	NA	10.0	105.	NA
QC-232431-1	LCS	Zinc	µg/sample	9.99	NA	10.0	99.9	NA
QD-232431-1	LCSD	Aluminum	µg/sample	40.8	40.1	0.00	0.00	1.87
QD-232431-1	LCSD	Arsenic	µg/sample	36.7	35.6	40.0	91.7	3.06
QD-232431-1	LCSD	Beryllium	µg/sample	10.4	10.2	10.0	104.	2.30
QD-232431-1	LCSD	Cadmium	µg/sample	10.8	10.5	10.0	108.	2.30
QD-232431-1	LCSD	Calcium	µg/sample	44.0	42.9	40.0	110.	2.58
QD-232431-1	LCSD	Chromium	µg/sample	10.8	10.6	10.0	108.	1.69
QD-232431-1	LCSD	Cobalt	µg/sample	10.9	10.6	10.0	109.	2.54
QD-232431-1	LCSD	Copper	µg/sample	11.3	11.1	10.0	113.	2.05
QD-232431-1	LCSD	Iron	µg/sample	22.0	26.1	20.0	110.	17.2
QD-232431-1	LCSD	Lead	µg/sample	42.0	41.0	40.0	105.	2.50
QD-232431-1	LCSD	Magnesium	µg/sample	41.7	40.8	40.0	104.	2.28
QD-232431-1	LCSD	Manganese	µg/sample	10.7	10.5	10.0	107.	1.98
QD-232431-1	LCSD	Molybdenum	µg/sample	42.2	41.3	40.0	105.	2.21
QD-232431-1	LCSD	Nickel	µg/sample	10.8	10.5	10.0	108.	2.47
QD-232431-1	LCSD	Selenium	µg/sample	40.2	39.5	40.0	100.	1.75
QD-232431-1	LCSD	Silver	µg/sample	10.8	10.6	10.0	108.	2.24
QD-232431-1	LCSD	Sodium	µg/sample	210.	208.	200.	105.	0.688
QD-232431-1	LCSD	Tellurium	µg/sample	0.00	0.00	0.00		0.00
QD-232431-1	LCSD	Vanadium	µg/sample	10.7	10.5	10.0	107.	2.09
QD-232431-1	LCSD	Zinc	µg/sample	10.2	9.99	10.0	102.	2.27
BL-232431-2	MB	Aluminum	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Arsenic	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Beryllium	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Cadmium	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Calcium	µg/sample	1.	NA	NA	NA	NA
BL-232431-2	MB	Chromium	µg/sample	0.2	NA	NA	NA	NA
BL-232431-2	MB	Cobalt	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Copper	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Iron	µg/sample	ND	NA	NA	NA	NA

DATA CHEM LABORATORIES

QC Summary Page

BL-232431-2	MB	Lead	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Magnesium	µg/sample	0.07	NA	NA	NA	NA
BL-232431-2	MB	Manganese	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Molybdenum	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Nickel	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Selenium	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Silver	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Sodium	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Tellurium	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Vanadium	µg/sample	ND	NA	NA	NA	NA
BL-232431-2	MB	Zinc	µg/sample	ND	NA	NA	NA	NA
QC-232431-2	LCS	Aluminum	µg/sample	39.8	NA	0.00	0.00	NA
QC-232431-2	LCS	Arsenic	µg/sample	36.2	NA	40.0	90.6	NA
QC-232431-2	LCS	Beryllium	µg/sample	10.4	NA	10.0	104.	NA
QC-232431-2	LCS	Cadmium	µg/sample	10.7	NA	10.0	107.	NA
QC-232431-2	LCS	Calcium	µg/sample	43.2	NA	40.0	108.	NA
QC-232431-2	LCS	Chromium	µg/sample	10.7	NA	10.0	107.	NA
QC-232431-2	LCS	Cobalt	µg/sample	10.8	NA	10.0	108.	NA
QC-232431-2	LCS	Copper	µg/sample	11.1	NA	10.0	111.	NA
QC-232431-2	LCS	Iron	µg/sample	21.2	NA	20.0	106.	NA
QC-232431-2	LCS	Lead	µg/sample	41.4	NA	40.0	103.	NA
QC-232431-2	LCS	Magnesium	µg/sample	41.3	NA	40.0	103.	NA
QC-232431-2	LCS	Manganese	µg/sample	10.5	NA	10.0	105.	NA
QC-232431-2	LCS	Molybdenum	µg/sample	41.9	NA	40.0	105.	NA
QC-232431-2	LCS	Nickel	µg/sample	10.6	NA	10.0	106.	NA
QC-232431-2	LCS	Selenium	µg/sample	40.0	NA	40.0	99.9	NA
QC-232431-2	LCS	Silver	µg/sample	10.7	NA	10.0	107.	NA
QC-232431-2	LCS	Sodium	µg/sample	210.	NA	200.	105.	NA
QC-232431-2	LCS	Tellurium	µg/sample	0.00	NA	0.00		NA
QC-232431-2	LCS	Vanadium	µg/sample	10.5	NA	10.0	105.	NA
QC-232431-2	LCS	Zinc	µg/sample	10.1	NA	10.0	101.	NA
QD-232431-2	LCSD	Aluminum	µg/sample	39.7	39.8	0.00	0.00	0.338
QD-232431-2	LCSD	Arsenic	µg/sample	36.3	36.2	40.0	90.7	0.138
QD-232431-2	LCSD	Beryllium	µg/sample	10.3	10.4	10.0	103.	0.884
QD-232431-2	LCSD	Cadmium	µg/sample	10.7	10.7	10.0	107.	0.575
QD-232431-2	LCSD	Calcium	µg/sample	43.0	43.2	40.0	108.	0.350
QD-232431-2	LCSD	Chromium	µg/sample	10.6	10.7	10.0	106.	0.101
QD-232431-2	LCSD	Cobalt	µg/sample	10.7	10.8	10.0	107.	0.684
QD-232431-2	LCSD	Copper	µg/sample	11.1	11.1	10.0	111.	0.449
QD-232431-2	LCSD	Iron	µg/sample	21.5	21.2	20.0	107.	1.46

DATA CHEM LABORATORIES

QC Summary Page

QD-232431-2	LCSD	Lead	µg/sample	41.5	41.4	40.0	104.	0.293
QD-232431-2	LCSD	Magnesium	µg/sample	41.1	41.3	40.0	103.	0.513
QD-232431-2	LCSD	Manganese	µg/sample	10.5	10.5	10.0	105.	0.296
QD-232431-2	LCSD	Molybdenum	µg/sample	41.5	41.9	40.0	104.	0.832
QD-232431-2	LCSD	Nickel	µg/sample	10.6	10.6	10.0	106.	0.369
QD-232431-2	LCSD	Selenium	µg/sample	39.9	40.0	40.0	99.7	0.235
QD-232431-2	LCSD	Silver	µg/sample	10.6	10.7	10.0	106.	0.446
QD-232431-2	LCSD	Sodium	µg/sample	207.	210.	200.	104.	1.44
QD-232431-2	LCSD	Tellurium	µg/sample	0.00	0.00	0.00		0.00
QD-232431-2	LCSD	Vanadium	µg/sample	10.5	10.5	10.0	105.	0.156
QD-232431-2	LCSD	Zinc	µg/sample	10.1	10.1	10.0	101.	0.496

MB - Method Blank
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MSD - Matrix Spike Duplicate
LD - Laboratory Duplicate

NA - Not Applicable
ND - Parameter not detected above LOD

LCS, LCSD Percent Rec. = (Result / Target) * 100.0
MS, MSD Percent Rec. = ((Result – Parent) / Target) * 100.0

LCS, LCSD Relative Percent Diff. = ((|LCS – LCSD|) / ((LCS + LCSD)/2.0)) * 100.
MS, MSD Relative Percent Diff. = ((|MS – MSD|) / ((MS+ MSD)/2.0)) * 100.
LD Relative Percent Diff. = ((|Parent – LD|) / ((Parent + LD)/2.0)) * 100

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

399

05K-0014-01

Site: RFETS Sampling Co: IH	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	COC. 05B0121#001	Page 1 of 3
Samplers: HIEBERT, DOUG (time/date)	Contact/Requests: SHANNON, ROBERT / HIEBERT, DOUG	Telephone No. 7208892770x234 / 3647	
RIN: 05B0121	Sampling Origin: Original Landfill	Purchase Order/ GR861900	
Project Title: Original Landfill Exposure Monitoring	Logbook No. N/A	Ice Chest No. N/A	Temp.
To LAB: DCHM	Shipment Method: REGULAR	Bill of Lading/ Air Bill No. 6285-7198- 2401	
Protocol: TBD	Related COC	PRE 050316-RISS-002	

POSSIBLE SAMPLE HAZARDS/REMARKS

Are acid preserved samples DOT hazardous per 40 CFR Part 136.3 Table II? YES NO
Are other known hazardous substances present? YES NO
** ** **

SCREENING REQUIRED ☐

SPECIAL INSTRUCTIONS Hold Time

Bottle No.	Customer Number	Matrix	Date/Time	Location	Container (size/type)	Sample Analysis [Field-Filtered] LIC (Method Title) (TAT)(Parameter List)	Preservative; Packing
05B0121 -001.001	460-05192005 -00-001	IH	19-MAY-05 07:00	ORIGINAL LANDFILL	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 05K00207	None; None
05B0121 -002.001	460-05192005 -00-002	IH	19-MAY-05 07:00	ORIGINAL LANDFILL	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 08	None; None
05B0121 -003.001	460-05202005 -00-003	IH	20-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 09	None; None
05B0121 -004.001	460-05202005 -00-004	IH	20-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 10	None; None
05B0121 -005.001	460-05232005 -00-005	IH	23-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 11	None; None
05B0121 -006.001	460-05232005 -00-006	IH	23-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 12	None; None
05B0121 -007.001	460-05232005 -00-007	IH	23-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 13	None; None
05B0121 -008.001	460-05232005 -00-008	IH	23-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 14	None; None
05B0121 -009.001	460-05242005 -00-009	IH	24-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 15	None; None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Ref #4 6-6-05	1040	[illegible] 6-6-05	1040	[illegible] 6-6-05	1500	Fedex	
Fedex		[illegible] 6/7/05	10:20				

COC Version: 6 (ASMSCOC_R0.RPT)

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

DATA CHEM LABORATORIES

COC Page

DATA CHEM LABORATORIES

COC Page

Site: RFETS Sampling Co: IH	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	COC: 05B0121#001	Page 2 of 3
RIN: 05B0121	Contact/Requestor: SHANNON, ROBERT / HIEBERT, DOUG	Telephone No. 7208892770x234 / 3647	

Bottle No.	Customer Number	Matrix	Date/Time	Location	Container (size/type)	Sample Analysis (Field-Filtered) LIC (Method Title) [TAT](Parameter List)	Preservative; Packing
05B0121 -010.001	460-05242005 -00-010	IH	24-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 05K00216	None; None
05B0121 -011.001	460-05242005 -00-011	IH	24-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 17	None; None
05B0121 -012.001	460-05262005 -00-012	IH	26-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 18	None; None
05B0121 -013.001	460-05262005 -00-013	IH	26-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 19	None; None
05B0121 -014.001	460-05262005 -00-014	IH	26-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 20	None; None
05B0121 -015.001	460-05262005 -00-015	IH	26-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 21	None; None
05B0121 -016.001	460-05272005 -00-016	IH	27-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 22	None; None
05B0121 -017.001	460-05272005 -00-017	IH	27-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 23	None; None
05B0121 -018.001	460-05272005 -00-018	IH	27-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 24	None; None
05B0121 -019.001	460-05272005 -00-019	IH	27-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 25	None; None
05B0121 -020.001	460-05272005 -00-020	IH	27-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 26	None; None
05B0121 -021.001	460-05272005 -00-021	IH	27-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 27	None; None
05B0121 -022.001	460-05312005 -00-022	IH	31-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 28	None; None
05B0121 -023.001	460-05312005 -00-023	IH	31-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1) 29	None; None

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	6.6.05 1040	[illegible]	6.6.05 1040	[illegible]	6.6.05 1500	Fedex	
[illegible]		[illegible]	6/7/05 [illegible]				

COC Version: 6 (ASMSCOC_R0.RPT)

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

400

COC Page

DATA CHEM LABORATORIES

Site: RFETS Sampling Co: IH	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	COC: 05B0121#001	Page 3 of 3
RIN: 05B0121	Contact/Requests: SHANNON, ROBERT / HIEBERT, DOUG	Telephone No. 7208892770x234 / 3647	

Bottle No.	Customer Number	Matrix	Date/Time	Location	Container (size/type)	Sample Analysis [Field-Filtered] LIC (Method Title) (TAT)/(Parameter List)	Preservative; Packing
05B0121 -024.001	460-05312005 -00-024	IH	31-MAY-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1)	None; None
05B0121 -025.001	460-06012005 -00-025	IH	01-JUN-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1)	None; None
05B0121 -026.001	460-06012005 -00-026	IH	01-JUN-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1)	None; None
05B0121 -027.001	460-06012005 -00-027	IH	01-JUN-05 07:00	Original Landfill	1-SAMPLE N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See Item 1)	None; None

Item 1 ALUMINUM; ARSENIC; BERYLLIUM; CADMIUM; CALCIUM; CHROMIUM; COBALT; COPPER; IRON; LEAD; MAGNESIUM; MANGANESE; MOLYBDENUM; NICKEL; SELENIUM; SILVER; SODIUM; TELLURIUM; VANADIUM; ZINC

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Kathy	6.6.05 1010	[illegible]	6.6.05 1010	[illegible]	6.6.05 1500	Fedex	
[illegible]		[illegible]	6/7/05 10:30				

COC Version: 6 (ASMSCOC_R0.RPT)

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

401

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

DATA CHEM LABORATORIES

COC Page

RUSH

RFETS Industrial Hygiene	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C.# 05B0121#1 Page: 1 of 2

RIN	Contact/Requestor	Telephone No.	MSIN	FAX
05B0121	DOUG HIEBERT	3039863647		

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
	460-05192005-00-001				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE) Cr, Pb, Cd As, Se, Ni	N/A None
	460-05192005-00-002				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05202005-00-003				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05202005-00-004				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05232005-00-005				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05232005-00-006				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05232005-00-007				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05232005-00-008				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05242005-00-009				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05242005-00-010				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05242005-00-011				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05262005-00-012				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05262005-00-013				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None
	460-05262005-00-014				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)	N/A None

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	6/6/05 0645	[illegible]	6/6/05 0645	[illegible]	6/6/05 0650	[illegible]	6/6/05 0650
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time

FINAL SAMPLE DISPOSITION	Disposal method (e.g., Return to customer, per lab procedur, used in process)	Disposed By:	Date/Time

OFFICIAL USE ONLY

Contains information which may be exempt from public release under the Freedom of Information Act (5 USC 552), exemption numbers(s) 2.
Approval by the Department of Energy prior to public release is required.

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

DATA CHEM LABORATORIES

COC Page

RFETS
Industrial Hygiene

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 05B0121#2

Page: 2 of 2

RIN: 05B0121

Contact/Requestor: DOUG HIEBERT

Telephone No.: 3039663647

MSIN

FAX

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis		Preservative Packing
	460-05262005-00-015				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05272005-00-016				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05272005-00-017				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05272005-00-018				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05272005-00-019				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05272005-00-020				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05272005-00-021				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05312005-00-022				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05312005-00-023				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-05312005-00-024				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-06012005-00-025				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-06012005-00-026				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None
	460-06012005-00-027				460	1-FILTER N/A	BERYLLIUM AND BE COMPOUNDS (AS BE)		N/A None

Unable to verify contents of 05B0121. JS 6/6/05

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	6/6/05 06.[illegible]	[illegible]	6/6/05 0645	[illegible]	6/6/05 0650	[illegible]	6/6/05 0650
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time

FINAL SAMPLE DISPOSITION: Disposal method (e.g., Return to customer, per lab procedur, used in process) | Disposed By: | Date/Time

OFFICIAL USE ONLY

Contains information which may be exempt from public release under the Freedom of Information Act (5 USC 552), exemption numbers(s) 2.
Approval by the Department of Energy prior to public release is required.

DATA CHEM LABORATORIES

Cover Page

Report Identification Number: 05K-0015-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: SHANNON, ROBERT / HIEBERT,DOUG
Laboratory Identification Number: DCHM
RIN: 05B0122
Purchase Order/Charge Code: GR861900

Sample Information

Bottle Number	Customer Sample Number	Laboratory Sample Number	Line Item Code (LIC)	Analytical Batch Identification	Sample Matrix
05B0122-001.001	460-06062005-00-001	05K00234	IH01D123	G055G011	FILTER
05B0122-002.001	460-06062005-00-002	05K00235	IH01D123	G055G011	FILTER
05B0122-003.001	460-06072005-00-003	05K00236	IH01D123	G055G011	FILTER
05B0122-004.001	460-06082005-00-004	05K00237	IH01D123	G055G011	FILTER
05B0122-005.001	460-06082005-00-005	05K00238	IH01D123	G055G011	FILTER
05B0122-006.001	460-06082005-00-006	05K00239	IH01D123	G055G011	FILTER
05B0122-007.001	460-06082005-00-007	05K00240	IH01D123	G055G011	FILTER
05B0122-008.001	460-06092005-00-008	05K00241	IH01D123	G055G011	FILTER
05B0122-009.001	460-06092005-00-009	05K00242	IH01D123	G055G011	FILTER
05B0122-010.001	460-06092005-00-010	05K00243	IH01D123	G055G011	FILTER
05B0122-011.001	460-06102005-00-011	05K00244	IH01D123	G055G011	FILTER
05B0122-012.001	460-06102005-00-012	05K00245	IH01D123	G055G011	FILTER
05B0122-013.001	460-06102005-00-013	05K00246	IH01D123	G055G011	FILTER
05B0122-014.001	460-06102005-00-014	05K00247	IH01D123	G055G011	FILTER

I certify that this electronic image and all hardcopies produced from this image accurately represent the data and are in compliance with the RFETS specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager or the Manager's designee.

The Delivery and receipt of this Data Deliverable constitutes an invoice for payment for this Data Deliverable.

Name: Michelle Paradise
Title: Chemist
Date: June 17, 2005

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547
Phone: (801) 266-7700
FAX: (801) 268-9992
Web Page: www.datachem.com
E-mail: lab@datachem.com

402

DATA CHEM LABORATORIES

Case Narrative Page

Report Identification Number: 05K-0015-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: SHANNON, ROBERT / HIEBERT,DOUG
Laboratory Identification Number: DCHM
RIN: 05B0122
Purchase Order/Charge Code: GR861900

General Set Information: There are 14 samples in RIN# 05B0122. The samples were analyzed for 20 metals on MCE filter by ICP. No problems were encountered with the receipt of these samples and no contact with the CTR was required.

Method Summary: Samples were transferred to 50 ml centrifuge tubes and digested in the presence of 10 mL of 1:1 (v/v) nitric acid. Samples were digested in a hot block set at 110°C (thermometer reading at 82.3°C) for 40 minutes. Samples were then diluted to a 25 mL volume with ASTM Type II Water. Samples were shaken and delivered for ICP analysis.

Sample Preparation: All samples were prepared in accordance with DCL SOP "IH-AN-021" and NIOSH method NMAM 7300 modified for hot block digestion.

Holding Times: The holding times were met for both sample preparation and analysis.

Instrument Calibration: Instrument calibration was performed in accordance with NIOSH method NMAM 7300.

Initial and Continuing Calibration Verification Analysis: Analyte recoveries in all Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples are within the quality control limits of ± 10%.

Initial and Continuing Calibration Blank Analysis: No analyte results were found in the Initial Calibration Blank (ICB) or Continuing Calibration Blanks (CCB) at levels above the Contract Required Detection Limits (CRDL).

Method Blank Analysis: The magnesium and zinc results in the media blank were above the Contract Required Detection Limits (CRDL). All other analytes in the media blank sample are below the CRDLs.

Dilution(s): None of the samples were diluted.

Laboratory Control Sample and Duplicate Analysis: One Laboratory Control Sample (LCS) and one Laboratory Control Sample Duplicate (LCSD) were prepared and analyzed with the sample batch. The LCS results are all within control limits of ± 20%. The Relative Percent Differences (RPD) between the LCS and LCSD are within the control limit of 20%.

Case Narrative Page

Replicate Analysis: One sample in this batch was replicated. The RPDs between the sample and the replicate are within the control limit of 20%. If the result of the sample or replicate is below the CRDL, replicate analysis is negligible.

Flagging Codes:

U - Analyte not detected above the Method Detection Limit (MDL).

J - Analyte result is reported above the Method Detection Limit (MDL) ug/sample, but below the Contract Required Detection Limit (CRDL).

Nonconformance/Corrective Action Report (NC/CAR): None.

Sample Calculation: The final results are calculated by the following equation:

Final result for aqueous samples (µg/sample) = (A) x (B) x (C)

Where:

A = Analyte concentration from instrument determination (µg/L)

B = Concentration factor from sample preparation

$$= \frac{\text{Final Volume of Digestate (L)}}{\text{Sample}}$$

C = Dilution performed at time of analysis

Example Calculation: (1 µg/L) x (0.025 L/sample) x (1) = 0.025 µg/sample

Miscellaneous Comments: See report for limits.

DATA CHEM LABORATORIES

Report Page

Report Identification Number: 05K-0015-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: SHANNON, ROBERT / HIEBERT,DOUG
Laboratory Identification Number: DCHM
RIN: 05B0122
Purchase Order/Charge Code: GR861900

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Aluminum µg/sample		Arsenic µg/sample		Beryllium µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	12.		<3.	U	<0.02	J
460-06062005-00-002	05K00235	15 Jun 2005	2.2		<3.	U	<0.02	U
460-06072005-00-003	05K00236	15 Jun 2005	<2.	J	<3.	U	<0.02	U
460-06082005-00-004	05K00237	15 Jun 2005	16.		<3.	U	<0.02	U
460-06082005-00-005	05K00238	15 Jun 2005	11.		<3.	U	<0.02	U
460-06082005-00-006	05K00239	15 Jun 2005	2.5		<3.	U	<0.02	U
460-06082005-00-007	05K00240	15 Jun 2005	3.2		<3.	U	<0.02	U
460-06092005-00-008	05K00241	15 Jun 2005	17.		<3.	U	<0.02	U
460-06092005-00-009	05K00242	15 Jun 2005	2.7		<3.	U	<0.02	U
460-06092005-00-010	05K00243	15 Jun 2005	4.7		<3.	U	<0.02	U
460-06102005-00-011	05K00244	15 Jun 2005	<2.	J	<3.	U	<0.02	U
460-06102005-00-012	05K00245	15 Jun 2005	<2.	J	<3.	U	<0.02	U
460-06102005-00-013	05K00246	15 Jun 2005	<2.	U	<3.	U	<0.02	U
460-06102005-00-014	05K00247	15 Jun 2005	<2.	U	<3.	U	<0.02	U
Limit of Detection (LOD)			0.5		1.		0.004	
Required Detection Limit (RDL)			2.		3.		0.02	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Cadmium µg/sample		Calcium µg/sample		Chromium µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	<0.06	U	12.		<0.4	J
460-06062005-00-002	05K00235	15 Jun 2005	<0.06	U	2.4		<0.4	J
460-06072005-00-003	05K00236	15 Jun 2005	<0.06	U	3.2		<0.4	J
460-06082005-00-004	05K00237	15 Jun 2005	<0.06	U	13.		<0.4	J
460-06082005-00-005	05K00238	15 Jun 2005	<0.06	U	12.		<0.4	J
460-06082005-00-006	05K00239	15 Jun 2005	<0.06	U	3.8		<0.4	J
460-06082005-00-007	05K00240	15 Jun 2005	<0.06	U	4.7		<0.4	J
460-06092005-00-008	05K00241	15 Jun 2005	<0.06	U	13.		<0.4	J
460-06092005-00-009	05K00242	15 Jun 2005	<0.06	U	4.3		<0.4	J
460-06092005-00-010	05K00243	15 Jun 2005	<0.06	U	7.9		<0.4	J

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Cadmium µg/sample		Calcium µg/sample		Chromium µg/sample	
460-06102005-00-011	05K00244	15 Jun 2005	<0.06	U	2.4		<0.4	J
460-06102005-00-012	05K00245	15 Jun 2005	<0.06	U	2.3		<0.4	J
460-06102005-00-013	05K00246	15 Jun 2005	<0.06	U	<2.	J	<0.4	J
460-06102005-00-014	05K00247	15 Jun 2005	<0.06	U	<2.	J	<0.4	J
Limit of Detection (LOD)			0.02		0.6		0.1	
Required Detection Limit (RDL)			0.06		2.		0.4	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Cobalt µg/sample		Copper µg/sample		Iron µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	<0.08	U	<0.2	U	16.	
460-06062005-00-002	05K00235	15 Jun 2005	<0.08	U	<0.2	U	2.3	
460-06072005-00-003	05K00236	15 Jun 2005	<0.08	U	<0.2	U	2.4	
460-06082005-00-004	05K00237	15 Jun 2005	<0.08	U	<0.2	U	25.	
460-06082005-00-005	05K00238	15 Jun 2005	<0.08	U	<0.2	U	18.	
460-06082005-00-006	05K00239	15 Jun 2005	<0.08	U	<0.2	U	3.0	
460-06082005-00-007	05K00240	15 Jun 2005	<0.08	U	<0.2	U	4.2	
460-06092005-00-008	05K00241	15 Jun 2005	<0.08	U	<0.2	J	30.	
460-06092005-00-009	05K00242	15 Jun 2005	<0.08	U	<0.2	U	3.2	
460-06092005-00-010	05K00243	15 Jun 2005	<0.08	U	<0.2	J	8.6	
460-06102005-00-011	05K00244	15 Jun 2005	<0.08	U	<0.2	U	1.7	
460-06102005-00-012	05K00245	15 Jun 2005	<0.08	U	<0.2	U	0.84	
460-06102005-00-013	05K00246	15 Jun 2005	<0.08	U	<0.2	U	0.83	
460-06102005-00-014	05K00247	15 Jun 2005	<0.08	U	<0.2	U	<0.8	J
Limit of Detection (LOD)			0.03		0.05		0.3	
Required Detection Limit (RDL)			0.08		0.2		0.8	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Lead µg/sample		Magnesium µg/sample		Manganese µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	<0.5	U	2.5		0.23	
460-06062005-00-002	05K00235	15 Jun 2005	<0.5	U	1.1		<0.08	J
460-06072005-00-003	05K00236	15 Jun 2005	<0.5	U	1.1		<0.08	J
460-06082005-00-004	05K00237	15 Jun 2005	<0.5	U	2.5		0.36	
460-06082005-00-005	05K00238	15 Jun 2005	<0.5	U	3.0		0.31	
460-06082005-00-006	05K00239	15 Jun 2005	<0.5	U	1.3		0.084	
460-06082005-00-007	05K00240	15 Jun 2005	<0.5	U	1.4		0.089	

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

404

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Lead µg/sample		Magnesium µg/sample		Manganese µg/sample	
460-06092005-00-008	05K00241	15 Jun 2005	<0.5	U	2.7		0.41	
460-06092005-00-009	05K00242	15 Jun 2005	<0.5	U	1.3		<0.08	J
460-06092005-00-010	05K00243	15 Jun 2005	<0.5	U	1.9		0.14	
460-06102005-00-011	05K00244	15 Jun 2005	<0.5	U	0.99		<0.08	J
460-06102005-00-012	05K00245	15 Jun 2005	<0.5	U	0.91		<0.08	J
460-06102005-00-013	05K00246	15 Jun 2005	<0.5	U	0.70		<0.08	U
460-06102005-00-014	05K00247	15 Jun 2005	<0.5	U	0.88		<0.08	U
Limit of Detection (LOD)			0.2		0.06		0.02	
Required Detection Limit (RDL)			0.5		0.2		0.08	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Molybdenum µg/sample		Nickel µg/sample		Selenium µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06062005-00-002	05K00235	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06072005-00-003	05K00236	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06082005-00-004	05K00237	15 Jun 2005	<0.3	U	<0.1	J	<3.	U
460-06082005-00-005	05K00238	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06082005-00-006	05K00239	15 Jun 2005	<0.3	U	<0.1	J	<3.	U
460-06082005-00-007	05K00240	15 Jun 2005	<0.3	U	<0.1	J	<3.	U
460-06092005-00-008	05K00241	15 Jun 2005	<0.3	U	<0.1	J	<3.	U
460-06092005-00-009	05K00242	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06092005-00-010	05K00243	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06102005-00-011	05K00244	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
460-06102005-00-012	05K00245	15 Jun 2005	<0.3	U	<0.1	J	<3.	U
460-06102005-00-013	05K00246	15 Jun 2005	<0.3	U	<0.1	J	<3.	U
460-06102005-00-014	05K00247	15 Jun 2005	<0.3	U	<0.1	U	<3.	U
Limit of Detection (LOD)			0.09		0.04		0.9	
Required Detection Limit (RDL)			0.3		0.1		3.	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Silver µg/sample		Sodium µg/sample		Tellurium µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	<0.1	U	14.		<1.	U
460-06062005-00-002	05K00235	15 Jun 2005	<0.1	U	9.9		<1.	U
460-06072005-00-003	05K00236	15 Jun 2005	<0.1	U	14.		<1.	U
460-06082005-00-004	05K00237	15 Jun 2005	<0.1	U	16.		<1.	U

DATA CHEM LABORATORIES

Report Page

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Silver µg/sample		Sodium µg/sample		Tellurium µg/sample	
460-06082005-00-005	05K00238	15 Jun 2005	<0.1	U	14.		<1.	U
460-06082005-00-006	05K00239	15 Jun 2005	<0.1	U	14.		<1.	U
460-06082005-00-007	05K00240	15 Jun 2005	<0.1	U	8.8		<1.	U
460-06092005-00-008	05K00241	15 Jun 2005	<0.1	U	14.		<1.	U
460-06092005-00-009	05K00242	15 Jun 2005	<0.1	U	13.		<1.	U
460-06092005-00-010	05K00243	15 Jun 2005	<0.1	U	14.		<1.	U
460-06102005-00-011	05K00244	15 Jun 2005	<0.1	U	8.1		<1.	U
460-06102005-00-012	05K00245	15 Jun 2005	<0.1	U	13.		<1.	U
460-06102005-00-013	05K00246	15 Jun 2005	<0.1	U	7.7		<1.	U
460-06102005-00-014	05K00247	15 Jun 2005	<0.1	U	14.		<1.	U
		Limit of Detection (LOD)	0.04		0.5		0.4	
		Required Detection Limit (RDL)	0.1		2.		1.	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Vanadium µg/sample		Zinc µg/sample	
460-06062005-00-001	05K00234	15 Jun 2005	<0.05	J	0.25	
460-06062005-00-002	05K00235	15 Jun 2005	<0.05	U	0.15	
460-06072005-00-003	05K00236	15 Jun 2005	<0.05	U	0.16	
460-06082005-00-004	05K00237	15 Jun 2005	<0.05	J	0.36	
460-06082005-00-005	05K00238	15 Jun 2005	<0.05	J	0.26	
460-06082005-00-006	05K00239	15 Jun 2005	<0.05	J	0.18	
460-06082005-00-007	05K00240	15 Jun 2005	<0.05	J	0.19	
460-06092005-00-008	05K00241	15 Jun 2005	<0.05	J	0.30	
460-06092005-00-009	05K00242	15 Jun 2005	<0.05	J	0.16	
460-06092005-00-010	05K00243	15 Jun 2005	<0.05	J	0.17	
460-06102005-00-011	05K00244	15 Jun 2005	<0.05	U	0.20	
460-06102005-00-012	05K00245	15 Jun 2005	<0.05	U	0.16	
460-06102005-00-013	05K00246	15 Jun 2005	<0.05	U	0.14	
460-06102005-00-014	05K00247	15 Jun 2005	<0.05	U	0.17	
		Limit of Detection (LOD)	0.01		0.02	
		Required Detection Limit (RDL)	0.05		0.07	

U - Parameter not detected above LOD.
J - Parameter between LOD and RDL.

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

405

DATA CHEM LABORATORIES

QC Summary Page

Report Identification Number: 05K-0015-01
Subcontract Number: KH 020004
Name of Industrial Hygienist: SHANNON, ROBERT / HIEBERT,DOUG
Laboratory Identification Number: DCHM
RIN: 05B0122
Purchase Order/Charge Code: GR861900

Batch ID: G055G011

QC Sample ID	QC Type	Analyte	Units	Result	Parent Result	Target	Percent Rec.	Relative Percent Diff.
BL-232723-1	MB	Aluminum	µg/sample	0.8	NA	NA	NA	NA
BL-232723-1	MB	Arsenic	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Beryllium	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Cadmium	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Calcium	µg/sample	2.	NA	NA	NA	NA
BL-232723-1	MB	Chromium	µg/sample	0.2	NA	NA	NA	NA
BL-232723-1	MB	Cobalt	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Copper	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Iron	µg/sample	0.3	NA	NA	NA	NA
BL-232723-1	MB	Lead	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Magnesium	µg/sample	0.27	NA	NA	NA	NA
BL-232723-1	MB	Manganese	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Molybdenum	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Nickel	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Selenium	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Silver	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Sodium	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Tellurium	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Vanadium	µg/sample	ND	NA	NA	NA	NA
BL-232723-1	MB	Zinc	µg/sample	0.32	NA	NA	NA	NA
QC-232723-1	LCS	Aluminum	µg/sample	40.7	NA	40.0	102.	NA
QC-232723-1	LCS	Arsenic	µg/sample	37.4	NA	40.0	93.5	NA
QC-232723-1	LCS	Beryllium	µg/sample	10.5	NA	10.0	105.	NA
QC-232723-1	LCS	Cadmium	µg/sample	10.7	NA	10.0	107.	NA
QC-232723-1	LCS	Calcium	µg/sample	43.6	NA	40.0	109.	NA
QC-232723-1	LCS	Chromium	µg/sample	11.0	NA	10.0	110.	NA
QC-232723-1	LCS	Cobalt	µg/sample	10.8	NA	10.0	108.	NA
QC-232723-1	LCS	Copper	µg/sample	11.1	NA	10.0	111.	NA
QC-232723-1	LCS	Iron	µg/sample	21.8	NA	20.0	109.	NA

DATA CHEM LABORATORIES

QC Summary Page

QC-232723-1	LCS	Lead	µg/sample	42.1	NA	40.0	105.	NA
QC-232723-1	LCS	Magnesium	µg/sample	41.8	NA	40.0	105.	NA
QC-232723-1	LCS	Manganese	µg/sample	10.6	NA	10.0	106.	NA
QC-232723-1	LCS	Molybdenum	µg/sample	41.3	NA	40.0	103.	NA
QC-232723-1	LCS	Nickel	µg/sample	10.8	NA	10.0	108.	NA
QC-232723-1	LCS	Selenium	µg/sample	41.4	NA	40.0	104.	NA
QC-232723-1	LCS	Silver	µg/sample	10.4	NA	10.0	104.	NA
QC-232723-1	LCS	Sodium	µg/sample	213.	NA	200.	106.	NA
QC-232723-1	LCS	Tellurium	µg/sample	ND	NA	0.00		NA
QC-232723-1	LCS	Vanadium	µg/sample	10.6	NA	10.0	106.	NA
QC-232723-1	LCS	Zinc	µg/sample	10.2	NA	10.0	102.	NA
QD-232723-1	LCSD	Aluminum	µg/sample	41.1	40.7	40.0	103.	0.913
QD-232723-1	LCSD	Arsenic	µg/sample	37.9	37.4	40.0	94.8	1.44
QD-232723-1	LCSD	Beryllium	µg/sample	10.7	10.5	10.0	107.	1.05
QD-232723-1	LCSD	Cadmium	µg/sample	10.8	10.7	10.0	108.	0.986
QD-232723-1	LCSD	Calcium	µg/sample	44.1	43.6	40.0	110.	1.29
QD-232723-1	LCSD	Chromium	µg/sample	10.9	11.0	10.0	109.	0.342
QD-232723-1	LCSD	Cobalt	µg/sample	10.9	10.8	10.0	109.	1.11
QD-232723-1	LCSD	Copper	µg/sample	11.3	11.1	10.0	113.	1.64
QD-232723-1	LCSD	Iron	µg/sample	21.5	21.8	20.0	107.	1.61
QD-232723-1	LCSD	Lead	µg/sample	42.7	42.1	40.0	107.	1.18
QD-232723-1	LCSD	Magnesium	µg/sample	42.3	41.8	40.0	106.	0.968
QD-232723-1	LCSD	Manganese	µg/sample	10.7	10.6	10.0	107.	1.68
QD-232723-1	LCSD	Molybdenum	µg/sample	41.9	41.3	40.0	105.	1.34
QD-232723-1	LCSD	Nickel	µg/sample	11.0	10.8	10.0	110.	1.48
QD-232723-1	LCSD	Selenium	µg/sample	41.7	41.4	40.0	104.	0.695
QD-232723-1	LCSD	Silver	µg/sample	10.5	10.4	10.0	105.	1.48
QD-232723-1	LCSD	Sodium	µg/sample	217.	213.	200.	108.	2.06
QD-232723-1	LCSD	Tellurium	µg/sample	ND	0.00	0.00		
QD-232723-1	LCSD	Vanadium	µg/sample	10.7	10.6	10.0	107.	1.50
QD-232723-1	LCSD	Zinc	µg/sample	10.3	10.2	10.0	103.	0.795

MB - Method Blank
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MSD - Matrix Spike Duplicate
LD - Laboratory Duplicate

NA - Not Applicable

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

406

QC Summary Page

ND - Parameter not detected above LOD

LCS, LCSD Percent Rec. = (Result / Target) * 100.0
MS, MSD Percent Rec. = ((Result – Parent) / Target) * 100.0

LCS, LCSD Relative Percent Diff. = ((|LCS – LCSD|) / ((LCS + LCSD)/2.0)) * 100.
MS, MSD Relative Percent Diff. = ((|MS – MSD|) / ((MS+ MSD)/2.0)) * 100.
LD Relative Percent Diff. = ((|Parent – LD|) / ((Parent + LD)/2.0)) * 100

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

DATA CHEM LABORATORIES

COC Page

Site: RFETS Sampling Co: IH	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 05K - 0015	COC. 05B0122#001	Page 1 of 2
Samplers: HIEBERT, DOUG (Time/Date)	Contact/Requests: SHANNON, ROBERT / HIEBERT, DOUG	Telephone No. 7208892770x234 / 3647	
RIN: 05B0122	Sampling Origin: Original Landfill	Purchase Order/ GR881900	
Project Title: Original Landfill Exposure Monitoring	Logbook No. n/a	Ice Chest No. n/a Temp.	
To LAB: DCHM	Shipment Method: REGULAR	Bill of Lading/ Air Bill No. 6285-7198-2662	
Protocol: n/a	Related COC: n/a	FIR: 050316-RISS-002	

POSSIBLE SAMPLE HAZARDS/REMARKS

Are acid preserved samples DOT hazardous per 40 CFR Part 136.3 Table II? YES NO

Are other known hazardous substances present? YES NO

SCREENING REQUIRED ☐

SPECIAL INSTRUCTIONS - Hold Time

Bottle No.	Customer Number	Matrix	Date/Time	Location	Container (size/type)	Sample Analysis (Field-Filtered) LIC (Method Title) (TAT)/(Parameter List)		Preservative; Packing
05B0122 -001.001	460-06062005 -00-001	IH	06-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	05K 00234	None; Box
05B0122 -002.001	460-06062005 -00-002	IH	06-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	35	None; Box
05B0122 -003.001	460-06072005 -00-003	IH	07-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	36	None; Box
05B0122 -004.001	460-06062005 -00-004	IH	06-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	37	None; Box
05B0122 -005.001	460-06062005 -00-005	IH	06-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	38	None; Box
05B0122 -006.001	460-06062005 -00-006	IH	06-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	39	None; Box
05B0122 -007.001	460-06062005 -00-007	IH	06-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	40	None; Box
05B0122 -008.001	460-06092005 -00-008	IH	09-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	41	None; Box
05B0122 -009.001	460-06092005 -00-009	IH	09-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] (See item 1)	42	None; Box

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	6/14/05 13:00	[signature]	6.14.05 1300	[signature]	6.14.05 1500	Fedex	
[signature]		[signature]					
Relinquished By:	Date/Time	Received By	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time

COC Version: 2 (ASMSCOC_R0.RPT)

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@datachem.com

407

DATA CHEM LABORATORIES

COC Page

Site: RFETS
Sampling Co: IH

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC: 05B0122#001

Page 2 of 2

RIN: 05B0122

Contact/Requestor: SHANNON, ROBERT / HIEBERT, DOUG

Telephone No. 7208892770x234 / 3647

Bottle No.	Customer Number	Matrix	Date/Time	Location	Container (size/type)	Sample Analysis (Field-Filtered) LIC (Method Title) (TAT)(Parameter List)		Preservative; Packing
05B0122 -010.001	460-06092005 -00-010	IH	09-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] [See Item 1]	05K 06243	None; Box
05B0122 -011.001	460-06102005 -00-011	IH	10-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] [See Item 1]	44	None; Box
05B0122 -012.001	460-06102005 -00-012	IH	10-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] [See Item 1]	45	None; Box
05B0122 -013.001	460-06102005 -00-013	IH	10-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] [See Item 1]	46	None; Box
05B0122 -014.001	460-06102005 -00-014	IH	10-JUN-05 07:00	Original Landfill	1-FILTER N/A	IH01D123 (Routine Metals BY NIOSH 7300/ICPAES [..][24hrS] [See Item 1]	47	None; Box

Item 1 ALUMINUM; ARSENIC; BERYLLIUM; CADMIUM; CALCIUM; CHROMIUM; COBALT; COPPER; IRON; LEAD; MAGNESIUM; MANGANESE; MOLYBDENUM; NICKEL; SELENIUM; SILVER; SODIUM; TELLURIUM; VANADIUM; ZINC

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[illegible]	6/14/05 13:00	[illegible]	6.14.05 1300	[illegible]	6.14.05 1300	Fedex	
[illegible]		[illegible]	6.14.05 1600				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

COC Version: 2 (ASMSCOC_R0.RPT)

DataChem Laboratories, Inc.
960 West Levoy Drive
Salt Lake City, Utah 84123-2547

Phone: (801) 266-7700
FAX: (801) 268-9992

Web Page: www.datachem.com
E-mail: lab@catachem.com

APPENDIX J
NEW GROUNDWATER MONITORING WELLS DRILLING RECORDS AND LOGS

408

FY05 WARP Work Plan Addendum
Attachment 5 (July 28, 2005)

Well Replacements at the Original Landfill

Approved: _____ WATER PROGRAMS MANAGER NAME SIGNATURE	Date: _____

This Attachment to the FY05 WARP WPA provides for the installation of three wells at the Original Landfill (OLF). General requirements set forth in the FY05 WARP WPA and supporting documents apply to work performed through this Attachment. Specific instructions set forth in this Attachment supercede those in the WPA, which in turn supercede those in task-specific SOPs.

Background

The OLF was active from 1950 until 1968. It was then studied as part of the OU5 characterization activities of the 1990s. This included the installation and sampling of numerous wells, well points, and piezometers (henceforth collectively referred to as wells) to support the evaluation of groundwater in this area. In 2004, these wells were scheduled for abandonment. All wells at the OLF have since been abandoned and this facility has been undergoing closure activities.

Groundwater monitoring at the OLF will be required at one existing upgradient well and three downgradient replacement wells. This WPA Attachment provides for the installation of the replacement wells. Appropriate well locations were selected in coordination with the regulators and project representatives, and were defined by now-abandoned wells 60493, 7086, and 62793. These locations were adjusted following regrading that was performed as a part of OLF closure.

Instruction: Well Replacement

The objective of the three replacement wells is to monitor groundwater downgradient of the OLF within the colluvium, any fill that may be present, and the uppermost weathered bedrock. The total depth of each well will be deep enough to allow ample storage capacity in the well. If an interval of sandstone or saturated siltstone is intercepted, the borehole will be advanced so that the well screens this material.

The Rig Geologist will carefully inspect the core for signs of fracturing, both because of the potential for fractures to act as preferential pathways for groundwater and because of inferred faults that have been mapped as extending through the OLF area, particularly the western portion of the OLF (Geologic Characterization Report, EG&G 1995). If heavy fracturing indicative of faulting is observed, the Rig Geologist shall contact the WARP project manager immediately and describe the observations. Discussions with the Original Landfill project manager will ensue, and may require changes to the well location and/or design. At a minimum, the borehole will likely be advanced to ensure the well screens the fracture zone.

Well designs and locations are proposed in the table below. Each will be installed using a drill rig employing hollow-stem auger methods. The actual well design shall be adjusted as necessary by the Rig Geologist. Depth to bedrock is uncertain due to the disturbed nature of the area, but should be fairly shallow (less than 20 ft. bgs). Each well shall be completed with above-ground protective casing, which shall not be allowed to compromise the integrity of the bentonite seal. The filter pack shall not extend above 4 ft. bgs.

Prior to initiating intrusive work, the proposed well locations will be flagged and reviewed by the OLF project manager or designee. Intrusive activities will not begin until the locations are accepted or revised accordingly. This process and the results will be documented in the Rig Geologist's field logbook.

409

Geologic core shall be collected from ground surface to total depth, and will be logged in accordance with RMRS/OPS-PRO.101, Logging Alluvial and Bedrock Material. After the core log has been QC'ed, the core will be disposed to the ground and spread in the area immediately surrounding the well unless directed otherwise by the OLF project.

Well	Bedrock Contact (ft bgs)	Total Depth (ft bgs)	Top of Screened Interval (ft bgs)	Diameter and Type of Well Components	Location Coordinates (State Planar)	
					Northing	Easting
80005	10	20	5	2" PVC	747491.07	2081405.35
80105	8	20	5	2" PVC	747463.17	2081941.09
80205	10	20	5	2" PVC	747535.70	2082349.46

Each of these wells will be developed as soon as feasible. Following completion of development activities, the Water Programs Sampling Liaison will be informed and the four wells (three downgradient wells identified above, and one existing upgradient well, identified as P416589) will be scheduled for sampling as soon as possible. Sampling frequency shall be quarterly, and shall be coordinated to the extent possible with associated OLF-specific surface water sampling. Requirements set forth in the corresponding task-specific SOPs, as modified by the FY05 WARP WPA where applicable, shall be followed in these activities. The analytical suite for all four wells shall include VOCs, SVOCs, metals, and pesticides using methods of sample collection and analysis that are consistent with those used at other routinely-sampled wells. (Analytical methods and turnaround times for SVOCs and pesticides will be selected to support Original Landfill monitoring objectives.)

Documentation

Well installations will employ the existing Soil Disturbance Permit for the OLF activities.

Standard documentation shall be completed, including such records as a field logbook for well installation; daily drill rig inspection forms; core logs; and well development and groundwater sample collection forms. The Daily Field Drilling Activities Report (form PRO.114A) need not be completed.

STATE PLANE COORDINATES AREA:
NORTH: 747489.979
EAST: 2081404.042
PROJECT: Original Landfill
REMARKS:
Routine well installation

GRND ELEV. (FT): 5957.54
TOTAL DEPTH (FT): 21.0
COMPLETION DATE: 8/9/05
GEOLOGIST: E. Warp

CASING DIA (IN): 2"
BH DIA. (IN): 8"
GRID LOCATOR:

LOG OF BORING NUMBER: 80005

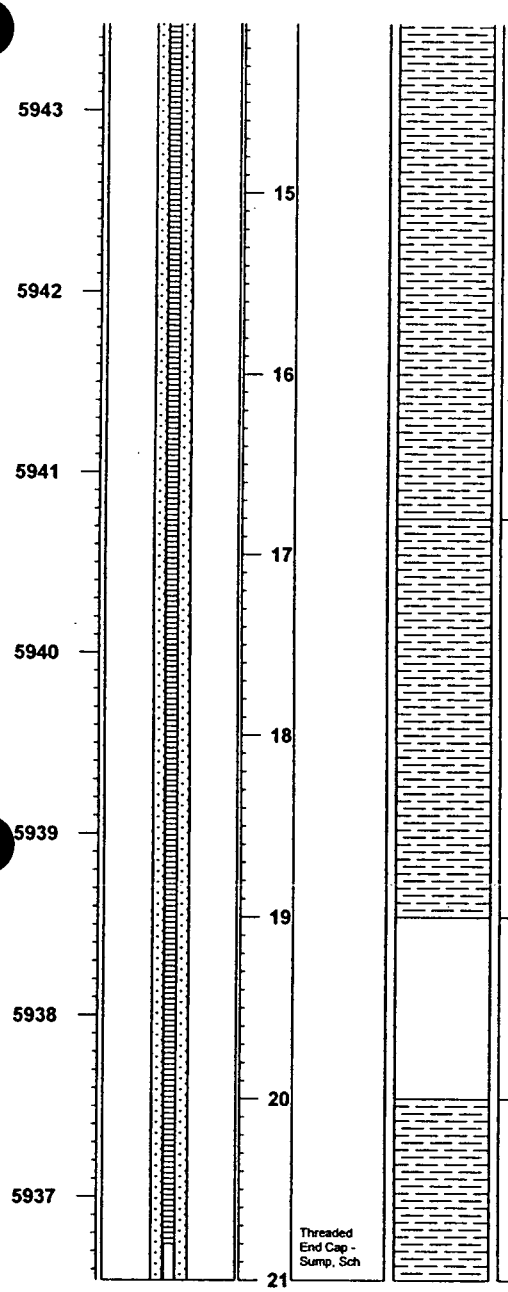
Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5961					
	Protective Casing, Steel, 6 in. ID.	3			
	Casing, Sch 40-PVC, 2 in. ID.				
5960		2			
5959		1			
5958		0			GC/CL: Gravelly, Sandy Clay with silt, brown (7.5YR4/4). 8 - 10% gravel (1/8" - 1/4" diameter, subangular to subrounded, composed of granite, schist, and quartzite). ~8% sand (coarse grained, subrounded to subangular). Clay has medium plasticity. Moist. 1" to 1-1/2" diameter cobbles of quartzite and granite at 0.4'.
5957		1			CL: Clay with trace gravel and sand, dark brown (7.5YR3/2). ~3 - 5% gravel (1/8" - 1/2" diameter, subangular), ~3 - 5% sand. Clay has medium plasticity. Shattered quartzite cobble at 0.6'. Roots at base of interval. Moist.
5956	Hydrated Bentonite Chips	2			CL: Clay with trace gravel and trace sand, brown (10YR4/3) with dark yellowish brown (10YR4/6) mottling. Possibly re-worked claystone with gravel and sand. Weak iron oxidation mottled throughout and disseminated at base. Trace roots. Moist.
5955		3			No recovery.
					CL: Clay with trace gravel and trace sand, same as interval from 0.8' to 1.3'. Moist.
5954		4			GP: Gravel/Cobbles, schist and quartzite cobbles (3/4" - 2" diameter, subangular) with gravel (1/4" - 1/2" diameter, subangular, composed of amphibolite (?)). Gravel is greenish gray (GLEY5/1).
					No recovery
5953					GC/CL: Sandy, Gravelly Clay with silt, dark brown (7.5YR3/2) clay matrix with ~30% gravel (1/4" - 3/4" diameter, subangular, composed of quartzite and schist). 5 - 10% sand (coarse grained,

410

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					subangular to subrounded). Clay has medium plasticity. Moist. Shattered cobbles (1" - 2" diameter) at base of interval from 4.6' to 4.8'.
	Filter Pack, 16/40 Silica Sand	5			SC/CL: Silty, Sandy Clay with some gravel, brown (7.5YR4/3 to 7.5YR4/4). Sand and gravel increase at base of interval. ~35% sand from 5.1' to 5.4', sand is coarse grained, subangular. ~25% gravel (1/4" - 1/2" diameter, subangular) from 5.1' to 5.4'. Moist. Possibly fluvial in origin (?)
5952		6			No recovery.
5951	Screen, Sch 40-PVC, 2 in. ID., 0.010 in. slots	7			SC/CL: Silty, Sandy Clay with some gravel, same as interval from 4.8' to 5.4'. Moist.
5950		8			SILTSTONE: TOP OF BEDROCK. Clayey Siltstone with some fine grained sand. Bedrock is gray (10YR6/1) with abundant yellowish brown (10YR5/6) mottling. Siltstone interbedded with claystone and fine grained sandy lenses. Some caliche as stringers and blebs throughout interval. Strong pervasive iron oxidation from 8.5' to 8.7' with ironstone fragments. Moist.
5949		9			
5948		10			SILTSTONE: Sandy Siltstone, grayish brown (10YR5/2) with light yellowish brown (10YR6/4) iron oxidation mottled throughout. Abundant very fine grained sand in siltstone. Friable. Caliche along internal bedding at 10.7'. Decreasing moisture to slightly moist.
5947		11			SILTSTONE: Clayey, Sandy Siltstone, yellowish brown (10YR5/6) with gray (10YR6/1) and light brownish gray (10YR6/2) mottling. Clayey lenses at 10.9' and from 11.65' to 11.8'. Black organic stringers associated with clayey lenses. Interval is friable and slightly fissile. Rip-up clasts common. Small healed fracture (45 deg) with iron oxidation at 11.95'. Abundant very fine grained sand from 11.2' to 11.4'. Slightly moist.
5946		12			
5945		13			SILTSTONE: Clayey Siltstone, yellowish brown (10YR5/6) with gray (10YR5/1) mottling from 12.4' to 13.0'. Color changes to brown (10YR5/3) from 13.0' to 14.0'. Decreasing very fine grained sand to trace. Black organic stringers common from 13.0' to 14.0'. Interval is competent, yet weak to moderately friable. Rip-up clasts common. Weak to moderate iron oxidation throughout. Slightly moist.
5944		14			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description

LOG OF BORING NUMBER: 80005



CLAYSTONE: Claystone with trace silt, gray (10YR5/1) with grayish brown (10YR5/2) and yellowish brown (10YR5/4) mottling. Weak to moderate pervasive iron oxidation. Some black organic stringers. Interval is firm and dense. Decreased moisture to very slightly moist.

CLAYSTONE: Claystone, un-weathered, dark gray (2.5Y4/1) to gray (2.5Y5/1). Trace iron oxidation along internal fractures from 16.8' to 17.0', and at 17.0'. Interval is highly fissile and friable. Dry.

No recovery.

CLAYSTONE: Claystone, un-weathered, dark gray (2.5Y4/1). Dense and firm, weakly fissile, dry.

411

STATE PLANE COORDINATES AREA: GRND ELEV. (FT): 5939.29 CASING DIA (IN): 2"
NORTH: 747463.414 TOTAL DEPTH (FT): 20.15 BH DIA. (IN): 8"
EAST: 2081942.494 COMPLETION DATE: 8/8/05 GRID LOCATOR:
PROJECT: Original Landfill GEOLOGIST: E. Warp
REMARKS:
Routine well installation

LOG OF BORING NUMBER: 80105

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5942	Protective Casing, Steel, 6 in. ID. Casing, Sch 40-PVC, 2 in. ID.	3			
5941		2			
5940		1			
5939		0			GC/CL: Gravel/Sandy Clay with silt mixture. Imported Qalrf fill. Strong brown (7.5YR4/6). 20 - 25% gravel (1/8" - 1" diameter, subrounded to subangular), predominately quartzite with less schist and granite. 20% sand (coarse grained, subangular to subrounded). Clay has medium plasticity. Dark brown (7.5YR3/2) clay lense from 0.4' to 0.5'. Disseminated caliche, tiny white specks common throughout interval. Moist.
5938		1			No recovery.
5937		2			GC/CL: Gravel/Sandy Clay with silt mixture, same as interval from 0.0' to 1.2'. Moist.
5936	Hydrated Bentonite Chips	3			No recovery
5935	Filter Pack, 16/40 Silica Sand	4			CL: Gravelly, Sandy Clay, dark brown (7.5YR3/2). Distinct color change. ~10% sand (coarse grained, subangular), 5 - 8% gravel (1/8" - 1/2" diameter, subrounded to subangular). Trace to some

412

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					organic material (woodchips). Medium to high plasticity, very moist. Color change may indicate prior ground surface (before fill added).
5934	Screen, Sch 40-PVC, 2 in. ID., 0.010 in. slots	5			GC/CL: Gravelly, Sandy Clay, dark gray (7.5YR4/1) to brown (7.5YR4/4). ~30% sand (coarse grained, subangular), 20 - 25% gravel (1/8" to 1-1/2" diameter, subrounded to subangular). Possible fluvial deposit. Well graded, poorly sorted, very moist.
5933		6			CL: Silty Clay. Re-worked bedrock. Light gray (10YR6/2) with brownish yellow (10YR6/6) mottling. Weak iron oxidation mottling. Trace caliche. [Very poor recovery, clay has been extruded like a "ribbon" due to a clogged cutting shoe.] Very moist.
					No recovery.
5932		7			CL: Silty Clay. Re-worked bedrock. Light gray (10YR7/1) with some light yellowish brown (10YR6/4) iron oxidation mottling. Trace alluvial clastics indicate not yet bedrock.
					CL: Clay with trace to some sand, gravel, and silt. Dark grayish brown (10YR4/2) with some light brownish gray (10YR6/2). 3 - 5% gravel (1/8" - 1/4" diameter), 3 - 5% sand (coarse grained, subangular). Weak to moderate iron oxidation mottled throughout. Very moist.
5931		8			SILTSTONE: TOP OF BEDROCK. Clayey Siltstone, gray (10YR6/1) with yellowish brown (10YR6/4) iron oxidation mottled throughout. Very subtle bedrock contact. [Very poor recovery, cutting shoe is clogged causing siltstone to appear "ribboned" in sample tube.] Very moist.
5930		9			No recovery.
5929		10			CLAYSTONE: Claystone, gray (10YR5/1) with yellowish brown (10YR5/6) mottling. Caliche blebs and stringers common throughout. Weak iron oxidation mottling. Massive texture. Moderately friable. Notable decrease in moisture to slightly moist.
5928		11			CLAYSTONE: Claystone, very dark gray (10YR3/1) to gray (10YR5/1). Massive texture. Abundant black organic stringers from 10.4' to 10.6'. Very rare caliche stringers. Moderately friable. No iron oxidation. Slightly moist.
5927		12			CLAYSTONE: Claystone, grayish brown (10YR5/2). Weak pervasive iron oxidation. Trace caliche blebs. Trace black organic material. Weakly friable. Organics or trace iron oxidation along internal fractures at 12.3', 12.6', and 13.4'. Decreased moisture to very slightly moist.
5926		13			

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
					LOG OF BORING NUMBER: 80105
		14			
5925					SILTSTONE: Clayey Siltstone, light brownish gray (10YR6/2) with some light yellowish brown (10YR6/4) iron oxidation mottling throughout. Massive texture. Weakly friable. Trace black organic stringers. Trace iron oxidation on minor internal fractures at 15.1', 15.5', 15.8', and 16.3'. Trace moisture. Occasional rip-up clasts.
		15			
5924					
		16			
5923					
					No recovery.
		17			
5922					CLAYSTONE: Claystone, dark gray (10YR4/1) to very dark gray (10YR3/1). Very fissile, friable, and dry. Abundant black carbonaceous material from 18.0' to 18.5'.
		18			
5921					
		19			
5920					No recovery. Reamed with augers from 19.0' to 20.15'. Did not sample this interval.
		20	Threaded End Cap - Sump, Sch 40-PVC		

413

STATE PLANE COORDINATES AREA: GRND ELEV. (FT): 5938.52 CASING DIA (IN): 2"
NORTH: 747535.636 TOTAL DEPTH (FT): 20.0 BH DIA. (IN): 8"
EAST: 2082324.443 COMPLETION DATE: 8/10/05 GRID LOCATOR:
PROJECT: Original Landfill GEOLOGIST: E. Warp
REMARKS:
Routine well installation

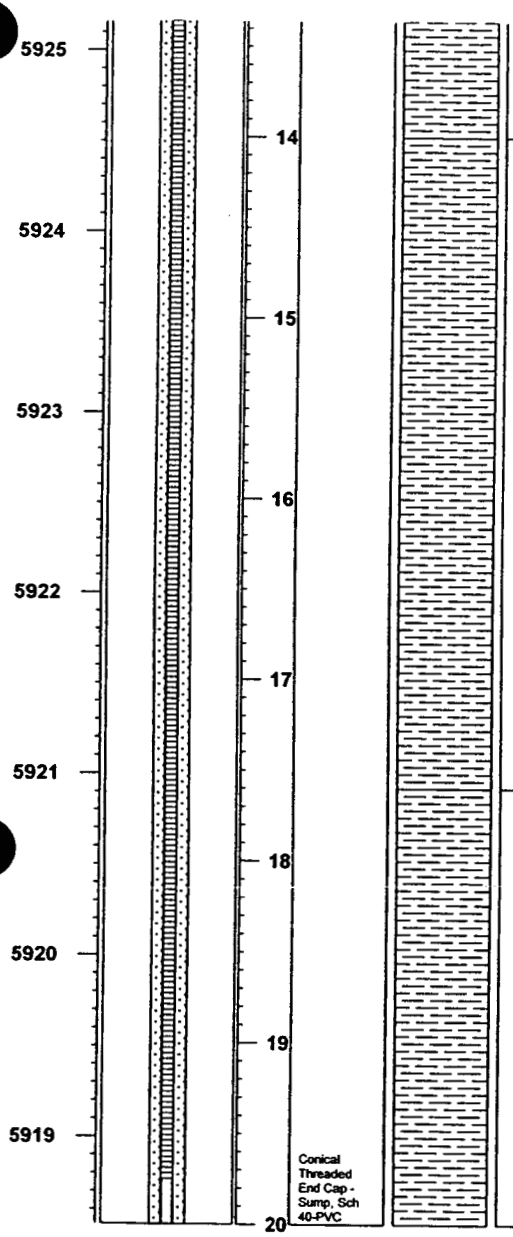
LOG OF BORING NUMBER: 80205

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5942	Protective Casing, Steel, 6 in. ID.	4			
5941	Casing, Sch 40-PVC, 2 in. ID.	3			
5940		2			
5939		1			
5938		0			GC/CL: Gravel/Sandy Clay with silt, strong brown (7.5YR4/6). 15 - 25% gravel (1/8" - 3/4" diameter, subrounded to subangular, predominately quartzite and granite). 20 - 25% sand (coarse grained, subangular). Clay has medium plasticity. Moist from 0.0' to 1.0'. Saturated, but not flowing, from 1.0' to 1.5'.
5937		1			CL: Silty Clay with trace sand and trace gravel, dark brown (7.5YR3/2) with some yellowish brown (10YR5/4) mottling. Clay has medium plasticity. Granite clast (3/4" diameter, angular) at 1.7'. Saturated, but not flowing.
5936		2			No recovery
5935	Bentonite Chips	3			CL: Clay with trace silt, trace gravel, and trace sand, brown (7.5YR4/3) from 2.0' to 2.2', yellowish brown (10YR5/4) to dark yellowish brown (10YR4/4) from 2.2' to 4.0'. Appears to be re-worked claystone bedrock (?). Interval is firm and dense but pliable due to moisture. Trace black organic stringers. Trace caliche blebs at base of interval. Roots and twigs common throughout. Gravel (1/4" - 1/2", subrounded) from 3.4' to 3.6', and at base of interval. Decreased moisture to very moist.

414

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	Lithologic Description
5934	Filter Pack, 16/40 Silica Sand; Screen, Sch 40-PVC, 2 in. ID., 0.010 in. slots	4			CL: Clay (re-worked claystone), gray (10YR5/1) with trace yellowish brown (10YR5/6) mottling. Roots common throughout interval. Trace caliche blebs. Caliche stringer with iron oxidation halo at 5.1'. Slight color change from 5.9' to 6.7' to light brownish gray (10YR6/2) with faint mottling. Decreased moisture to moist.
5933		5			
5932		6			
		7			No recovery.
5931					CL: Clay with trace gravel (probably re-worked claystone), grayish brown (10YR5/2). Roots common. Soft and pliable. Saturated, free water from 7.6' to 8.0'. Gravel (1/2" diameter, subrounded) at 7.6' with trace iron oxidation in clay surrounding gravel clast.
5930		8			GC/CL: Gravelly Clay, dark brown (7.5YR3/3) with some strong brown (7.5YR5/6) iron oxidation at 8.15'. Strongly fractured and crumbly. 20 - 25% gravel (1/4" - 3/4" diameter, subrounded to subangular). Composition of gravel (?) - possible conglomerate, coated with iron oxide and manganese oxide. Interval is saturated with free water.
5929		9			CLAYSTONE: TOP OF BEDROCK. Claystone (bedrock) - possibly re-worked. Grayish brown (10YR5/2) to gray (10YR5/1) with minor yellowish brown (10YR5/6) mottling. Roots common. Trace caliche stringers. Interval competent from 8.35' to 9.0'; friable from 9.0' to 9.45'. Distinct decrease in moisture to very moist, further decreasing to moist at base.
5928		10			CLAYSTONE: Claystone, grayish brown (10YR5/2) to gray (10YR5/1) with trace brownish yellow (10YR6/8) iron oxidation mottling throughout. Massive texture. Interval is moderately friable. Slightly moist.
5927		11			
		12			No recovery.
5926		13			CLAYSTONE: Claystone, pale brown (10YR6/3). Massive texture. Trace iron oxidation along bedding planes. Silty lense (~1/8" thick) with iron oxidation at 13.8'. Firm and dense. Decreased moisture to very slightly moist. Trace silt at 12.5' and below.

Elev (Ft)	Well or Piezometer Construction and Materials	Depth (Ft)	Lithology	Unified Soils Classification or Rock Type	LOG OF BORING NUMBER: 80205 Lithologic Description	Page 3 of 3



CLAYSTONE: Claystone, gray (10YR5/1) to dark gray (10YR4/1). Massive textured. Trace iron oxidation along bedding planes (sub-horizontal). Disseminated caliche coating from 15.2' to 15.8' along vertical fracture with iron oxidation. Interval weakly friable. Trace black organic stringers. Decreased moisture to trace.

CLAYSTONE: Claystone, dark gray (10YR4/1) to very dark gray (10YR3/1). Massive texture. Moderately fissile and friable. No iron oxidation. Trace moisture to dry.

415

APPENDIX K

CHANNEL SLOPE STABILITY ANALYSIS

4/6

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ACCELERATED ACTION DESIGN FOR THE ORIGINAL LANDFILL

LANDFILL ENGINEERING
CHANNEL SLOPE STABILITY ANALYSIS

SEPTEMBER 2, 2005

Prepared by:

Earth Tech, Inc.
5575 DTC Parkway, Suite 200
Englewood, Colorado 80111
(303) 694-6660

This calculation was performed by Earth Tech, Inc. Although each sheet composing this calculation may or may not be initialed, it has nonetheless been reviewed and checked.

Prepared By: SK Date: 9/1/05

Checked By: RA Date: 9/1/05

Approved By: RT Date: 9/2/05

417

E A R T H T E C H
A tyco INTERNATIONAL LTD. COMPANY
5575 DTC Parkway, Suite 200
Englewood, Colorado 80111

Project: RFETS – Original Landfill Accelerated Action Project No. 57378 6040 Date: 9/1/05

Subject: Landfill Engineering – Channel Slope Stability Analysis

By: SK Date: 9/1/05 Chk By: RA Date: 9/1/05 App By: RT Date: 9/2/05

LIST OF ATTACHMENTS

Attachment 1 Seep Locations
Attachment 2 Site Investigation Geotechnical Drawings
Attachment 3 PCSTABL5M Results

418

1.0 INTRODUCTION

As part of the surface water management plan for the accelerated action at the Original Landfill, drainage channels were constructed on the west and east sides of the landfill to convey surface water run-on and runoff to below the buttress fill. During construction of the channels, seeps were encountered on the sideslopes that appeared to compromise the stability of the slope (see Attachment 1). Therefore, the slopes at the seeps were modified for both channels by both regrading to more gradual slopes and replacing the claystones present at the surface with Rocky Flats Alluvium (RFA). The purpose of this calculation is to determine the slope stability of the reconfigured channels to ensure that the overall stability of the Original Landfill is not compromised. The slope stability is determined using PCSTABL5M computer software.

This stability analysis follows methodology similar to the analysis completed during design of the Original Landfill cover. Applicable references and other information can be found in Appendix A of the Final Design Analysis and Design Calculations (Earth Tech 2005).

2.0 STABILITY CRITERIA

The stability analysis will meet the following design criteria developed in the Accelerated Action Design for the Original Landfill Geotechnical Investigation Phase 3 Stability Analysis Technical Support Memorandum (Phase 3 report) (Earth Tech 2004). Static stability is based on Technical Guidance for RCRA/CERCLA Final Cover (US EPA 2002) There are no specific guidelines regarding seismic stability, therefore the criteria were developed considering the project site setting, geologic conditions, standard of practice, and various regulatory requirements. The design criteria are as follows:

Design Criteria

Stability	Minimum Safety Factor
Static	1.5
Seismic	1.0 for a seismic coefficient of 0.06g or Deformation analysis with a seismically induced permanent displacement of 12 inches or less

3.0 PCSTABL5M MODELS

The PCSTABL5M model runs were conducted for both the west and east channel under static and seismic (pseudostatic) design criteria during both dry and saturated piezometric conditions. The PCSTABL5M models require development of a section for analysis as well as input of the engineering properties of the material within the sections and groundwater levels. The following sections summarize this input.

Section for Analysis

The sections for analysis were developed from site survey data (Attachment 1) and a site investigation conducted by geotechnical engineer Jack Woo and summarized in the drawings found in Attachment 2. Both sections in the PCSTABL5M model runs reflect the survey data and site investigation drawings which show RFA over weathered and unweathered claystones. In general the survey data was used to develop depths and relative elevations. The geotechnical drawings were used to conceptually develop layer interfaces.

Engineering Material Properties

Engineering material properties used in the modeling are identical to those used in Appendix A of the Final Design Analysis and Design Calculations (Earth Tech 2005). These properties can be found in the PCSTABL5M results included in Attachment 3.

Groundwater Levels

For both the west and east channels, saturated conditions assumed the weathered claystones were saturated up to the interface with the RFA and a seep was present at the toe of the slope in the RFA.

4.0 RESULTS

Results of the PCSTABL5M model runs are included in Attachment 3 and summarized in the following tables:

Channel Stability

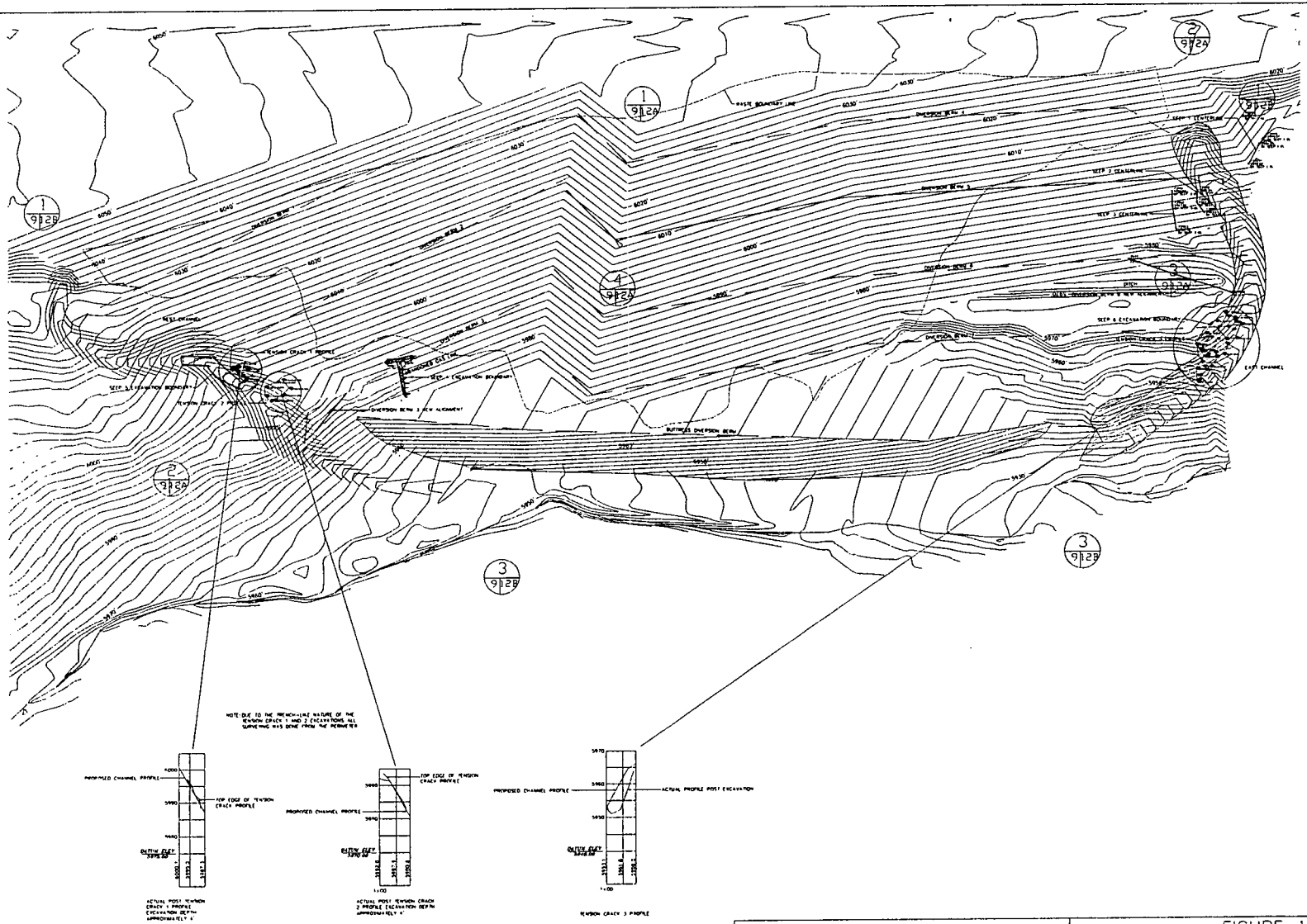
	Groundwater Condition	Minimum Safety Factor	
		Static	Pseudostatic 0.06g[1]
West Channel	Dry	1.8	1.2
	Saturated	1.5	1.0
East Channel	Dry	2.4	1.7
	Saturated	2.3	1.6

[1] Seismic coefficient for pseudostatic analysis.

The stability of the sideslope locations where seeps were encountered for the west and east channels meet the design criteria. Under static condtions both slopes have a factor of safety of 1.5 or greater and under pseudostatic conditions both have a factor of safety of 1.0 or greater.

ATTACHMENT 1
SEEP LOCATIONS

Fig 2



EarthTech

A tyco International Ltd. Company

FIGURE 1
OLF TENSION CRACK REPAIRS

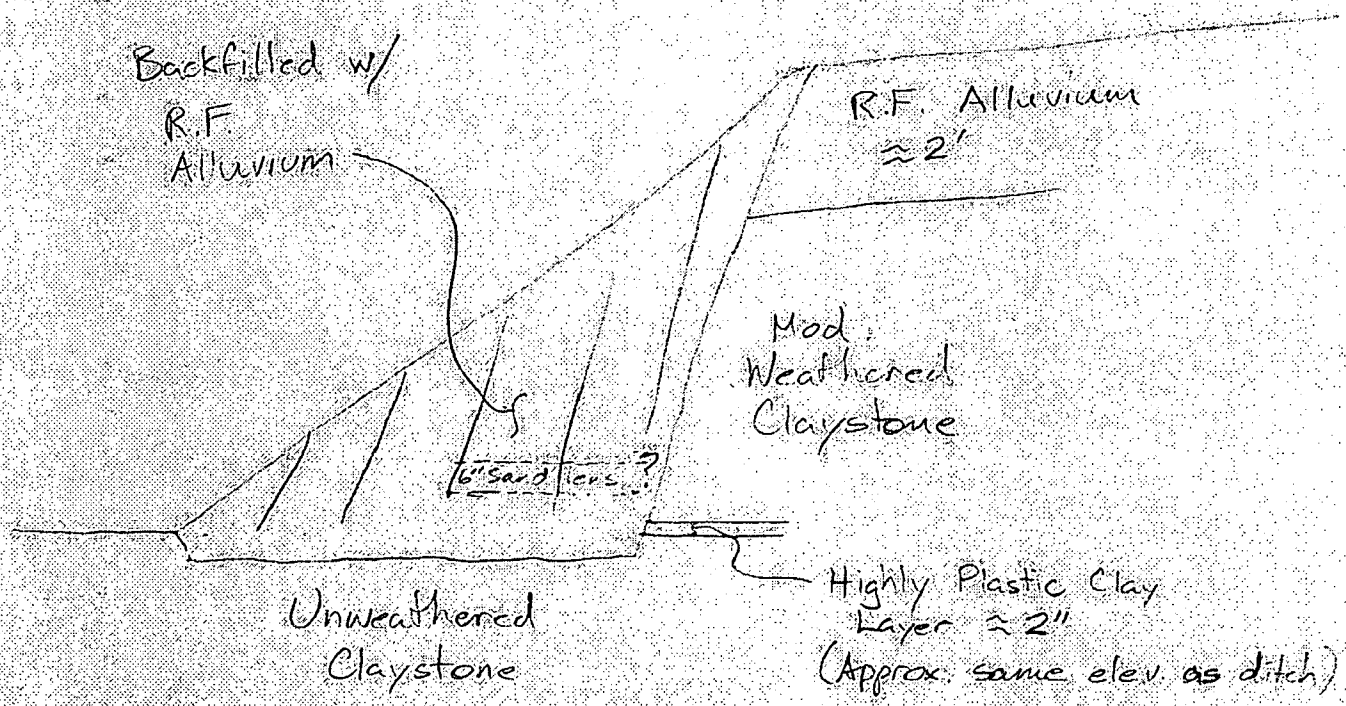
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

SEPT. 2005

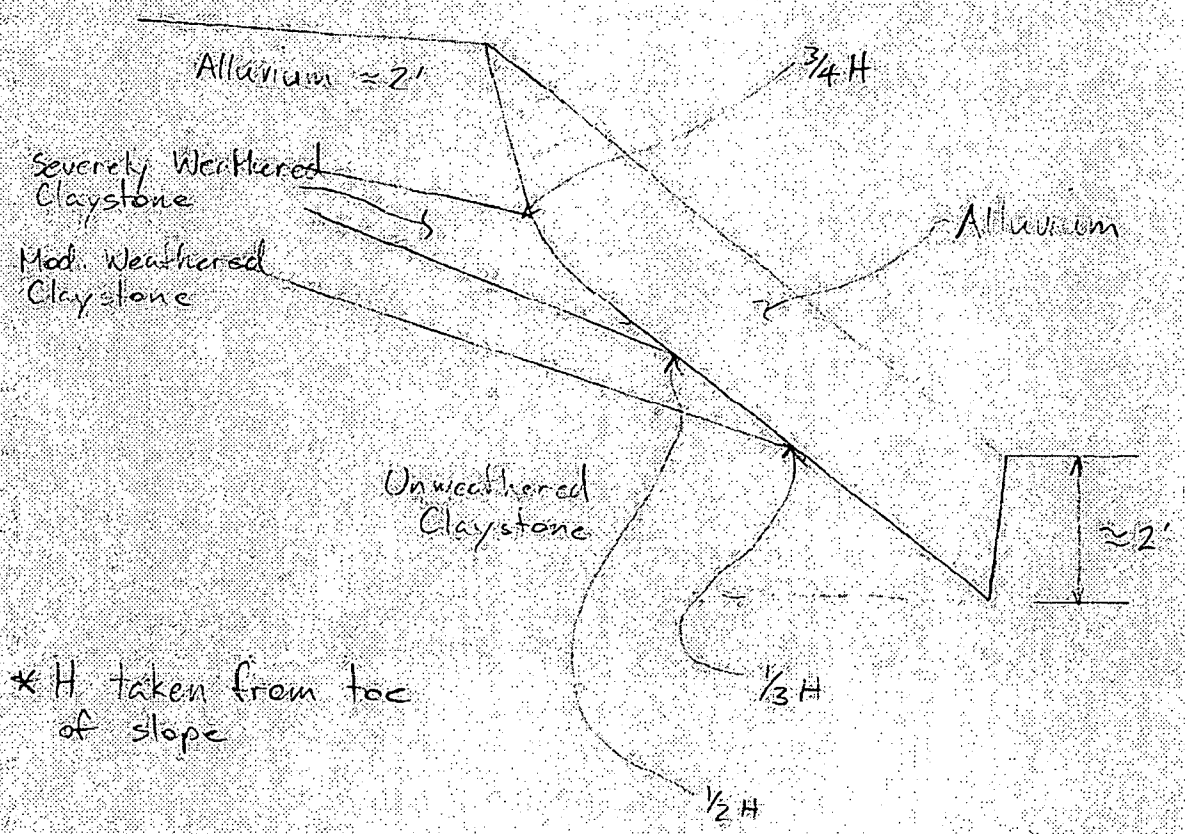
ATTACHMENT 2
SITE INVESTIGATION
GEOTECHNICAL DRAWINGS

423

East Slope - West Perimeter Channel



Soil Profile
West Side of East Perimeter Channel



* H taken from toe of slope

Notes:

- since I don't have dimensions, I referenced things from toe of slope.
- angle of layers is my interpretation. All I could see was what was on the surface.

425

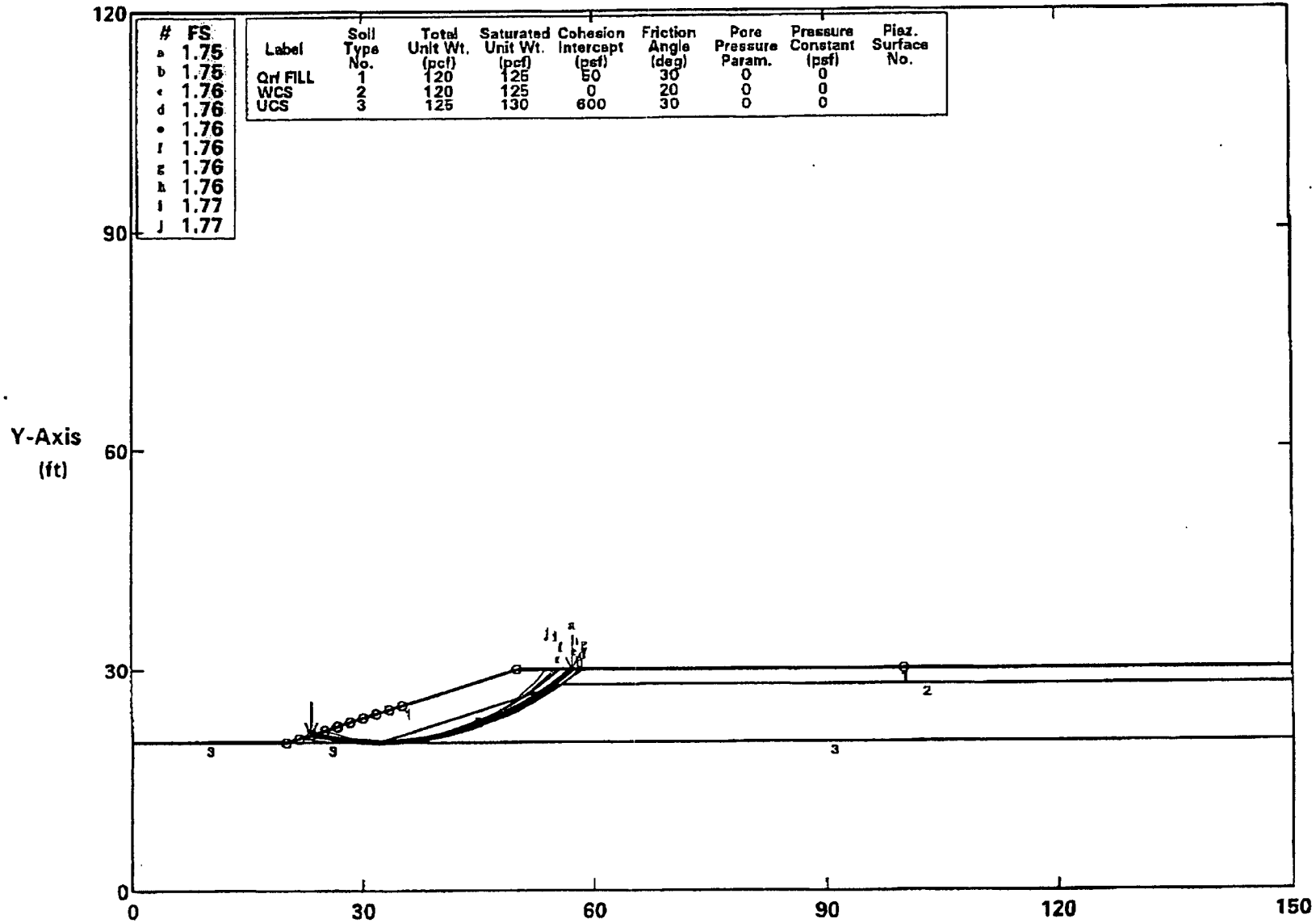
ATTACHMENT 3
PCSTABL5M RESULTS

426

427

ROCKY FLATS OLF - E SLOPE OF W CHANNEL - DRY - STATIC

Ten Most Critical. C:WCHANDS.PLT By: STAN KLINE 09-01-05 12:06pm



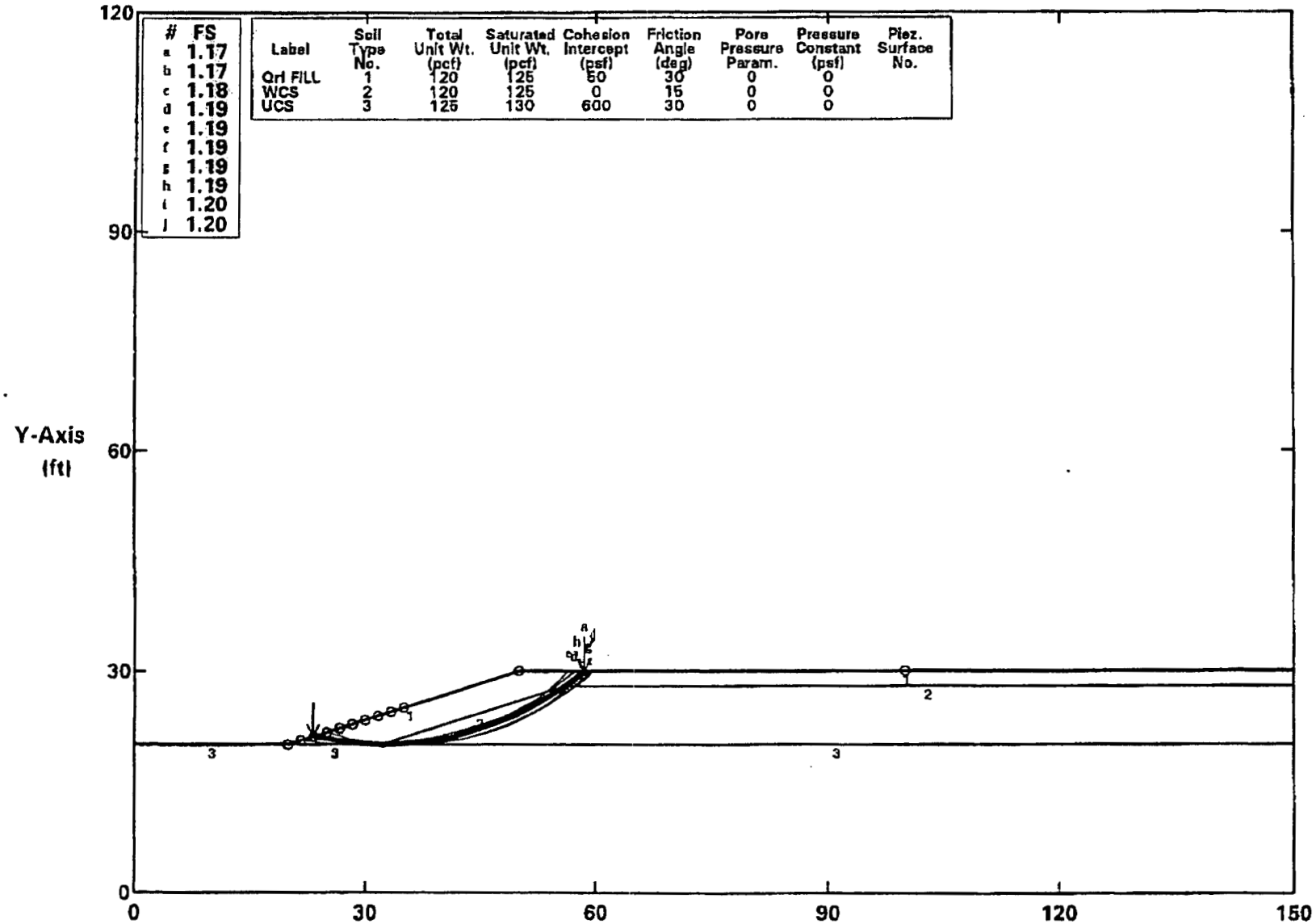
PCSTABL5M/SI FSmin = 1.75 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

428

ROCKY FLATS OLF - E SLOPE OF W CHANNEL - DRY - 0.06g

Ten Most Critical. C:WCHAND06.PLT By: STAN KLINE 09-01-05 12:08pm



#	FS
a	1.17
b	1.17
c	1.18
d	1.19
e	1.19
f	1.19
g	1.19
h	1.19
i	1.20
j	1.20

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Orl FILL	1	120	125	50	30	0	0	
WCS	2	120	125	0	15	0	0	
UCS	3	125	130	600	30	0	0	

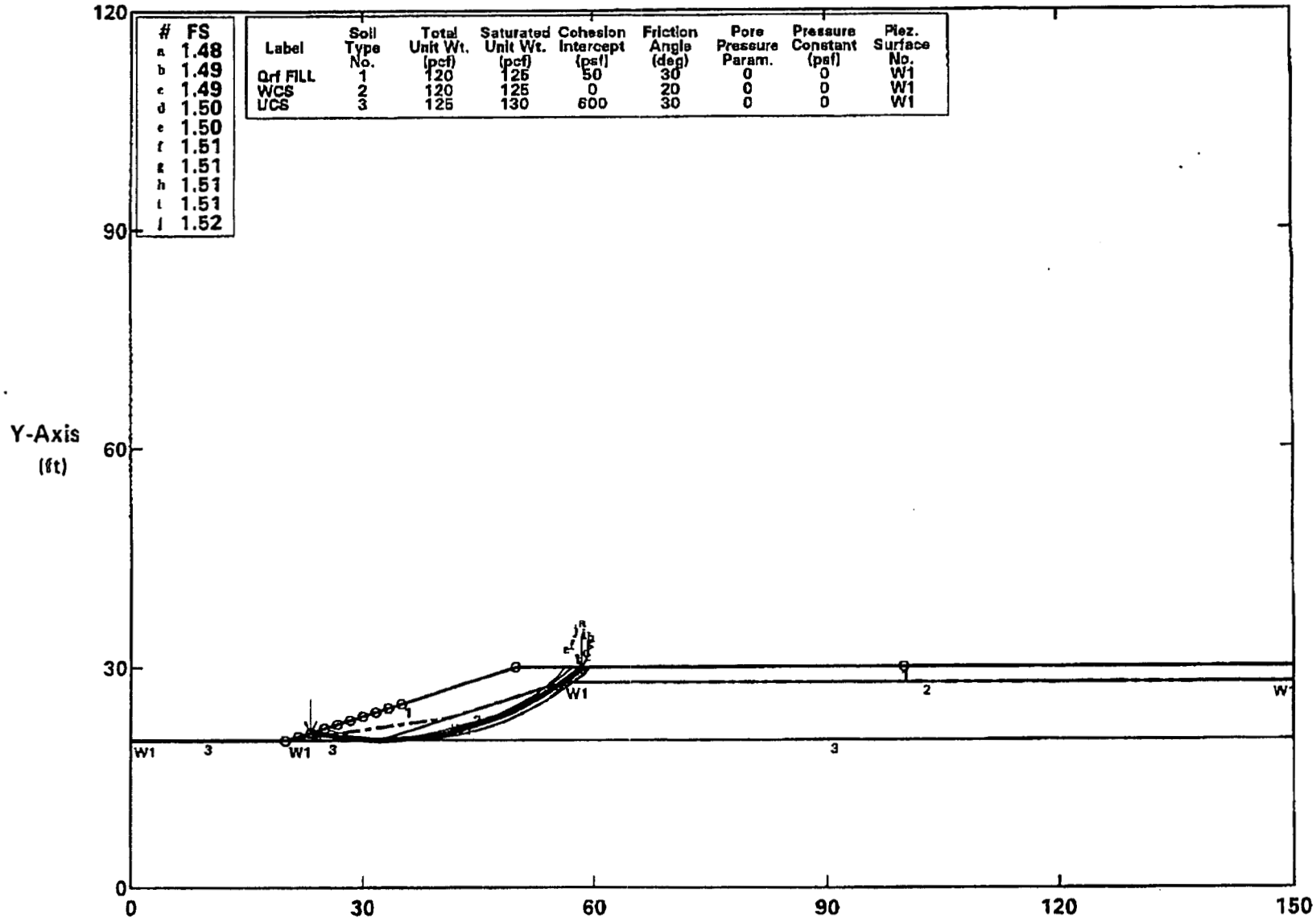
PCSTABL5M/SI FSmin=1.17 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

429

ROCKY FLATS OLF - E SLOPE OF W CHANNEL - SATURATED WCS - STATIC

Ten Most Critical. C:WCHANWS.PLT By: STAN KLINE 09-01-05 12:19pm



#	FS
a	1.48
b	1.49
c	1.49
d	1.50
e	1.50
f	1.51
g	1.51
h	1.51
i	1.51
j	1.52

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qrf FILL	1	120	125	50	30	0	0	W1
WCS	2	120	125	0	20	0	0	W1
UCS	3	125	130	600	30	0	0	W1

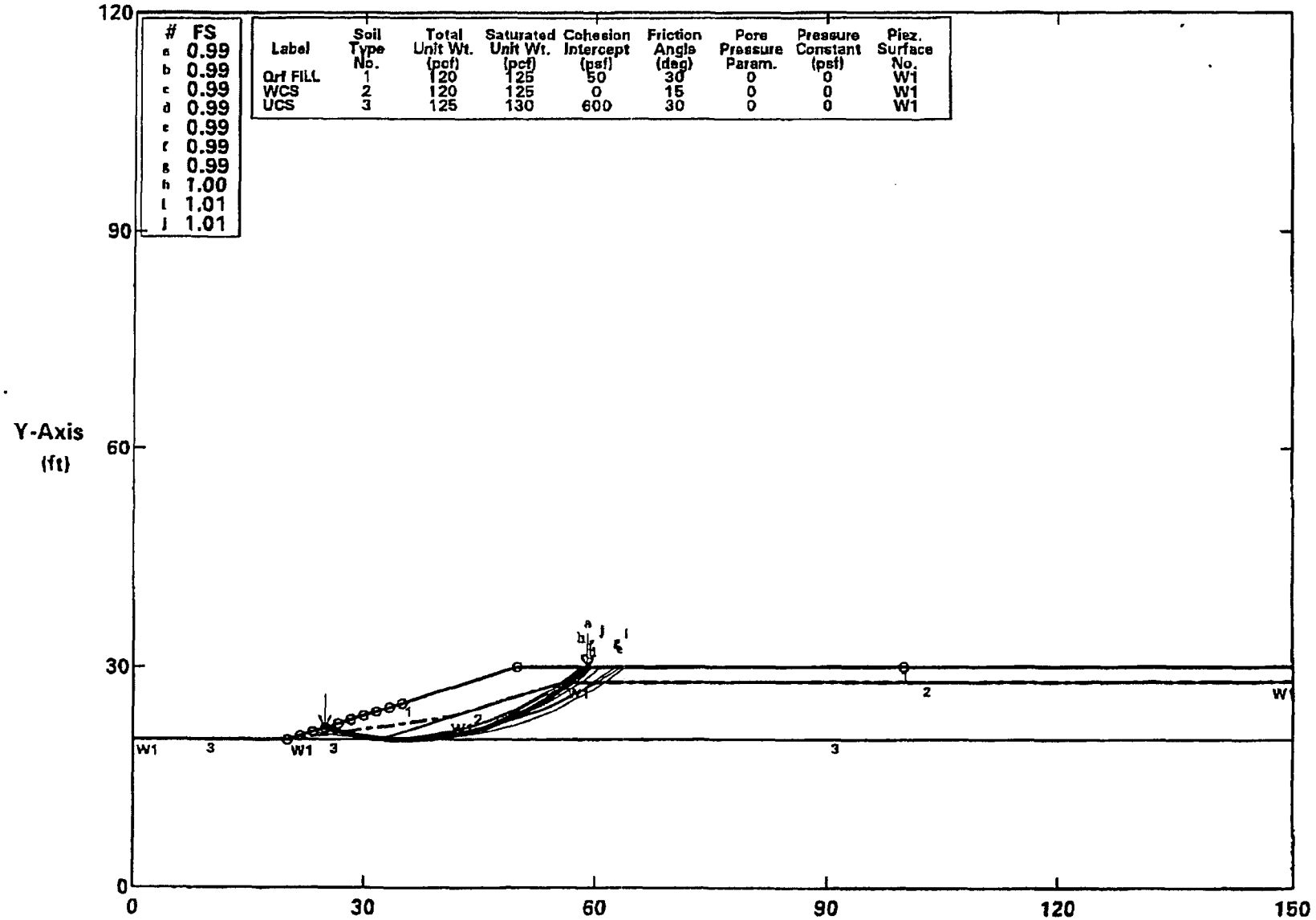
PCSTABL5M/SI FSmin = 1.48 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

430

ROCKY FLATS OLF - E SLOPE OF W CHANNEL - SATURATED WCS - 0.06g

Ten Most Critical. C:WCHANW06.PLT By: STAN KLINE 09-01-05 12:15pm



#	FS
a	0.99
b	0.99
c	0.99
d	0.99
e	0.99
f	0.99
g	0.99
h	1.00
i	1.01
j	1.01

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qrf FILL	1	120	125	50	30	0	0	W1
WCS	2	120	125	0	15	0	0	W1
UCS	3	125	130	600	30	0	0	W1

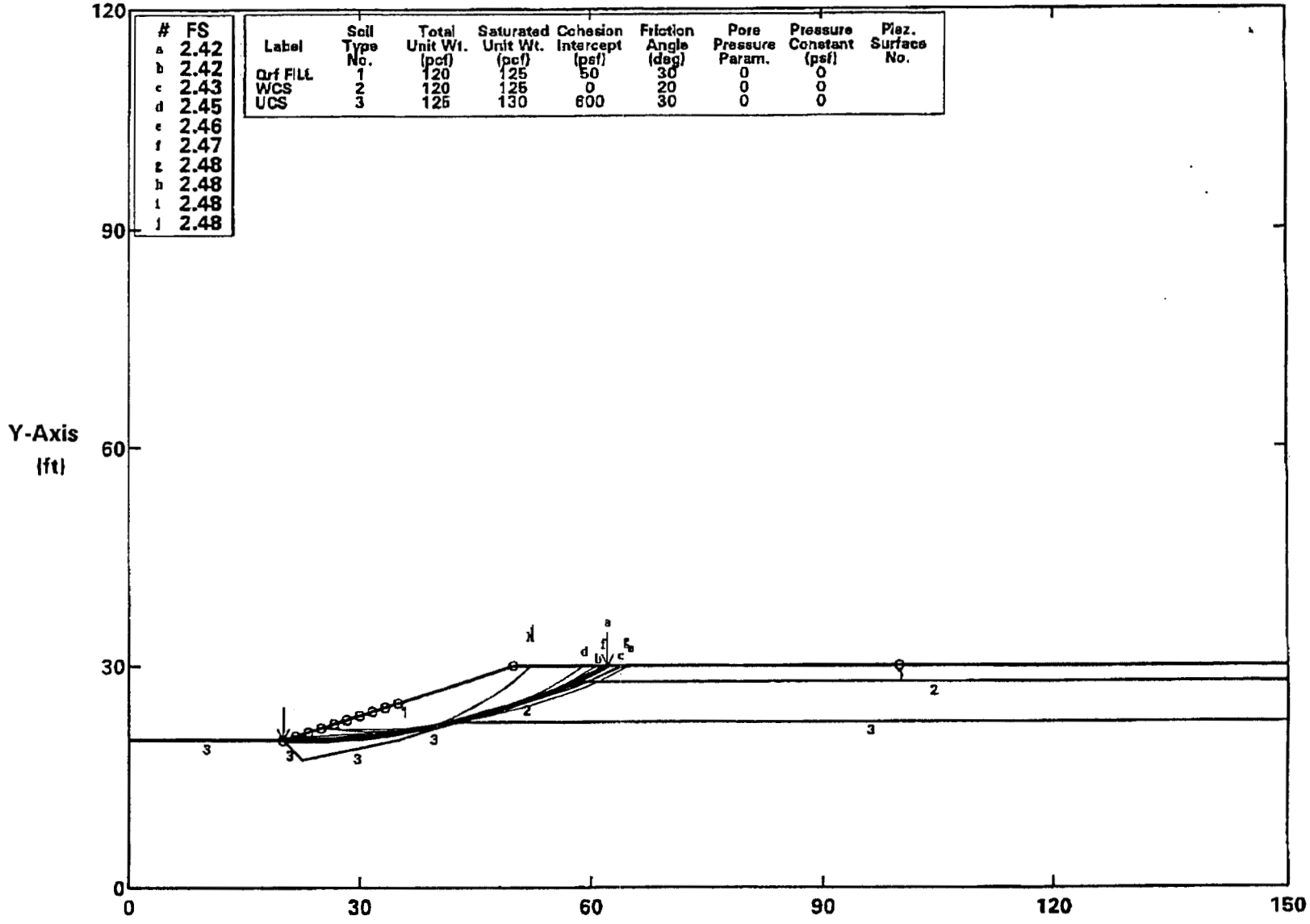
PCSTABL5M/SI FSmin = 0.99 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

431

ROCKY FLATS OLF - W SLOPE OF E CHANNEL - DRY - STATIC

Ten Most Critical. C:WCHANDS.PLT By: STAN KLINE 09-01-05 12:21pm



#	FS
a	2.42
b	2.42
c	2.43
d	2.45
e	2.46
f	2.47
g	2.48
h	2.48
i	2.48
j	2.48

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qrf FILL	1	120	125	50	30	0	0	
WCS	2	120	125	0	20	0	0	
UCS	3	125	130	600	30	0	0	

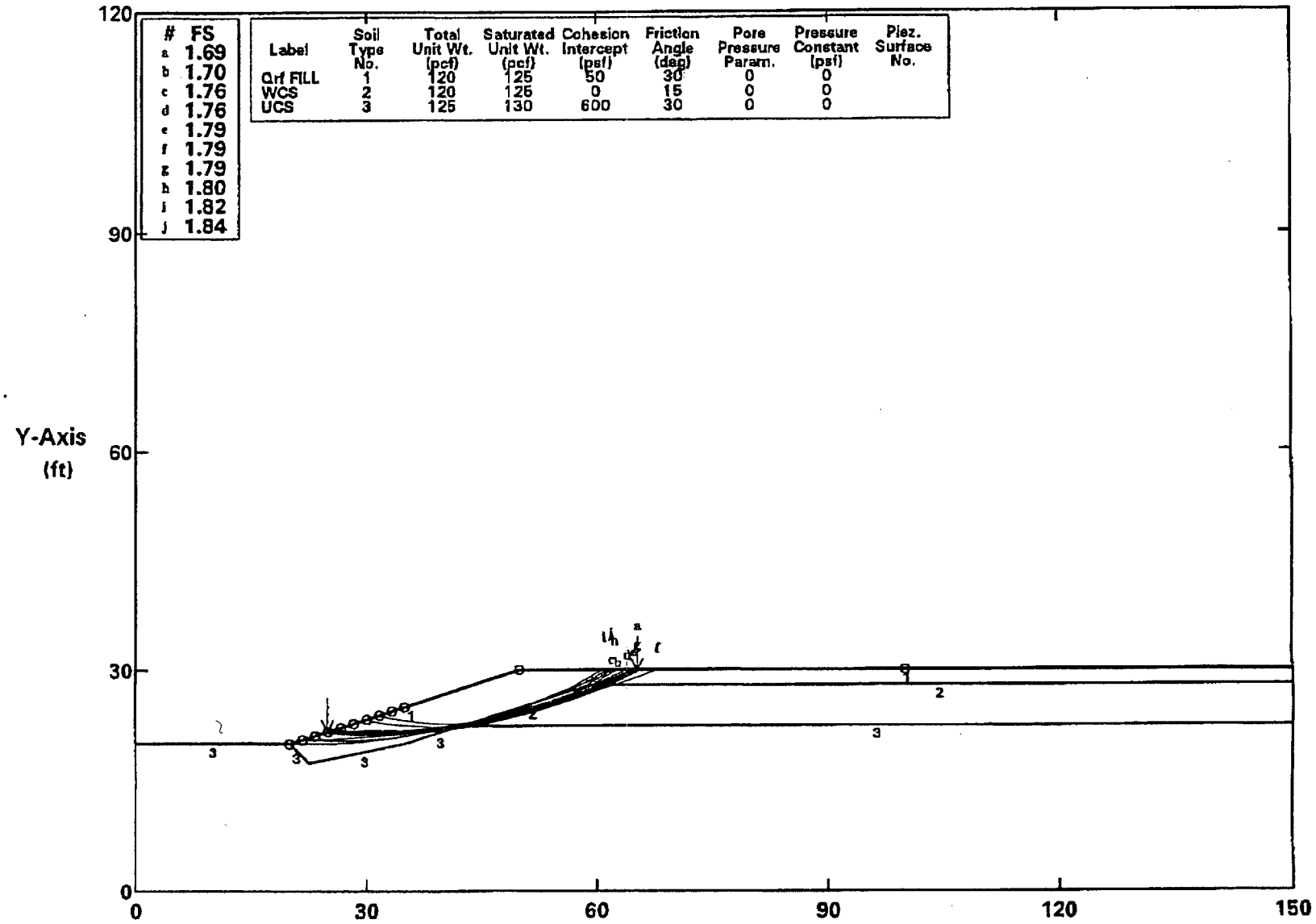
PCSTABL5M/SI FSmin = 2.42 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

432

ROCKY FLATS OLF - W SLOPE OF E CHANNEL - DRY - 0.06g

Ten Most Critical. C:WCHAND06.PLT By: STAN KLINE 09-01-05 12:27pm



PCSTABL5M/SI FSmin = 1.69 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

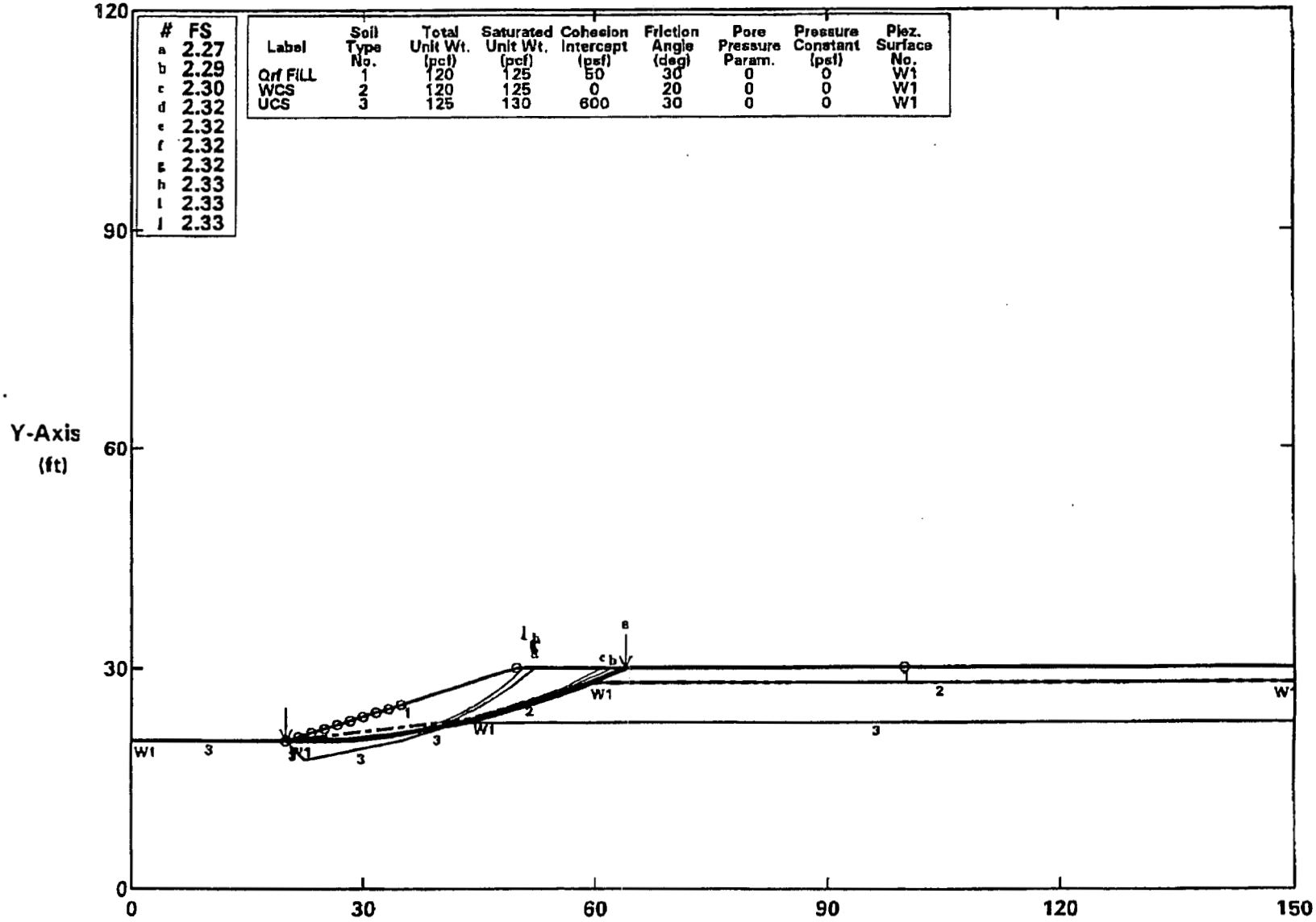
433

ROCKY FLATS OLF - W SLOPE OF E CHANNEL - SATURATED WCS - STATIC

Ten Most Critical. C:WCHANWS.PLT By: STAN KLINE 09-01-05 12:26pm

#	FS
a	2.27
b	2.29
c	2.30
d	2.32
e	2.32
f	2.32
g	2.32
h	2.33
i	2.33
j	2.33

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qrf FILL	1	120	125	50	30	0	0	W1
WCS	2	120	125	0	20	0	0	W1
UCS	3	125	130	600	30	0	0	W1



PCSTABL5M/SI FSmin = 2.27 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

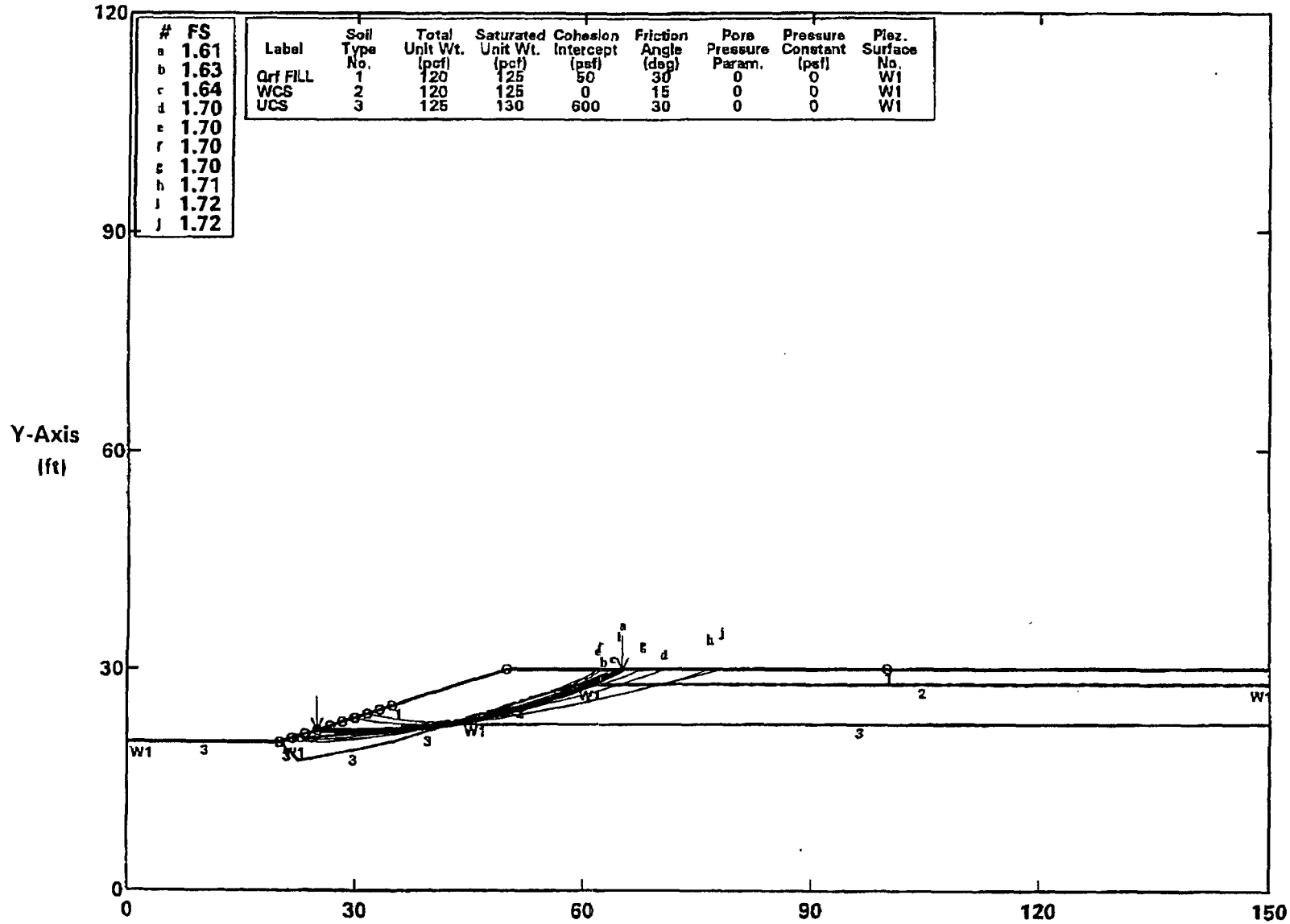
434
434

ROCKY FLATS OLF - W SLOPE OF E CHANNEL - SATURATED WCS - 0.06g

Ten Most Critical. C:WCHANW06.PLT By: STAN KLINE 09-01-05 12:29pm

#	FS
a	1.61
b	1.63
c	1.64
d	1.70
e	1.70
f	1.70
g	1.70
h	1.71
i	1.72
j	1.72

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qrf FILL	1	120	125	50	30	0	0	W1
WCS	2	120	125	0	15	0	0	W1
UCS	3	125	130	600	30	0	0	W1



PCSTABL5M/SI FSmin = 1.61 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ORIGINAL LANDFILL CLOSURE PROJECT
ASBUILT TOPOGRAPHIC SURVEY
COVER SHEET
DRAFT COPY

N

TABLE OF CONTENTS

SHEET 1: COVER SHEET

SHEET 2: ASBUILT TOPOGRAPHY SURVEY

SHEET 3: FINISHED GRADE TO SUBGRADE 2 COMPARISONS

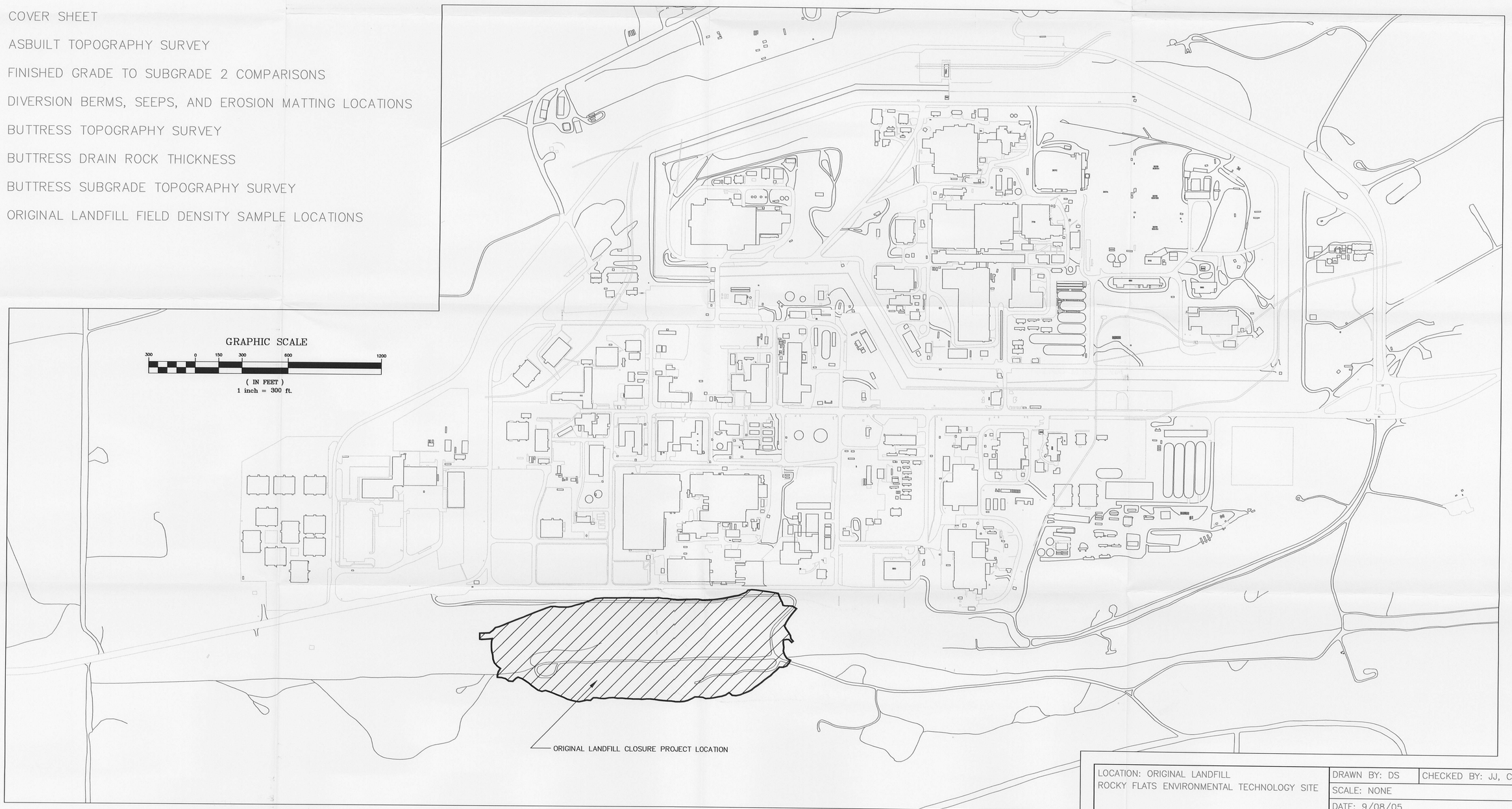
SHEET 4: DIVERSION BERMS, SEEPS, AND EROSION MATTING LOCATIONS

SHEET 5: BUTTRESS TOPOGRAPHY SURVEY

SHEET 6: BUTTRESS DRAIN ROCK THICKNESS

SHEET 7: BUTTRESS SUBGRADE TOPOGRAPHY SURVEY

SHEET 8: ORIGINAL LANDFILL FIELD DENSITY SAMPLE LOCATIONS



LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY: DS	CHECKED BY: JJ, CMc
	SCALE: NONE	
	DATE: 9/08/05	
DESCRIPTION: ORIGINAL LANDFILL CLOSURE PROJECT	JOB NUMBER 43872	SHEET 1 OF 8

377

IA-A-002857
1 of 7

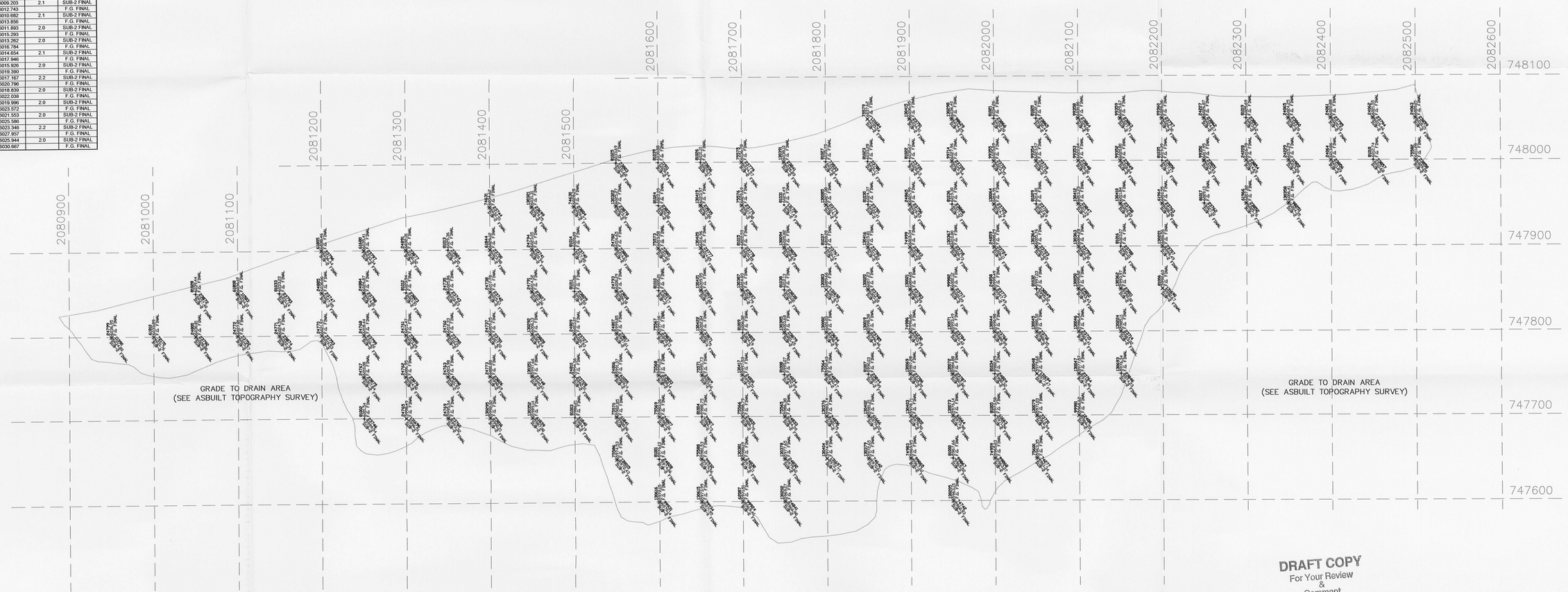
ORIGINAL LANDFILL
FINISHED GRADE TO SUB2 COMPARISON
SURVEYED 03/02/05 - 08/31/05
DRAFT COPY

N

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.



POINT #	NORTHING	EASTING	ELEVATION	THICKNESS	DESCRIPTION
24063	748049.986	2082500.009	6020.207		F.G. FINAL
23859	748049.965	2082500.008	6018.151	2.1	SUB-2 FINAL
24062	748050.007	2082449.970	6021.548		F.G. FINAL
23794	748050.018	2082450.025	6019.459	2.1	SUB-2 FINAL
24061	748049.976	2082400.006	6022.675		F.G. FINAL
23795	748050.069	2082400.044	6020.633	2.2	SUB-2 FINAL
24065	748049.994	2082350.017	6024.247		F.G. FINAL
23860	748050.001	2082350.023	6022.205	2.0	SUB-2 FINAL
81019	748049.994	2082300.003	6025.692		F.G. FINAL
23861	748050.078	2082299.991	6023.624	2.1	SUB-2 FINAL
24227	748049.990	2082250.021	6026.874		F.G. FINAL
23862	748050.053	2082249.954	6024.665	2.2	SUB-2 FINAL
99360	748050.030	2082199.957	6028.356		F.G. FINAL
23757	748049.953	2082199.990	6026.299	2.1	SUB-2 FINAL
99359	748049.996	2082150.057	6029.667		F.G. FINAL
23863	748050.005	2082150.022	6027.713	2.0	SUB-2 FINAL
99358	748049.917	2082100.010	6031.055		F.G. FINAL
23864	748050.020	2082100.036	6029.058	2.0	SUB-2 FINAL
81020	748049.968	2082049.984	6032.483		F.G. FINAL
23865	748049.989	2082050.033	6030.440	2.0	SUB-2 FINAL
81021	748049.983	2081999.96	6034.26		F.G. FINAL
23866	748049.998	2082000.025	6032.205	2.1	SUB-2 FINAL
130298	748050.066	2081949.967	6036.402		F.G. FINAL
98629	748050.095	2081949.991	6034.250	2.2	SUB-2 FINAL
130415	748049.977	2081899.980	6036.946		F.G. FINAL
23751	748049.962	2081900.021	6034.912	2.0	SUB-2 FINAL
75579	748049.994	2081850.030	6037.621		F.G. FINAL
131684	748049.96	2081849.93	6035.54	2.1	SUB-2 FINAL
75582	748000.036	2082500.110	6011.278		F.G. FINAL
23858	748000.067	2082499.906	6009.203	2.1	SUB-2 FINAL
81018	748000.011	2082449.954	6012.743		F.G. FINAL
23857	747999.984	2082449.982	6010.682	2.1	SUB-2 FINAL
24064	748000.030	2082399.986	6013.856		F.G. FINAL
23856	747999.954	2082399.952	6011.893	2.0	SUB-2 FINAL
24229	748000.052	2082349.995	6015.293		F.G. FINAL
11922	748000.040	2082349.964	6013.262	2.0	SUB-2 FINAL
24228	747999.993	2082299.983	6016.784		F.G. FINAL
23854	747999.990	2082300.039	6014.654	2.1	SUB-2 FINAL
99350	747999.937	2082250.050	6017.946		F.G. FINAL
23851	747999.998	2082249.899	6015.926	2.0	SUB-2 FINAL
81035	747999.960	2082199.930	6019.390		F.G. FINAL
23850	747999.931	2082199.962	6017.167	2.2	SUB-2 FINAL
99352	747999.923	2082149.978	6020.796		F.G. FINAL
23849	748000.124	2082150.076	6018.839	2.0	SUB-2 FINAL
99353	747999.945	2082099.951	6022.038		F.G. FINAL
23848	748000.006	2082100.045	6019.996	2.0	SUB-2 FINAL
99354	748000.003	2082050.004	6023.572		F.G. FINAL
23719	748000.094	2082050.123	6021.553	2.0	SUB-2 FINAL
99355	747999.943	2081999.956	6025.586		F.G. FINAL
23721	748000.091	2082000.069	6023.346	2.2	SUB-2 FINAL
99714	748000.016	2081949.973	6027.957		F.G. FINAL
23722	747999.989	2081950.001	6025.944	2.0	SUB-2 FINAL
81022	748000.072	2081900.024	6030.667		F.G. FINAL

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS	DESCRIPTION
81026	747999.936	2081649.976	6031.096		F.G. FINAL
23836	748000.043	2081649.995	6029.068	2.0	SUB-2 FINAL
81039	748000.060	2081600.000	6030.580		F.G. FINAL
11911	747999.958	2081599.938	6028.542	2.0	SUB-2 FINAL
81025	748000.015	2081550.005	6033.69		F.G. FINAL
23803	748000.012	2081550.014	6031.682	2.0	SUB-2 FINAL
130358	747950.048	2082350.010	6006.408		F.G. FINAL
98251	747949.997	2082350.095	6004.353	2.1	SUB-2 FINAL
61966	747949.995	2082300.024	6007.819		F.G. FINAL
23852	747949.949	2082299.978	6005.760	2.1	SUB-2 FINAL
81017	747949.99	2082250.021	6009.134		F.G. FINAL
23762	747949.999	2082250.085	6007.101	2.0	SUB-2 FINAL
61964	747950.047	2082200.025	6010.551		F.G. FINAL
23763	747950.050	2082199.947	6008.584	2.0	SUB-2 FINAL
130410	747950.030	2082149.957	6011.835		F.G. FINAL
23758	747950.049	2082150.131	6009.834	2.0	SUB-2 FINAL
130412	747950.039	2082100.081	6013.227		F.G. FINAL
23847	747949.954	2082100.100	6011.194	2.0	SUB-2 FINAL
81029	747949.97	2082049.97	6014.81		F.G. FINAL
23726	747949.902	2082049.991	6012.688	2.1	SUB-2 FINAL
130064	747950.075	2081999.977	6016.906		F.G. FINAL
23725	747950.021	2081999.966	6014.791	2.1	SUB-2 FINAL
81036	747950.020	2081950.000	6019.300		F.G. FINAL
23868	747949.955	2081950.044	6017.150	2.2	SUB-2 FINAL
24865	747949.974	2081899.955	6021.986		F.G. FINAL
23756	747950.057	2081900.030	6019.930	2.1	SUB-2 FINAL
81030	747950.04	2081849.91	6024.37		F.G. FINAL
23781	747950.000	2081849.983	6022.409	2.0	SUB-2 FINAL
130085	747949.934	2081800.043	6027.079		F.G. FINAL
23776	747950.071	2081800.028	6024.939	2.1	SUB-2 FINAL
81031	747950.02	2081749.96	6029.49		F.G. FINAL
131689	747950.040	2081750.040	6027.490	2.0	SUB-2 FINAL
75576	747949.952	2081699.928	6029.690		F.G. FINAL
131700	747950.040	2081700.070	6027.490	2.2	SUB-2 FINAL
130419	747950.033	2081649.968	6023.966		F.G. FINAL
23835	747950.046	2081650.026	6021.865	2.1	SUB-2 FINAL
81024	747950.001	2081600.011	6022.092		F.G. FINAL
23831	747950.017	2081599.911	6020.083	2.0	SUB-2 FINAL
130322	747949.987	2081550.060	6025.272		F.G. FINAL
23878	747949.967	2081549.858	6023.163	2.1	SUB-2 FINAL
74630	747950.016	2081500.019	6026.280		F.G. FINAL
23804	747949.927	2081499.927	6026.271	2.0	SUB-2 FINAL
130321	747949.957	2081449.955	6031.306		F.G. FINAL
23699	747949.914	2081449.936	6029.248	2.1	SUB-2 FINAL
74631	747949.902	2081399.911	6034.622		F.G. FINAL
23744	747950.039	2081399.976	6032.509	2.1	SUB-2 FINAL
130221	747899.971	2082200.005	6001.555		F.G. FINAL
23707	747900.022	2082199.971	5999.494	2.1	SUB-2 FINAL
81016	747900.004	2082149.963	6003.072		F.G. FINAL
23708	747899.895	2082149.908	6001.010	2.1	SUB-2 FINAL
130363	747899.983	2082100.003	6004.279		F.G. FINAL
23759	747900.043	2082099.975	6002.300	2.0	SUB-2 FINAL
130364	747899.966	2082049.922	6005.755		F.G. FINAL

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS	DESCRIPTION
81037	747899.920	2081799.980	6018.280		F.G. FINAL
23767	747900.008	2081799.927	6016.139	2.1	SUB-2 FINAL
130094	747900.024	2081750.067	6020.823		F.G. FINAL
23839	747900.059	2081750.051	6018.687	2.1	SUB-2 FINAL
81015	747899.974	2081700.025	6022.589		F.G. FINAL
23778	747900.063	2081699.976	6020.550	2.0	SUB-2 FINAL
130420	747900.051	2081649.985	6016.964		F.G. FINAL
23777	747900.056	2081650.028	6014.848	2.1	SUB-2 FINAL
75573	747900.057	2081599.982	6013.583		F.G. FINAL
23801	747900.087	2081600.048	6011.597	2.0	SUB-2 FINAL
24782	747900.055	2081550.011	6016.654		F.G. FINAL
23902	747900.035	2081549.922	6014.612	2.0	SUB-2 FINAL
81014	747900.061	2081500.04	6020.089		F.G. FINAL
23740	747900.045	2081500.011	6017.952	2.1	SUB-2 FINAL
24794	747900.036	2081449.966	6023.054		F.G. FINAL
23741	747900.025	2081450.001	6020.944	2.1	SUB-2 FINAL
61844	747900.009	2081400.028	6026.119		F.G. FINAL
23705	747899.976	2081400.028	6023.980	2.1	SUB-2 FINAL
81013	747899.946	2081349.971	6029.357		F.G. FINAL
23824	747900.007	2081350.002	6027.346	2.0	SUB-2 FINAL
24891	747900.028	2081300.000	6032.308		F.G. FINAL
23877	747899.947	2081300.106	6030.322	2.0	SUB-2 FINAL
61680	747899.906	2081250.043	6035.406		F.G. FINAL
23797	747900.002	2081250.019	6033.339	2.1	SUB-2 FINAL
61805	747900.066	2081199.981	6038.459		F.G. FINAL
23796	747899.955	2081199.916	6036.443	2.0	SUB-2 FINAL
130360	747850.046	2082199.911	5992.627		F.G. FINAL
131690	747849.99	2082200.02	5990.67	2.0	SUB-2 FINAL
130362	747849.957	2082149.957	5993.974		F.G. FINAL
23811	747850.021	2082150.053	5992.003	2.0	SUB-2 FINAL
130050	747849.964	2082099.920	5995.518		F.G. FINAL
23812	747849.985	2082099.926	5993.431	2.1	SUB-2 FINAL
81032	747850	2082050.03	5997.03		F.G. FINAL
130049	747850.093	2082050.057	5995.022	2.0	SUB-2 FINAL
24858	747849.966	2081999.975	5999.494		F.G. FINAL
23771	747849.990	2081999.969	5997.491	2.0	SUB-2 FINAL
99962	747850.029	2081949.972	6002.116		F.G. FINAL
23717	747849.928	2081950.021	6000.092	2.0	SUB-2 FINAL
130021	747850.041	2081899.998	6004.655		F.G. FINAL
23783	747849.937	2081899.999	6002.582	2.1	SUB-2 FINAL
130020	747850.035	2081850.028	6007.226		F.G. FINAL
23768	747849.997	2081849.925	6005.181	2.0	SUB-2 FINAL
130083	747850.019	2081799.946	6009.657		F.G. FINAL
131692	747849.96	2081800.05	6007.63	2.0	SUB-2 FINAL
81038	747850.070	2081749.990	6012.130		F.G. FINAL
23837	747850.024	2081749.983	6010.000	2.1	SUB-2 FINAL
130387	747850.004	2081700.060	6014.833		F.G. FINAL
23837	747849.978	2081700.035	6012.786	2.0	SUB-2 FINAL
130421	747850.059	2081649.988	6009.951		F.G. FINAL
23834	747849.916	2081650.097	6007.798	2.2	SUB-2 FINAL
81010	747849.973	2081599.991	6005.21		F.G. FINAL
23819	747850.029	2081599.978	6003.170	2.0	SUB-2 FINAL
24793	747850.023	2081550.002	6008.293		F.G. FINAL

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS	DESCRIPTION
81012	747849.955	2081300.05	6023.944		F.G. FINAL
23823	747849.915	2081299.908	6021.906	2.0	SUB-2 FINAL
24894	747849.961	2081249.968	6026.870		F.G. FINAL
23798	747849.947	2081250.048	6024.808	2.1	SUB-2 FINAL
24885	747850.038	2081200.037	6030.064		F.G. FINAL
23747	747850.085	2081200.047	6027.946	2.1	SUB-2 FINAL
81033	747849.97	2081149.99	6033.22		F.G. FINAL
23793	747849.993	2081149.999	6031.144	2.1	SUB-2 FINAL
61808	747850.047	2081099.984	6036.120		F.G. FINAL
11583	747850.007	2081099.998	6034.097	2.0	SUB-2 FINAL
81028	747850.057	2081050.005	6039.445		F.G. FINAL
23872	747850.024	2081050.015	6037.396	2.0	SUB-2 FINAL
130224	747800.044	2082149.896	5985.110		F.G. FINAL
23714	747800.056	2082150.005	5983.024	2.1	SUB-2 FINAL
130046	747799.929	2082099.943	5986.538		F.G. FINAL
23715	747799.885	2082099.998	5984.411	2.1	SUB-2 FINAL
130045	747799.958	2082049.907	5988.503		F.G. FINAL
23716	747799.949	2082049.961	5986.355	2.1	SUB-2 FINAL
130044	747800.077	2082000.055	5990.975		F.G. FINAL
23766	747800.002	2082000.055	5988.986	2.0	SUB-2 FINAL
130071	747799.995	2081949.994	5993.486		F.G. FINAL
23784	747800.092	2081950.042	5991.405	2.1	SUB-2 FINAL
74686	747799.885	2081899.946	5996.001		F.G. FINAL
61230	747799.943	2081900.046	5993.991	2.1	SUB-2 FINAL
130019	747799.959	2081849.936	5998.579		F.G. FINAL
23785	747799.973	2081850.011	5996.462	2.1	SUB-2 FINAL
130082	747800.019	2081800.065	6001.033		F.G. FINAL
23694	747800.035	2081800.033	5998.958	2.1	SUB-2 FINAL
130385	747800.068	2081749.967	6003.677		F.G. FINAL
23879	747799.955	2081750.029	6001.449	2.2	SUB-2 FINAL
81009	747800.036	2081699.962	6006.316		F.G. FINAL
24815	747800.049	2081699.944	6004.195	2.1	SUB-2 FINAL
130422	747799.945	2081649.934	6002.839		F.G. FINAL
23871	747799.980	2081650.021	6000.750	2.1	SUB-2 FINAL
75567	747800.104	2081599.985	5997.162		F.G. FINAL
23832	747800.119	2081600.057	5995.129	2.0	SUB-2 FINAL
24807	747800.014	2081549.949	5999.853		F.G. FINAL
23817	747800.045	2081550.023	5997.609	2.2	SUB-2 FINAL
24809	747800.032	2081500.012	6003.067		F.G. FINAL
23727	747799.889	2081500.008	6000.925	2.1	SUB-2 FINAL
130292	747800.024	2081450.014	6006.128		F.G. FINAL
23828	747800.044	2081449.961	6004.042	2.1	SUB-2 FINAL
24737	747800.033	2081400.032	6008.248		F.G. FINAL
23701	747800.033	2081400.106	6007.201	2.0	SUB-2 FINAL
24760	747800.052	2081350.030	6012.327		F.G. FINAL
23755	747799.992	2081350.028	6010.210	2.1	SUB-2 FINAL
24761	747799.951	2081300.018	6015.468		F.G. FINAL
23800	747799.885	2081299.943	6013.253	2.2	SUB-2 FINAL
24768	747799.977	2081249.993	6018.437		F.G. FINAL
23799	747800.089	2081250.022	6016.199	2.2	SUB-2 FINAL
24770	747800.007	2081199.978	6021.570		F.G. FINAL
23753	747799.998	2081200.098	6019.527	2.0	SUB-2 FINAL
24771	747799.972	2081149.996	6024.591		F.G. FINAL

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS	DESCRIPTION
81006	747749.966	2082150.001	5976.335		F.G. FINAL
23846	747749.943	2082150.049	5974.233	2.1	SUB-2 FINAL
130047	747749.999	2082099.939	5977.571		F.G. FINAL
23764	747749.928	2082099.994	5975.456	2.1	SUB-2 FINAL
130048	747749.957	2082050.034	5979.604		F.G. FINAL
131694	747749.96	2082049.94	5977.47	2.1	SUB-2 FINAL
81034	747750.05	2082000.01	5982.29		F.G. FINAL
24824	747750.019	2082000.008	5980.317	2.0	SUB-2 FINAL
130072	747749.978	2081950.037	5984.876		F.G. FINAL
23787	747750.066	2081950.083	5982.866	2.0	SUB-2 FINAL
130069	747750.083	2081899.927	5987.28		F.G. FINAL
23786	747750.041	2081900.114	5985.20	2.1	SUB-2 FINAL
81007	747750.015	2081849.968	5990.031		F.G. FINAL
23844	747749.966	2081849.978	5987.998	2.0	SUB-2 FINAL
75564	747749.972	2081799.980	5992.434		F.G. FINAL
24835	747749.953	2081799.952	5990.471	2.0	SUB-2 FINAL
81008	747749.997	2081750.026	5995.07		F.G. FINAL
24834	747750.019	2081750.084	5992.986	2.1	SUB-2 FINAL
130417	747749.975	2081699.974	5997.527		F.G. FINAL
24816	747749.997	2081699.953	5995.509	2.0	SUB-2 FINAL
75571	747749.961	2081650.031	5995.732		F.G. FINAL
24819	747749.966	2081650.056	5993.667	2.1	SUB-2 FINAL
75568	747749.967	2081599.946	5996.140		F.G. FINAL
23833	747750.128	2081600.035	5988.140	2.0	SUB-2 FINAL
24806	747749.941	2081550.061	5991.373		F.G. FINAL
61055	747750.117	2081549.937	5989.140	2.2	SUB-2 FINAL
24810	747750.031	2081500.007	5994.559		F.G. FINAL
23728	747748.443	2081499.768	5992.513	2.0	SUB-2 FINAL
130351	747750.016	2081449.970	5997.060		F.G. FINAL
23748	747749.999	2081450.001	5995.610	2.1	SUB-2 FINAL
24773	747750.001	2081399.997	6000.884		F.G. FINAL
23826	747750.018	2081399.981	5998.688	2.2	SUB-2 FINAL
24763	747749.921	2081349.961	6003.975		F.G. FINAL
60998	747750.043	2081350.100	6001.925	2.1	SUB-2 FINAL
24762	747749.965	2081299.972	6006.953		F.G. FINAL
23876	747750.012	2081300.001	6004.896	2.1	SUB-2 FINAL
24767	747749.989	2081250.009	6010.076		F.G. FINAL
23875	747750.063	2081250.050	6007.836	2.2	SUB-2 FINAL
99981	747700.031	2082099.924	5968.624		F.G. FINAL
12486	747699.927	2082100.038	5966.545	2.1	SUB-2 FINAL
130079	747700.021	2082049.994	5971.035		F.G. FINAL
23731	747699.989	2082050.002	5969.941	2.1	SUB-2 FINAL
81005	747699.985	2081999.991	5973.577		F.G. FINAL
61663	747699.923	2082000.049	5971.562	2.0	SUB-2 FINAL
130073	747700.131	2081949.966	5976.141		F.G. FINAL
61964	747700.055	2081950.057	5973.979	2.2	SUB-2 FINAL
130403	747700.057	2081899.964	5978.713		F.G. FINAL
61822	747699.976	2081899.951	5976.502	2.2	SUB-2 FINAL
130402	747699.947	2081850.028	5981.212		F.G. FINAL
61666	747700.043	2081849.972	5979.224	2.0	SUB-2 FINAL
130376	747699.956	2081799.984	5983.746		F.G. FINAL
24836	747699.970	2081799.957	5981.750	2.0	SUB-2 FINAL
75565	747699.940	2081750.004	5986.381		F.G. FINAL

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS	DESCRIPTION
81003	747699.935	2081500.053	5986.209		F.G. FINAL
61840	747699.988	2081499.987	5984.194	2.0	SUB-2 FINAL
130302	747699.928	2081450.013	5989.137		F.G. FINAL
61839	747699.943	2081449.984	5987.078	2.1	SUB-2 FINAL
130295	747700.068	2081400.040	5992.317		F.G. FINAL
23818	747700.081	2081399.986	5990.214	2.1	SUB-2 FINAL
24769	747700.029	2081349.965	5995.541		F.G. FINAL
23760	747699.942	2081350.023	5993.320	2.2	SUB-2 FINAL
24765	747700.012	2081300.060	5998.488		F.G. FINAL
131696	747699.99	2081300.03	5996.51	2.0	SUB-2 FINAL
81002	747699.985	2081249.977	6001.544		F.G. FINAL
23746	747700.121	2081250.058	5999.539	2.0	SUB-2 FINAL
75600	747649.954	2082049.957	5963.355		F.G. FINAL
74277	747649.976	2082049.976	5961.335	2.0	SUB-2 FINAL
74959	747649.954	2081999.968	5965.033		F.G. FINAL
99968	747649.904	2082000.017	5963.069	2.0	SUB-2 FINAL
81000	747649.987	2081949.999	5967.659		F.G. FINAL
99967	747649.932	2081949.942	5965.525	2.1	SUB-2 FINAL
74983	747650.051	2081900.012	5969.954		F.G. FINAL
99965	747650.047	2081899.966	5967.825	2.1	SUB-2 FINAL
130379	747649.953	2081849.948	5972.653		F.G. FINAL
74642	747649.984	2081850.017	5970.606	2.0	SUB-2 FINAL
130404	747650.049	2081800.078	5974.981		F.G. FINAL
131697	747650.04	2081798.99	5972.77	2.2	SUB-2 FINAL
130378	747649.961	2081749.987	5977.650		F.G. FINAL
24832	747649.965	2081749.976	5975.597	2.1	SUB-2 FINAL
130381	747649.994	2081699.940	5980.189		F.G. FINAL
24830	747649.948	2081699.932	5978.114	2.1	SUB-2 FINAL
75588	747650.027	2081649.953	5981.528		F.G. FINAL
99932	747649.962	2081649.934	5979.562	2.0	SUB-2 FINAL
81001	747649.988	2081599.981	5976.131		F.G. FINAL
24828	747649.973	2081600.014	5974.065	2.1	SUB-2 FINAL
75586	747649.987	2081550.060	5974.532		F.G. FINAL
130015	747650.120	2081549.972	5972.433	2.1	SUB-2 FINAL
130205	747599.958	2081950.014	5963.152		F.G. FINAL
74742	747599.994	2081949.959	5960.930	2.2	SUB-2 FINAL
130202	747600.051	2081750.023	5969.067		F.G. FINAL
24841	747599.955	2081749.998	5966.985	2.1	SUB-2 FINAL
62087	747600.039	2081699.926	5971.507		F.G. FINAL
99924	747600.098	2081699.906	5969.462	2.0	SUB-2 FINAL
130615	747599.930	2081649.900	5973.990		F.G. FINAL
99934	747599.923	2081649.941	5971.948	2.0	SUB-2 FINAL
130616	747599.940	2081599.960	5972.150		F.G. FINAL
99931	747599.983	2081599.959	5970.139	2.0	SUB-2 FINAL

DRAFT COPY
For Your Review
&
Comment

NOTES:

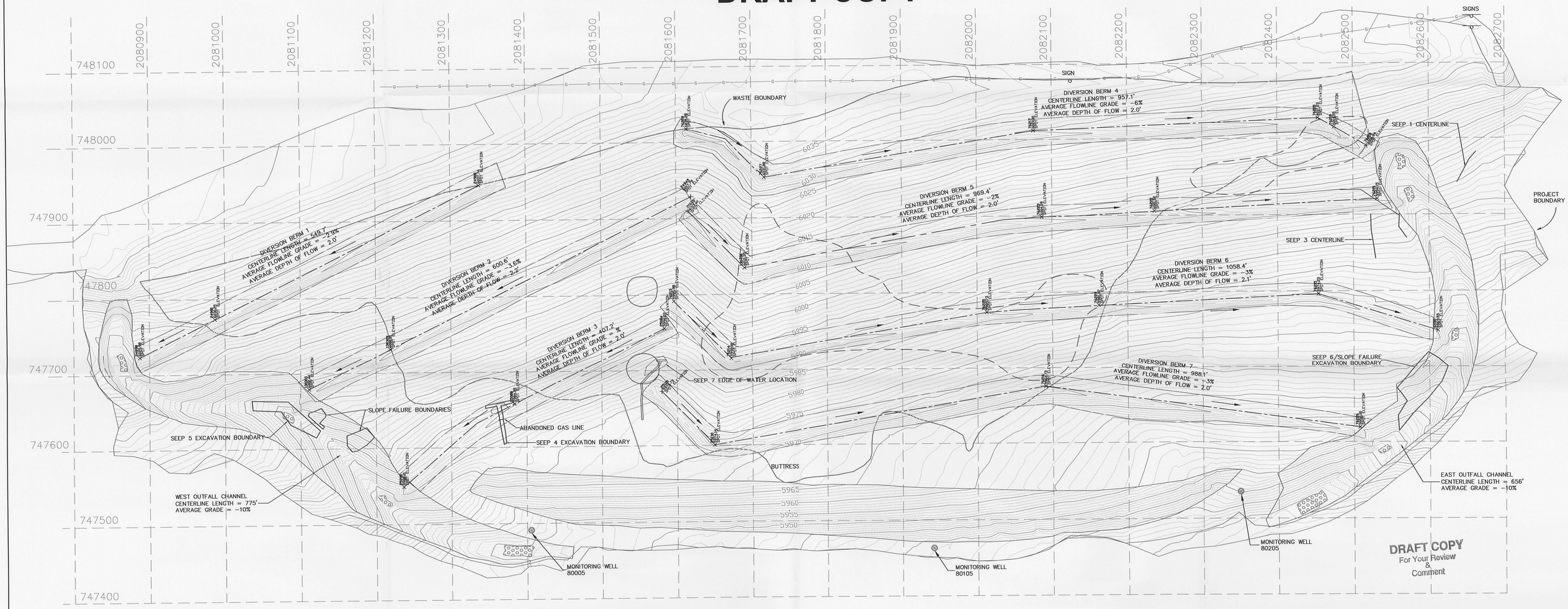
1. ENGINEERED FEATURES AND LOCAL INFRASTRUCTURE NOT DEFINED BY SURVEY.
2. POINTS ARE IN COLORADO STATE PLANE COORDINATE SYSTEM, NAD 27 CENTRAL ZONE.
3. ELECTRONIC DRAWING IS NOT A DESIGN GRADE TOPO.
4. THE ELEVATIONS OF POINT NUMBERS 75600 AND 74277 WERE FIELD CHANGED TO MEET DRAINAGE NEEDS AND APPROVED ACCORDING TO RFI #18.
5. THE ELEVATIONS OF POINT NUMBERS 130616 AND 99929 WERE FIELD CHANGED TO MEET DRAINAGE NEEDS AND WERE APPROVED ACCORDING TO RFI #9.

LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY: DS/KG	CHECKED BY: JJ, CMc
	SCALE: 1' = 60'	
	DATE: 09/21/05	
	JOB NUMBER	SHEET
DESCRIPTION: FINISHED GRADE TO SUB 2 COMPARISON	43872	3 OF 8

318

IA-A-002857
2 of 7

ORIGINAL LANDFILL
DIVERSION BERMS, SEEP AND EROSION MATTING LOCATIONS
SURVEYED (03/02/05 TO 09/08/05)
DRAFT COPY



GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

Legend

- —5112— CONTOUR ELEVATION
- MONITORING WELL
- SIGN
- EROSION MATTING (SEE ORIGINAL LANDFILL TOPO FOR DETAILS)
- 24" BOULDERS
- SEEP IDENTIFICATION/MITIGATION
- FEATURE SPOT ELEVATIONS
- AREAS WHERE SUBGRADE 1 WAS NOT OBTAINED

NOTES:

1) THE CONTOURS REPRESENTED HEREON WERE INTERPOLATED BY LAND DEVELOPMENT DESKTOP (DIGITAL TERRAIN MODELING) LDD 4 SOFTWARE BETWEEN ACTUAL MEASURED SPOT ELEVATIONS. DEPENDING ON THE DISTANCE FROM A MEASURED SPOT ELEVATION, THE CONTOUR SHOWN MAY NOT BE AN EXACT REPRESENTATION OF THE SITE TOPOGRAPHY. THE PURPOSE OF THIS TOPOGRAPHIC MAP IS FOR SITE EVALUATION AND TO SHOW SURFACE DRAINAGE FEATURES. ADDITIONAL TOPOGRAPHIC OBSERVATIONS MAY BE NECESSARY IN SPECIFIC AREAS OF DESIGN. ALL GRADES, ELEVATIONS AND CONTOURS WERE SURVEYED PRIOR TO 09/08/05.

2) ELECTRONIC DRAWING IS NOT A DESIGN GRADE TOPO.

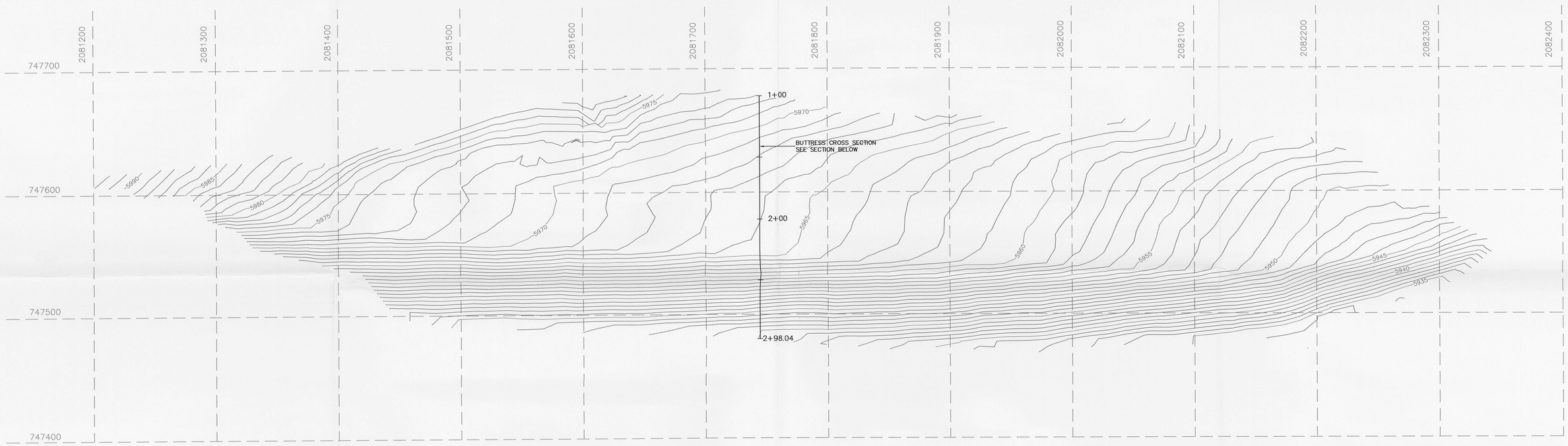
REV.	DESCRIPTION	BY	DATE

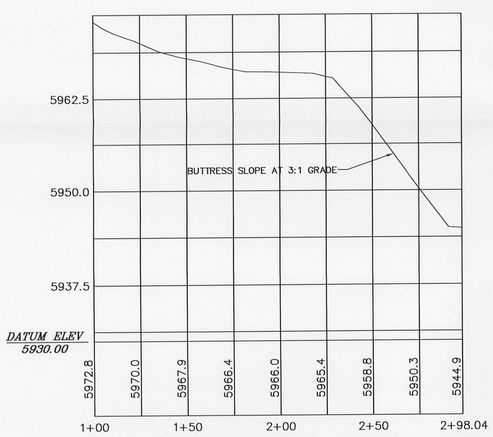
LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY: DS	CHECKED BY: JJ, CMc
	SCALE: 1" = 60'	
	DATE: 09/12/05	
	JOB NUMBER	SHEET
DESCRIPTION: DIVERSION BERMS, SEEPS, AND EROSION MATTING	43872	4 OF 8

319

IA-A-002857
3 OF 7

ORIGINAL LANDFILL
BUTTRESS TOPOGRAPHY SURVEY
SURVEYED 03/02/05 - 07/24/05
DRAFT COPY





BUTTRESS TOPO ALIGNMENT GRADES AT SECTION		
STATION	ELEVATION	GRADE OUT
2+28.69	5965.24	-29.08
2+30.12	5964.82	-27.88
2-43.04	5961.22	-34.42
2-68.41	5952.49	-34.92
2+71.44	5951.43	-32.71
2+83.51	5947.48	-32.78

N

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NOTES:

1. ENGINEERED FEATURES AND INFRASTRUCTURE NOT DEFINED BY SURVEY.
2. POINTS ARE IN COLORADO STATE PLANE COORDINATE SYSTEM, NAD 27 CENTRAL ZONE.
3. ELECTRONIC DRAWING IS NOT A DESIGN GRADE TOPO.
4. BUTTRESS CONTOURS SHOWN ARE PRIOR TO PLACEMENT OF ROCKY FLATS ALLUVIUM COVER.

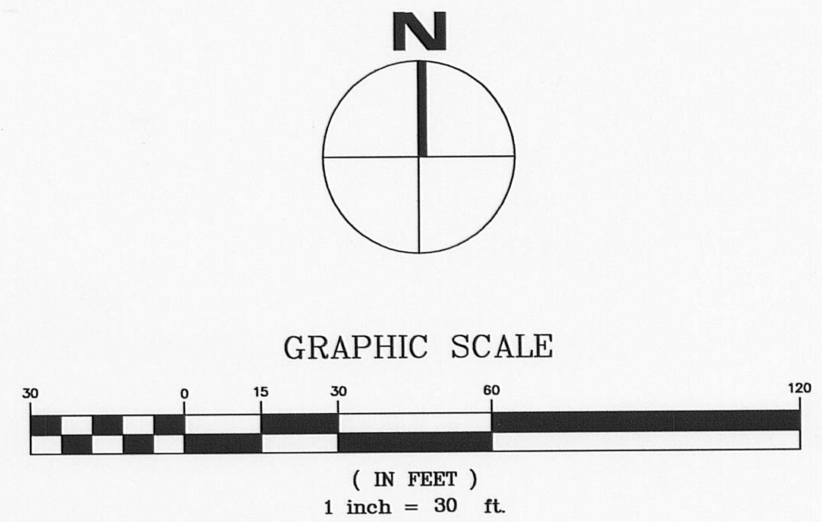
REV.	DESCRIPTION	BY	DATE

LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY: DS	CHECKED BY: JJ, CMc
	SCALE: 1' = 40'	
	DATE: 08/09/05	
	JOB NUMBER	SHEET
DESCRIPTION: ORIGINAL LANDFILL BUTTRESS TOPOGRAPHY SURVEY	43872	5 OF 8

380

IA-A-002857
4 OF 7

ORIGINAL LANDFILL
DRAIN ROCK THICKNESS
SURVEYED 03/02/05 - 06/30/05
DRAFT COPY



POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
71969	747487.907	2081941.099	5937.180	
60676	747487.907	2081941.115	5938.184	1.0'
71970	747488.453	2081925.085	5937.470	
60677	747488.465	2081925.085	5938.370	0.9'
86319	747489.034	2081892.634	5938.003	
60679	747489.346	2081893.069	5939.192	1.1'
86284	747489.546	2081857.090	5939.427	
60681	747489.581	2081857.076	5940.218	0.7'
72506	747490.489	2081875.989	5938.420	
60680	747490.512	2081875.995	5939.368	0.9'
71455	747491.349	2081828.483	5940.630	
72002	747491.392	2081828.526	5941.681	1.0'
71456	747492.320	2081813.388	5940.670	
60684	747492.320	2081813.431	5942.471	1.8'
71457	747495.389	2081797.379	5941.740	
19484	747495.448	2081797.260	5942.745	1.0'
75122	747498.520	2081762.449	5942.550	
19486	747498.577	2081762.562	5943.750	1.2'
71967	747500.657	2081987.940	5936.580	
21115	747500.702	2081988.031	5937.410	0.8'
8427	747500.790	2082014.866	5936.498	
72511	747500.796	2082014.877	5935.600	0.9'
60688	747501.261	2081746.342	5944.101	
75123	747501.261	2081746.382	5942.950	1.1'
71513	747503.518	2081665.012	5945.070	
19489	747503.572	2081664.958	5945.916	0.8'
61541	747503.858	2081696.276	5944.819	
71512	747503.907	2081696.227	5943.920	0.9'
60694	747504.162	2081643.269	5946.516	
71514	747504.162	2081643.344	5945.470	1.0'
8421	747506.700	2081888.290	5939.937	
71971	747506.896	2081888.336	5939.110	0.8'
8420	747508.398	2081858.460	5941.026	
72507	747508.398	2081858.555	5940.180	0.8'
71419	747508.512	2081842.042	5940.890	
8419	747508.517	2081842.048	5941.693	0.8'
10147	747510.110	2081545.120	5947.354	
15631	747510.072	2081545.228	5948.532	1.1'
71520	747510.108	2081606.324	5946.470	
97943	747510.177	2081606.324	5947.270	0.8'
7440	747511.560	2082081.035	5936.200	
70632	747511.637	2082081.149	5934.198	2.0'
75124	747511.899	2081746.692	5943.200	
60719	747511.949	2081746.692	5944.075	0.8'
97819	747512.476	2081788.929	5943.400	
71458	747512.476	2081788.980	5942.300	1.1'
74266	747512.739	2081496.863	5948.830	
15637	747512.739	2081496.914	5950.231	1.4'

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
15695	747516.312	2082190.949	5935.095	
72158	747516.386	2082190.986	5932.900	2.2'
71420	747516.855	2081825.580	5941.370	
97818	747516.872	2081825.615	5942.274	0.9'
10168	747518.211	2081596.980	5946.548	
97839	747518.117	2081596.941	5947.412	0.8'
15656	747518.534	2081473.941	5951.093	
10003	747518.651	2081473.998	5950.268	0.9'
75249	747519.089	2081555.805	5947.510	
97840	747519.168	2081555.765	5949.305	1.8'
15310	747519.117	2081847.949	5941.897	
71418	747519.152	2081847.926	5941.000	0.9'
15657	747519.520	2081453.940	5952.270	
74267	747519.645	2081453.769	5950.820	1.4'
21174	747521.800	2082148.480	5935.070	
70715	747521.844	2082148.362	5933.345	1.7'
74268	747522.331	2081431.938	5952.010	
15668	747522.366	2081431.903	5952.908	0.9'
8097	747524.370	2081801.480	5943.495	
97154	747524.295	2081801.324	5942.203	1.2'
72501	747524.653	2081880.299	5939.740	
19153	747524.691	2081880.299	5940.842	1.1'
72513	747526.962	2081930.000	5939.170	
19157	747527.000	2081929.981	5939.964	0.7'
97942	747528.908	2081607.705	5947.522	
75245	747528.972	2081607.737	5946.620	0.9'
97859	747529.978	2081403.299	5955.776	
74269	747529.978	2081403.349	5954.580	1.2'
19158	747530.279	2081979.960	5938.882	
72512	747530.307	2081979.932	5937.570	1.3'
72157	747531.224	2082240.522	5934.360	
16831	747531.259	2082240.522	5935.962	1.6'
74282	747533.277	2081498.598	5950.260	
15638	747533.320	2081498.641	5951.560	1.3'
71966	747535.818	2082045.402	5937.500	
19482	747535.818	2082045.541	5938.710	1.2'
15674	747537.923	2081384.831	5959.190	
72227	747537.923	2081384.908	5956.990	2.2'
8590	747538.610	2081848.245	5942.640	
71421	747538.652	2081848.023	5941.140	1.5'
97962	747538.688	2081454.368	5953.343	
74270	747538.619	2081454.368	5952.040	1.3'
60717	747541.329	2081747.500	5945.705	
75126	747541.349	2081747.549	5944.300	1.4'
86328	747541.362	2081905.312	5940.556	
21177	747541.360	2081905.310	5941.750	1.1'
97273	747541.360	2082103.560	3937.580	
21172	747541.359	2082103.562	5939.050	1.4'

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
60722	747543.810	2081760.750	5945.910	
75125	747543.733	2081760.866	5944.260	1.6'
60699	747544.141	2081644.088	5947.620	
71515	747544.187	2081643.997	5946.070	1.5'
15670	747544.597	2081413.474	5956.698	
74272	747544.597	2081413.592	5955.000	1.7'
71516	747545.245	2081627.984	5946.800	
19494	747545.245	2081628.047	5947.751	0.9'
72420	747546.017	2081546.953	5949.530	
97952	747546.127	2081546.953	5950.534	1.0'
97963	747546.264	2081436.446	5955.001	
74271	747546.264	2081436.489	5953.700	1.3'
72228	747547.395	2081387.658	5957.900	
97969	747547.410	2081387.705	5959.503	1.6'
97946	747548.305	2081589.094	5948.872	
71964	747548.331	2081589.015	5948.070	0.8'
72156	747548.694	2082135.264	5938.600	
15700	747548.717	2082135.241	5939.795	1.2'
72226	747549.111	2081365.383	5960.190	
97971	747549.161	2081365.333	5962.192	2.0'
21171	747551.290	2081992.980	5940.100	
70656	747551.334	2081992.904	5938.668	1.4'
71930	747551.807	2081499.644	5951.780	
97958	747551.860	2081499.591	5952.780	1.0'
72508	747552.276	2081857.853	5942.500	
15309	747552.329	2081857.906	5943.698	1.2'
72225	747552.479	2081354.399	5961.880	
15478	747552.559	2081354.399	5963.280	1.4'
72503	747552.743	2082283.427	5938.360	
15697	747552.762	2082283.438	5939.477	1.1'
72155	747552.770	2082173.637	5939.650	
8856	747552.831	2082173.682	5940.553	0.9'
74262	747553.070	2081796.221	5944.030	
8099	747553.070	2081796.284	5945.530	1.5'
72505	747553.181	2082204.659	5938.740	
8853	747553.181	2082204.714	5940.041	1.3'
71562	747554.067	2081825.603	5943.120	
97817	747554.080	2081825.590	5944.821	1.7'
15509	747554.465	2081563.047	5950.490	
75253	747554.507	2081563.174	5949.590	0.9'
75234	747555.493	2081705.829	5947.380	
15617	747555.532	2081705.790	5949.279	1.9'
15698	747556.151	2082234.393	5940.195	
72504	747556.197	2082234.348	5938.990	1.2'
97921	747556.863	2081683.802	5949.601	
75233	747556.897	2081683.784	5947.900	1.7'
71900	747558.174	2081543.817	5950.830	
97881	747558.174	2081543.938	5951.631	0.8'

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
71931	747558.775	2081483.226	5953.290	
97851	747558.778	2081483.241	5954.087	0.8'
97968	747562.898	2081392.200	5960.941	
74285	747562.940	2081392.116	5960.140	0.8'
97908	747563.067	2081645.101	5951.331	
71554	747563.097	2081645.101	5949.330	2.0'
72224	747563.442	2081343.052	5965.550	
15678	747563.541	2081343.052	5967.746	2.2'
74287	747564.490	2081404.830	5959.220	
97860	747564.609	2081404.895	5960.421	1.2'
19154	747564.830	2081875.982	5944.759	
71561	747564.844	2081875.954	5942.400	2.3'
15526	747568.610	2081602.908	5952.554	
75246	747568.654	2081602.952	5950.650	1.9'
11986	747569.233	2082010.201	5943.339	
70664	747569.295	2082010.189	5941.821	1.5'
20379	747570.430	2081924.960	5943.456	
71968	747570.485	2081924.869	5942.070	1.3'
70682	747570.819	2082062.396	5943.905	
9113	747570.927	2082062.390	5944.969	1.0'
74261	747570.995	2081785.575	5948.500	
19150	747571.031	2081785.575	5949.516	1.0'
21173	747571.590	2082097.520	5945.580	
70692	747571.705	2082097.522	5944.066	1.5'
8471	747572.335	2081443.516	5959.381	
74296	747572.359	2081443.467	5958.280	1.1'
8842	747572.442	2082274.594	5944.130	
72502	747572.442	2082274.636	5943.030	1.1'
70734	747573.114	2082198.895	5942.322	
19217	747573.133	2082198.950	5943.386	1.0'
8841	747575.299	2082297.184	5944.941	
74303	747575.299	2082297.184	5943.640	1.3'
9117	747575.983	2082128.856	5945.101	
71757	747575.956	2082128.845	5943.262	1.8'
19159	747577.328	2081973.037	5944.777	
86589	747577.407	2081973.052	5943.254	1.5'
71114	747578.201	2082173.243	5943.260	
8857	747578.209	2082173.275	5944.648	1.4'
72223	747578.575	2081325.415	5971.620	
8447	747578.642	2081325.348	5972.821	1.2'
72222	747579.853	2081314.427	5972.560	
8444	747579.891	2081314.465	5974.064	1.5'
71553	747581.374	2081646.485	5953.940	
15544	747581.417	2081646.528	5955.144	1.2'
15311	747583.287	2081856.057	5947.410	
71564	747583.287	2081856.160	5946.210	1.2'
71790	747583.481	2082283.108	5945.355	
9120	747583.510	2082283.043	5946.389	1.0'

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
75127	747584.122	2081742.297	5953.250	
15316	747584.122	2081742.330	5954.153	0.9'
19155	747584.829	2081922.915	5946.326	
86568	747584.833	2081922.893	5944.378	1.9'
15312	747585.070	2081823.800	5949.810	
74103	747585.143	2081823.835	5948.610	1.2'
71963	747585.831	2082276.376	5945.610	
8843	747585.988	2082276.323	5946.711	1.1'
8911	747588.346	2082262.876	5946.906	
71962	747588.388	2082262.918	5945.920	1.0'
8855	747589.408	2082225.441	5945.458	
72005	747589.408	2082225.471	5944.160	1.3'
74273	747589.763	2081442.859	5963.140	
97856	747589.780	2081442.876	5964.441	1.3'
97932	747590.902	2081707.704	5956.511	
75131	747590.948	2081707.750	5955.210	1.3'
74102	747591.237	2081837.409	5948.820	
19151	747591.241	2081837.433	5949.963	1.1'
71961	747591.259	2082248.351	5945.430	
8912	747591.274	2082248.346	5946.432	1.0'
71932	747593.929	2081484.666	5961.030	
15427	747593.953	2081484.666	5962.828	1.8'
21176	747593.940	2082040.510	5947.700	
71741	747594.022	2082040.427	5946.811	0.8'
71563	747594.550	2081873.066	5950.310	
21048	747594.615	2081872.869	5952.211	1.9'
74284	747594.850	2081405.035	5967.440	
97861	747594.911	2081405.035	5968.637	1.2'
97863	747595.565	2081366.088	5972.440	
71422	747595.580	2081366.104	5971.540	0.9'
72221	747597.180	2081523.430	5960.270	
97847	747597.261	2081523.317	5961.465	1.2'
74260	747598.380	2081768.500	5953.960	
8085	747598.253	2081768.542	5955.660	1.7'
8850	747599.430	2082201.350	5946.617	
72004	747599.473	2082201.287	5945.420	1.2'
97891	747599.656	2081584.575	5960.875	
75252	747599.680	2081584.575	5959.380	1.5'
15540	747600.000	2081625.273	5959.776	
75247	747600.000	2081625.350	5958.380	1.4'
71552	747600.176	2081648.007	5958.100	
97910	747600.226	2081648.107	5959.705	1.6'
70811	747601.370	2081980.875	5950.618	
21175	747601.370	2081980.880	5951.570	0.9'
21139	747601.429	2082241.758	5947.239	
72006	747601.461	2082241.693	5945.740	1.5'
74259	747601.791	2081794.802	5953.620	
8114	747601.812	2081794.843	5954.519	0.9'

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
97898	747603.952	2081604.552	5961.464	
75248	747604.167	2081604.498	5959.860	1.6'
21246	747604.760	2082074.870	5950.450	
70000	747604.793	2082074.705	5949.060	1.3'
97826	747608.293	2081696.801	5960.754	
75132	747608.338	2081696.846	5958.750	2.0'
8063	747609.588	2081739.738	5958.947	
75128	747609.588	2081739.770	5957.350	1.6'
8894	747610.720	2081391.960	5975.449	
74283	747610.766	2081391.957	5974.350	1.1'
71112	747610.850	2082155.433	5948.150	
8859	747610.867	2082155.365	5949.253	1.1'
70776	747611.434	2081936.265	5950.753	
19472	747611.610	2081934.857	5952.060	1.3'
21061	747612.701	2082015.586	5951.840	
71965	747612.749	2082015.610	5950.580	1.2'
21245	747614.410	2082103.190	5952.150	
70001	747614.521	2082103.201	5951.130	1.0'
97878	747615.656	2081522.705	5965.874	
71908	747615.656	2081522.772	5964.470	1.4'
72003	747616.708	2082220.032	5947.500	
8847	747616.729	2082220.095	5948.604	1.1'
72448	747618.235	2081649.586	5961.980	
97911	747618.316	2081649.546	5963.784	1.8'
7924	747618.336	2081426.458	5974.503	
74286	747618.434	2081426.440	5973.300	1.2'
71113	747624.061	2082175.580	5948.730	
8858	747624.092	2082175.578	5950.130	1.4'
96393	747625.243	2081465.412	5948.570	
8848	747625.562	2082206.173	5949.468	0.9'
74257	747626.379	2081794.159	5957.720	
8112	747626.454	2081794.234	5959.019	1.3'
71565	747628.187	2081872.366	5954.920	
19471	747628.187	2081872.382	5956.490	1.5'
72444	747629.142	2081687.786	5963.000	
15599	747629.259	2081687.747	5965.200	2.2'
8898	747630.304	2081451.870	5976.094	
74265	747630.338	2081451.904	5975.190	0.9'
71905	747630.342	2081561.224	5967.290	
97843	747630.382	2081561.305	5969.194	1.9'
97877	747632.938	2081518.591	5970.624	
71907	747633.004	2081518.788	5969.120	1.5'
71773	747634.286	2082191.528	5949.912	
9119	747634.336	2082191.481	5950.983	1.0'
70808	747634.469	2081972.703	5957.539	
9115	747634.536	2081972.606	5958.590	1.0'
71763	747636.122	2082146.903	5951.604	
9118	747636.176	2082146.919	5952.845	1.2'

POINT #	NORTHING	EASTING	ELEVATION	THICKNESS
8082	747636.615	2081769.430	5962.051	
74258	747636.615	2081769.455	5960.750	1.3'
71423	747637.098	2081491.331	5973.390	
7956	747637.204	2081491.384	5974.289	0.9'
74256	747638.860	2081824.579	5958.980	
19481	747638.860	2081824.646	5960.420	1.4'
8899	747639.717	2081467.249	5977.391	
71425	747639.764	2081467.273	5976.390	1.0'
9116	747639.628	2082022.013	5958.164	
71716	747639.721	2082021.936	5957.116	1.0'
97929	747643.780	2081715.825	5966.605	
75130	747643.823	2081715.868	5964.600	2.0'
97835	747646.788	2081607.573	5971.391	
71902	747646.837	2081607.622	5969.990	1.4'
72445	747647.462	2081691.700	5966.360	
97926	747647.462	2081691.743	5968.458	2.1'
71424	747647.680	2081483.010	5976.940	
97854	747647.568	2081483.089	5978.338	1.4'
72446	747647.831	2081654.230	5968.260	
97834	747647.791	2081654.272	5969.661	1.4'
71726	747649.510	2082085.400	5956.477	
74302	747649.469	2082085.473	5955.160	1.3'
23196	747649.800	2081909.460	5962.489	
74300	747649.647	2081909.382	5963.360	0.8'
15623	747650.230	2081731.330	5966.619	
75129	747650.155	2081731.173	5965.020	1.6'
71906	747650.192	2081515.919	5956.550	
7972	747650.254	2081515.950	5975.649	1.1'
97888	747651.234	2081583.851	5973.725	
71903	747651.234	2081583.911	5972.230	1.5'
71904	747651.490	2081563.830	5972.210	
97887	747651.530	2081563.907	5973.806	1.6'
72447	747655.611	2081653.286	5969.820	
97913	747655.640	2081653.286	5971.221	1.4'
97927	747662.018	2081696.362	5970.181	
23107	747662.100	2081696.451	5968.629	1.5'
8059	747663.580	2081740.110	5967.777	
74298	747663.539	2081740.021	5966.280	1.5'
8109	747664.150	2081798.830	5965.680	
74299	747664.178	2081798.770	5964.580	1.1'
8779	747672.540	2081536.110	5978.560	
74301	747672.653	2081535.999	5977.090	1.4'

NOTES:

1. ENGINEERED FEATURES AND LOCAL INFRASTRUCTURE NOT DEFINED BY SURVEY.
2. POINTS ARE IN COLORADO STATE PLANE COORDINATE SYSTEM, NAD 27 CENTRAL ZONE.
3. ELECTRONIC DRAWING IS NOT A DESIGN GRADE TOPO.
4. BASED ON ECR#5, THE AVERAGE THICKNESS OF DRAIN ROCK IS GREATER THAN 1.0 FEET WITH A TOLERANCE OF MINUS 0.2 FEET (0.8 FEET MINIMUM THICKNESS).
5. THE AVERAGE DEPTH IS 1.3 FEET.

REV.	DESCRIPTION	BY	DATE

LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY: DS	CHECKED BY: JJ, CMc
	SCALE: 1' = 30'	
	DATE: 9/19/05	
DESCRIPTION: DRAIN ROCK THICKNESS	JOB NUMBER 43872	SHEET 6 OF 8

381

IA-A-002857
5 of 7

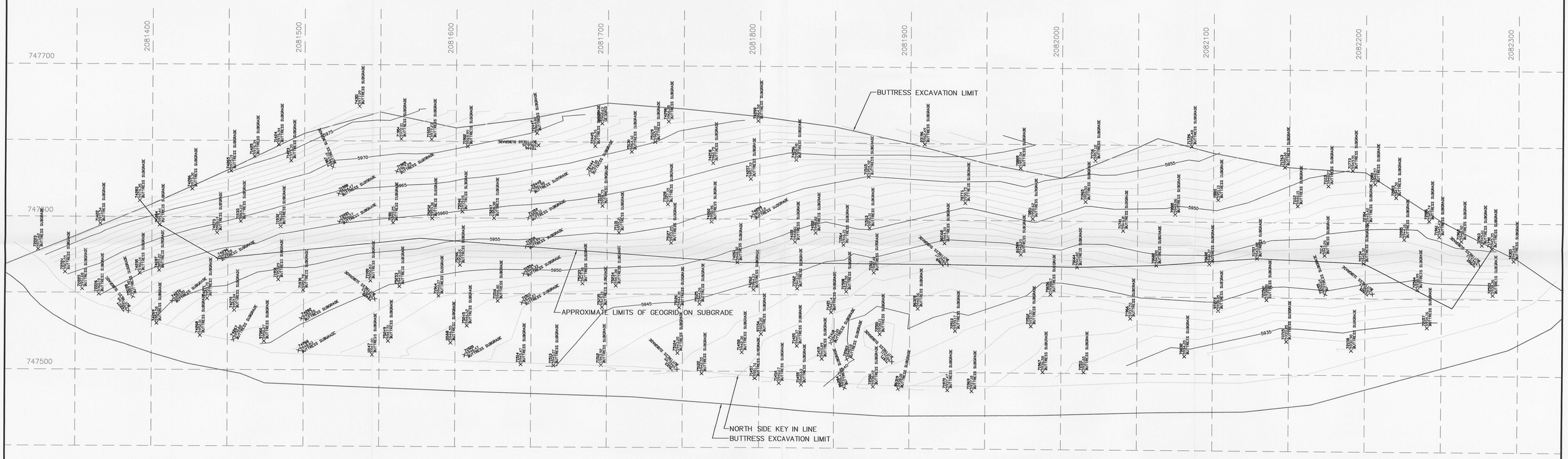
ORIGINAL LANDFILL
BUTTRESS SUBGRADE TOPOGRAPHY SURVEY
SURVEYED 03/02/05 - 06/30/05
DRAFT COPY

N

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.



DRAFT COPY
For Your Review
&
Comment

NOTES:

1. POINTS ARE IN COLORADO STATE PLANE COORDINATE SYSTEM, NAD 27 CENTRAL ZONE.
2. ELECTRONIC DRAWING IS NOT A DESIGN GRADE TOPO.

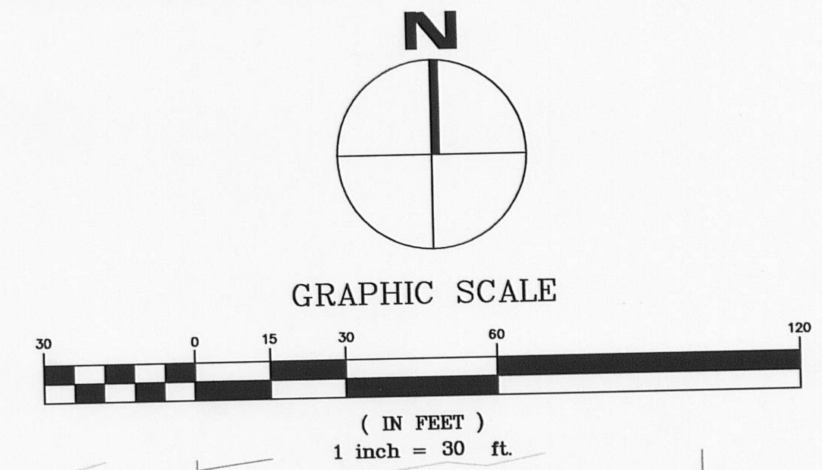
REV.	DESCRIPTION	BY	DATE

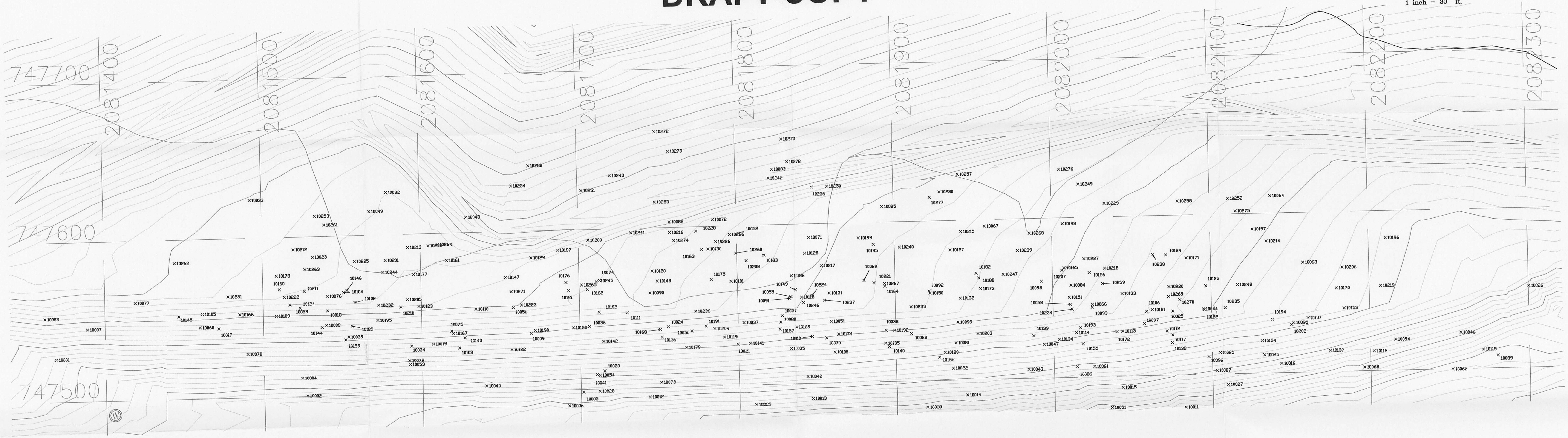
LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY: DS	CHECKED BY: JJ, CMc
	SCALE: 1' = 30'	
	DATE: 8/09/05	
	JOB NUMBER	SHEET
DESCRIPTION: BUTTRESS SUBGRADE TOPOGRAPHY SURVEY	43872	7 OF 8

382

IA-A-002857
6 OF 7

ORIGINAL LANDFILL FIELD DENSITY SAMPLE POINTS
SURVEYED 06-13-05 TO 07-12-05
DRAFT COPY





POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10001	747526.62	2081369.10	5959.98	QC-BF-DT-001	PASS
10002	747500.32	2081527.05	5949.79	QC-BF-DT-002	PASS
10003	747552.15	2081362.31	5965.32	QC-BF-DT-003	PASS
10004	747511.50	2081524.14	5952.69	QC-BF-DT-004	PASS
10005	747498.31	2081701.62	5947.50	QC-BF-DT-005	PASS
10006	747489.86	2081692.40	5948.43	QC-BF-DT-006	PASS
10007	747545.01	2081388.93	5962.29	QC-BF-DT-007	PASS
10008	747544.18	2081539.79	5952.89	QC-BF-DT-008	PASS
10009	747535.91	2081669.16	5949.63	QC-BF-DT-009	PASS
10010	747529.30	2081847.10	5943.16	QC-BF-DT-010	PASS
10011	747479.47	2082082.66	5935.31	QC-BF-DT-011	PASS
10012	747494.15	2081743.45	5947.14	QC-BF-DT-012	PASS
10013	747490.30	2081846.50	5943.63	QC-BF-DT-013	PASS
10014	747490.53	2081944.50	5940.70	QC-BF-DT-014	PASS
10015	747493.13	2082043.16	5938.00	QC-BF-DT-015	PASS
10016	747505.68	2082143.92	5936.24	QC-BF-DT-016	PASS
10017	747543.56	2081471.81	5957.43	QC-BF-DT-017	PASS
10018	747553.34	2081540.57	5955.74	QC-BF-DT-018	PASS
10019	747530.83	2081607.14	5952.50	QC-BF-DT-019	PASS
10020	747511.31	2081715.19	5947.87	QC-BF-DT-020	PASS
10021	747525.69	2081799.69	5945.13	QC-BF-DT-021	PASS
10022	747507.43	2081936.05	5941.11	QC-BF-DT-022	PASS
10023	747587.24	2081531.79	5960.42	QC-BF-DT-023	PASS
10024	747537.73	2081755.73	5947.31	QC-BF-DT-024	PASS
10025	747540.01	2082075.61	5940.91	QC-BF-DT-025	PASS
10026	747550.99	2082300.42	5939.76	QC-BF-DT-026	PASS
10027	747493.38	2082110.06	5936.35	QC-BF-DT-027	PASS
10028	747498.61	2081711.85	5947.95	QC-BF-DT-028	PASS
10029	747487.46	2081810.52	5944.41	QC-BF-DT-029	PASS
10030	747483.29	2081919.27	5941.31	QC-BF-DT-030	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10031	747480.39	2082036.23	5937.56	QC-BF-DT-031	PASS
10032	747626.62	2081579.05	5968.74	QC-BF-DT-032	PASS
10033	747623.84	2081492.70	5971.19	QC-BF-DT-033	PASS
10034	747529.80	2081593.41	5952.60	QC-BF-DT-034	PASS
10035	747521.98	2081833.19	5944.24	QC-BF-DT-035	PASS
10036	747539.15	2081706.12	5950.30	QC-BF-DT-036	PASS
10037	747539.03	2081803.68	5946.79	QC-BF-DT-037	PASS
10038	747532.05	2081893.84	5943.17	QC-BF-DT-038	PASS
10039	747536.55	2081553.65	5955.17	QC-BF-DT-039	PASS
10040	747503.76	2081640.30	5951.10	QC-BF-DT-040	PASS
10041	747509.06	2081710.39	5949.45	QC-BF-DT-041	PASS
10042	747504.35	2081843.73	5945.07	QC-BF-DT-042	PASS
10043	747505.58	2081983.90	5940.58	QC-BF-DT-043	PASS
10044	747540.86	2082095.04	5940.61	QC-BF-DT-044	PASS
10045	747511.31	2082133.28	5937.18	QC-BF-DT-045	PASS
10046	747522.63	2082257.14	5936.55	QC-BF-DT-046	PASS
10047	747521.02	2081994.02	5942.31	QC-BF-DT-047	PASS
10048	747609.76	2081629.34	5963.15	QC-BF-DT-048	PASS
10049	747614.90	2081568.16	5965.99	QC-BF-DT-049	PASS
10050	747534.66	2081770.63	5948.80	QC-BF-DT-050	PASS
10051	747538.50	2081859.36	5947.19	QC-BF-DT-051	PASS
10052	747595.17	2081801.19	5954.19	QC-BF-DT-052	PASS
10053	747518.34	2081592.32	5954.71	QC-BF-DT-053	PASS
10054	747508.63	2081712.20	5951.16	QC-BF-DT-054	PASS
10055	747554.68	2081833.62	5948.12	QC-BF-DT-055	PASS
10056	747552.38	2081658.00	5954.28	QC-BF-DT-056	PASS
10057	747542.87	2081827.98	5948.13	QC-BF-DT-057	PASS
10058	747545.68	2082011.02	5943.16	QC-BF-DT-058	PASS
10059	747555.49	2081523.38	5959.01	QC-BF-DT-059	PASS
10060	747544.58	2081460.05	5960.28	QC-BF-DT-060	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10061	747506.50	2082025.61	5942.06	QC-BF-DT-061	PASS
10062	747499.84	2082251.65	5934.33	QC-BF-DT-062	PASS
10063	747568.82	2082158.51	5944.66	QC-BF-DT-063	PASS
10064	747610.89	2082138.75	5951.18	QC-BF-DT-064	PASS
10065	747513.29	2082105.05	5939.50	QC-BF-DT-065	PASS
10066	747545.36	2082024.94	5943.28	QC-BF-DT-066	PASS
10067	747595.97	2081957.54	5951.44	QC-BF-DT-067	PASS
10068	747529.64	2081909.93	5945.22	QC-BF-DT-068	PASS
10069	747563.65	2081880.47	5947.41	QC-BF-DT-069	PASS
10070	747528.16	2081856.18	5947.29	QC-BF-DT-070	PASS
10071	747591.52	2081846.09	5952.25	QC-BF-DT-071	PASS
10072	747604.16	2081785.12	5956.99	QC-BF-DT-072	PASS
10073	747503.24	2081750.69	5950.87	QC-BF-DT-073	PASS
10074	747567.97	2081712.85	5953.37	QC-BF-DT-074	PASS
10075	747538.52	2081618.85	5956.32	QC-BF-DT-075	PASS
10076	747562.49	2081540.59	5959.13	QC-BF-DT-076	PASS
10077	747560.96	2081419.30	5964.74	QC-BF-DT-077	PASS
10078	747527.27	2081489.90	5959.38	QC-BF-DT-078	PASS
10079	747520.68	2081592.03	5957.10	QC-BF-DT-079	PASS
10080	747538.80	2081826.92	5949.27	QC-BF-DT-080	PASS
10081	747523.22	2081938.00	5945.00	QC-BF-DT-081	PASS
10082	747603.53	2081757.78	5956.40	QC-BF-DT-082	PASS
10083	747634.70	2081823.10	5960.82	QC-BF-DT-083	PASS
10084	747557.67	2082011.66	5944.83	QC-BF-DT-084	PASS
10085	747609.56	2081892.79	5954.62	QC-BF-DT-085	PASS
10086	747506.72	2082014.49	5942.60	QC-BF-DT-086	PASS
10087	747502.31	2082102.80	5940.78	QC-BF-DT-087	PASS
10088	747502.33	2082196.14	5938.00	QC-BF-DT-088	PASS
10089	747507.87	2082280.20	5936.27	QC-BF-DT-089	PASS
10090	747559.33	2081744.73	5952.97	QC-BF-DT-090	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10091	747553.60	2081832.79	5950.22	QC-BF-DT-091	PASS
10092	747556.01	2081921.59	5946.85	QC-BF-DT-092	PASS
10093	747543.60	2082024.74	5944.28	QC-BF-DT-093	PASS
10094	747519.29	2082216.00	5938.73	QC-BF-DT-094	PASS
10095	747531.17	2082152.02	5941.10	QC-BF-DT-095	PASS
10096	747511.05	2082097.73	5941.73	QC-BF-DT-096	PASS
10097	747532.53	2082057.63	5943.31	QC-BF-DT-097	PASS
10098	747560.59	2081993.08	5946.31	QC-BF-DT-098	PASS
10099	747536.17	2081939.51	5946.44	QC-BF-DT-099	PASS
10100	747519.08	2081861.37	5949.67	QC-BF-DT-100	PASS
10101	747565.15	2081796.19	5952.33	QC-BF-DT-101	PASS
10102	747548.02	2081712.27	5954.95	QC-BF-DT-102	PASS
10103	747527.95	2081623.59	5956.89	QC-BF-DT-103	PASS
10104	747564.50	2081550.90	5959.96	QC-BF-DT-104	PASS
10105	747553.07	2081461.68	5961.79	QC-BF-DT-105	PASS
10106	747540.26	2082059.09	5950.61	QC-BF-DT-106	PASS
10107	747533.95	2082161.05	5948.02	QC-BF-DT-107	PASS
10108	747558.13	2081557.90	5960.78	QC-BF-DT-108	PASS
10109	747550.75	2081508.35	5961.26	QC-BF-DT-109	PASS
10110	747551.93	2081634.48	5958.84	QC-BF-DT-110	PASS
10111	747547.17	2081730.01	5956.20	QC-BF-DT-111	PASS
10112	747527.62	2082071.74	5942.04	QC-BF-DT-112	PASS
10113	747528.17	2082043.71	5943.22	QC-BF-DT-113	PASS
10114	747527.82	2082014.50	5944.40	QC-BF-DT-114	PASS
10115	747511.79	2082271.07	5937.10	QC-BF-DT-115	PASS
10116	747512.25	2082202.35	5938.91	QC-BF-DT-116	PASS
10117	747525.11	2082075.32	5943.63	QC-BF-DT-117	PASS
10118	747554.19	2081840.76	5952.30	QC-BF-DT-118	PASS
10119	747530.32	2081791.27	5953.37	QC-BF-DT-119	PASS
10120	747572.91	2081746.37	5955.74	QC-BF-DT-120	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10121	747562.06	2081693.25	5957.07	QC-BF-DT-121	PASS
10122	747525.99	2081656.64	5957.04	QC-BF-DT-122	PASS
10123	747554.59	2081598.45	5959.38	QC-BF-DT-123	PASS
10124	747557.59	2081516.97	5961.41	QC-BF-DT-124	PASS
10125	747555.30	2082096.69	5944.24	QC-BF-DT-125	PASS
10126	747565.23	2082023.37	5947.01	QC-BF-DT-126	PASS
10127	747581.55	2081935.57	5950.27	QC-BF-DT-127	PASS
10128	747581.68	2081843.24	5952.77	QC-BF-DT-128	PASS
10129	747583.20	2081669.92	5958.99	QC-BF-DT-129	PASS
10130	747585.80	2081781.99	5955.39	QC-BF-DT-130	PASS
10131	747556.27	2081858.31	5951.95	QC-BF-DT-131	PASS
10132	747551.12	2081941.37	5948.60	QC-BF-DT-132	PASS
10133	747551.75	2082043.80	5945.64	QC-BF-DT-133	PASS
10134	747523.98	2082003.60	5945.65	QC-BF-DT-134	PASS
10135	747523.91	2081893.53	5949.51	QC-BF-DT-135	PASS
10136	747531.36	2081751.71	5954.32	QC-BF-DT-136	PASS
10137	747513.25	2082174.67	5944.28	QC-BF-DT-137	PASS
10138	747520.34	2082074.92	5944.28	QC-BF-DT-138	PASS
10139	747526.55	2081987.47	5946.61	QC-BF-DT-139	PASS
10140	747521.71	2081895.74	5950.09	QC-BF-DT-140	PASS
10141	747525.89	2081807.57	5953.23	QC-BF-DT-141	PASS
10142	747529.65	2081714.85	5956.40	QC-BF-DT-142	PASS
10143	747534.12	2081627.24	5958.40	QC-BF-DT-143	PASS
10144	747542.97	2081536.98	5958.10	QC-BF-DT-144	PASS
10145	747551.81	2081446.73	5964.46	QC-BF-DT-145	PASS
10146	747565.86	2081553.01	5961.38	QC-BF-DT-146	PASS
10147	747571.40	2081653.60	5959.21	QC-BF-DT-147	PASS
10148	747566.61	2081749.45	5956.49	QC-BF-DT-148	PASS
10149	747558.79	2081836.79	5953.78	QC-BF-DT-149	PASS
10150	747554.75	2081922.14	5950.51	QC-BF-DT-150	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10151	747550.15	2082010.36	5947.78	QC-BF-DT-151	PASS
10152	747540.45	2082095.42	5944.71	QC-BF-DT-152	PASS
10153	747539.62	2082183.91	5941.61	QC-BF-DT-153	PASS
10154	747520.19	2082131.89	5943.37	QC-BF-DT-154	PASS
10155	747520.76	2082018.61	5946.74	QC-BF-DT-155	PASS
10156	747514.44	2081927.39	5949.82	QC-BF-DT-156	PASS
10157	747534.34	2081826.43	5953.64	QC-BF-DT-157	PASS
10158	747538.62	2081695.88	5957.84	QC-BF-DT-158	PASS
10159	747534.76	2081551.66	5960.96	QC-BF-DT-159	PASS
10160	747567.35	2081510.47	5963.82	QC-BF-DT-160	PASS
10161	747583.00	2081616.60	5961.99	QC-BF-DT-161	PASS
10162	747562.46	2081705.16	5958.19	QC-BF-DT-162	PASS
10163	747585.57	2081777.82	5956.73	QC-BF-DT-163	PASS
10164	747559.67	2081893.59	5952.45	QC-BF-DT-164	PASS
10165	747568.66	2082007.52	5949.45	QC-BF-DT-165	PASS
10166	747552.20	2081485.22	5963.85	QC-BF-DT-166	PASS
10167	747537.07	2081620.02	5959.19	QC-BF-DT-167	PASS
10168	747536.05	2081750.59	5956.06	QC-BF-DT-168	PASS
10169	747535.40	2081837.14	5954.02	QC-BF-DT-169	PASS
10170	747552.21	2082179.30	5944.83	QC-BF-DT-170	PASS
10171	747573.11	2082084.70	5948.05	QC-BF-DT-171	PASS
10172	747527.99	2082040.09	5947.36	QC-BF-DT-172	PASS
10173	747556.72	2081954.27	5950.75	QC-BF-DT-173	PASS
10174	747530.42	2081863.79	5952.81	QC-BF-DT-174	PASS
10175	747566.68	2081783.62	5956.06	QC-BF-DT-175	PASS
10176	747567.23	2081691.73	5958.86	QC-BF-DT-176	PASS
10177	747574.73	2081595.55	5961.67	QC-BF-DT-177	PASS
10178	747575.93	2081508.78	5963.79	QC-BF-DT-178	PASS
10179	747524.47	2081767.05	5955.46	QC-BF-DT-179	PASS
10180	747517.33	2081930.96	5949.88	QC-BF-DT-180	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10181	747541.13	2082062.69	5947.25	QC-BF-DT-181	PASS
10182	747566.45	2081951.54	5951.84	QC-BF-DT-182	PASS
10183	747581.07	2081816.79	5956.06	QC-BF-DT-183	PASS
10184	747575.25	2082071.80	5948.87	QC-BF-DT-184	PASS
10185	747586.17	2081886.83	5954.78	QC-BF-DT-185	PASS
10186	747567.63	2081834.16	5954.97	QC-BF-DT-186	PASS
10187	747587.56	2081686.79	5960.41	QC-BF-DT-187	PASS
10188	747563.53	2081953.20	5951.55	QC-BF-DT-188	PASS
10189	747543.29	2081555.79	5962.11	QC-BF-DT-189	PASS
10190	747537.61	2081671.73	5959.25	QC-BF-DT-190	PASS
10191	747537.49	2081779.79	5956.44	QC-BF-DT-191	PASS
10192	747531.92	2081899.29	5953.06	QC-BF-DT-192	PASS
10193	747530.86	2082017.03	5949.12	QC-BF-DT-193	PASS
10194	747533.55	2082138.60	5945.99	QC-BF-DT-194	PASS
10195	747546.46	2081572.39	5961.54	QC-BF-DT-195	PASS
10196	747583.05	2082210.89	5947.45	QC-BF-DT-196	PASS
10197	747590.30	2082127.09	5949.40	QC-BF-DT-197	PASS
10198	747596.33	2082006.99	5953.14	QC-BF-DT-198	PASS
10199	747590.43	2081877.47	5956.61	QC-BF-DT-199	PASS
10200	747593.38	2081706.21	5961.77	QC-BF-DT-200	PASS
10201	747584.04	2081577.88	5964.08	QC-BF-DT-201	PASS
10202	747530.00	2082150.68	5947.03	QC-BF-DT-202	PASS
10203	747528.75	2081951.93	5952.60	QC-BF-DT-203	PASS
10204	747535.66	2081785.27	5957.24	QC-BF-DT-204	PASS
10205	747559.08	2081591.31	5964.04	QC-BF-DT-205	PASS
10206	747565.11	2082183.28	5947.70	QC-BF-DT-206	PASS
10207	747567.18	2082005.99	5953.12	QC-BF-DT-207	PASS
10208	747577.88	2081805.92	5959.13	QC-BF-DT-208	PASS
10209	747592.50	2081605.10	5964.82	QC-BF-DT-209	PASS
10210	747554.47	2081587.06	5964.46	QC-BF-DT-210	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10211	747565.92	2081526.06	5966.81	QC-BF-DT-211	PASS
10212	747592.19	2081519.68	5967.44	QC-BF-DT-212	PASS
10213	747591.74	2081592.20	5965.79	QC-BF-DT-213	PASS
10214	747582.62	2082135.83	5950.05	QC-BF-DT-214	PASS
10215	747592.84	2081942.45	5955.92	QC-BF-DT-215	PASS
10216	747596.78	2081757.85	5961.57	QC-BF-DT-216	PASS
10217	747573.56	2081853.67	5957.94	QC-BF-DT-217	PASS
10218	747567.89	2082033.07	5952.78	QC-BF-DT-218	PASS
10219	747553.11	2082207.31	5947.35	QC-BF-DT-219	PASS
10220	747555.36	2082073.52	5951.52	QC-BF-DT-220	PASS
10221	747562.13	2081886.76	5956.42	QC-BF-DT-221	PASS
10222	747562.56	2081513.57	5967.19	QC-BF-DT-222	PASS
10223	747553.78	2081663.33	5963.20	QC-BF-DT-223	PASS
10224	747555.03	2081847.45	5958.33	QC-BF-DT-224	PASS
10225	747583.90	2081558.05	5967.26	QC-BF-DT-225	PASS
10226	747590.32	2081786.90	5961.57	QC-BF-DT-226	PASS
10227	747574.09	2082020.22	5954.45	QC-BF-DT-227	PASS
10228	747597.24	2081774.47	5962.36	QC-BF-DT-228	PASS
10229	747608.32	2082033.64	5955.54	QC-BF-DT-229	PASS
10230	747618.03	2081929.25	5959.19	QC-BF-DT-230	PASS
10231	747563.69	2081477.95	5967.97	QC-BF-DT-231	PASS
10232	747555.93	2081573.09	5966.85	QC-BF-DT-232	PASS
10233	747546.39	2081909.97	5957.22	QC-BF-DT-233	PASS
10234	747542.60	2082012.01	5953.96	QC-BF-DT-234	PASS
10235	747541.39	2082108.99	5951.77	QC-BF-DT-235	PASS
10236	747546.97	2081773.31	5961.11	QC-BF-DT-236	PASS
10237	747551.94	2081855.24	5959.33	QC-BF-DT-237	PASS
10238	747575.59	2082063.72	5953.84	QC-BF-DT-238	PASS
10239	747580.28	2081978.08	5956.68	QC-BF-DT-239	PASS
10240	747584.06	2081903.38	5958.79	QC-BF-DT-240	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10241	747597.24	2081733.40	5964.53	QC-BF-DT-241	PASS
10242	747629.13	2081820.69	5963.11	QC-BF-DT-242	PASS
10243	747633.43	2081720.77	5966.43	QC-BF-DT-243	PASS
10244	747576.46	2081576.21	5968.81	QC-BF-DT-244	PASS
10245	747567.12	2081711.01	5966.02	QC-BF-DT-245	PASS
10246	747550.63	2081841.94	5961.79	QC-BF-DT-246	PASS
10247	747565.37	2081968.70	5958.15	QC-BF-DT-247	PASS
10248	747555.61	2082117.05	5952.10	QC-BF-DT-248	PASS
10249	747620.69	2082017.45	5957.78	QC-BF-DT-249	PASS
10250	747623.18	2081858.35	5963.30	QC-BF-DT-250	PASS
10251	747624.61	2081702.58	5968.30	QC-BF-DT-251	PASS
10252	747609.80	2082112.13	5953.32	QC-BF-DT-252	PASS
10253	747612.86	2081533.50	5969.92	QC-BF-DT-253	PASS
10254	747628.64	2081658.16	5968.88	QC-BF-DT-254	PASS
10255	747616.08	2081748.65	5966.93	QC-BF-DT-255	PASS
10256	747622.81	2081848.64	5963.35	QC-BF-DT-256	PASS
10257	747628.65	2081941.11	5960.37	QC-BF-DT-257	PASS
10258	747608.74	2082079.88	5954.09	QC-BF-DT-258	PASS
10259	747558.17	2082031.66	5955.52	QC-BF-DT-259	PASS
10260	747582.79	2081799.53	5964.38	QC-BF-DT-260	PASS
10261	747607.22	2081539.38	5970.90	QC-BF-DT-261	PASS
10262	747585.48	2081444.58	5973.27	QC-BF-DT-262	PASS
10263	747579.59	2081526.85	5971.05	QC-BF-DT-263	PASS
10264	747593.04	2081611.02	5969.19	QC-BF-DT-264	PASS
10265	747565.42	2081701.63	5966.80	QC-BF-DT-265	PASS
10266	747594.52	2081795.69	5964.85	QC-BF-DT-266	PASS
10267	747561.30	2081893.34	5961.44	QC-BF-DT-267	PASS
10268	747590.82	2081985.85	5959.86	QC-BF-DT-268	PASS
10269	747549.26	2082073.16	5954.20	QC-BF-DT-269	PASS
10270	747547.10	2082080.14	5953.84	QC-BF-DT-270	PASS

POINT #	NORTHING	EASTING	ELEV.	DESC.	PASS/FAIL
10271	747562.39	2081656.93	5967.80	QC-BF-DT-271	PASS
10272	747660.57	2081749.24	5970.45	QC-BF-DT-272	PASS
10273	747653.54	2081829.39	5967.41	QC-BF-DT-273	PASS
10274	747591.77	2081760.45	5965.60	QC-BF-DT-274	PASS
10275	747601.82	2082116.69	5953.73	QC-BF-DT-275	PASS
10276	747630.37	2082005.46	5959.26	QC-BF-DT-276	PASS
10277	747614.65	2081922.96	5961.69	QC-BF-DT-277	PASS
10278	747639.13	2081832.82	5965.70	QC-BF-DT-278	PASS
10279	747647.76	2081757.84	5968.93	QC-BF-DT-279	PASS
10280	747641.08	2081669.39	5970.08	QC-BF-DT-280	PASS

NOTES:

1. ELECTRONIC DRAWING IS NOT A DESIGN GRADE TOPO.
2. POINTS ARE IN COLORADO STATE PLANE COORDINATE SYSTEM, NAD 27 CENTRAL ZONE.
3. ENGINEERED FEATURES AND LOCAL INFRASTRUCTURE NOT DEFINED BY SURVEY.
4. ALL LOCATIONS PASSED INTIAL TESTING OR WERE REWORKED AND RETESTED AND PASSING RESULTS WERE OBTAINED IN ALL LOCATIONS INDICATED IN THE TABLES.

REV.	DESCRIPTION	BY	DATE

LOCATION: ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE	DRAWN BY:CMc/KG	CHECKED BY: JJ, DS
	SCALE: 1' = 30'	
	DATE: 09/08/05	
	JOB NUMBER	SHEET
DESCRIPTION: FIELD DENSITY SAMPLE LOCATIONS	43872	8 OF 8

383

IA-A-002857
7 OF 7