Inspection Report

To: **Mark Jacklin (NRG Keystone Generating Station)**

From: **Jesse Varsho, P.E.**

Re: **Keystone Ash Disposal Site – Annual CCR Unit Inspection Report No. 1**

Inspection Date: **October 15, 2015**

Report Date: **January 12, 2016**

INTRODUCTION

Title 40 Code of Federal Regulations (CFR) Part 257 addresses, in part, the management of Coal Combustion Residuals (CCR Rule, or Rule) in regulated units, including landfills. Specific to §257.84(b) of the Rule, existing and new CCR landfills must be inspected on an annual basis by a qualified professional engineer. For the Keystone Generating Station (operated by GenOn Northeast Management Company, a subsidiary of NRG Energy, Inc. [NRG]), this inspection requirement applies to the existing Ash Disposal Site. In support of this obligation, Mr. Jesse Varsho (a qualified professional engineer with CB&I Environmental & Infrastructure, Inc. [CB&I]) conducted an on-site inspection of the Ash Disposal Site on October 15, 2015. Prior to the inspection, CB&I personnel under the direct supervision of Mr. Varsho, reviewed the relevant portions of the facility's operating record in relation to the requirements of §257.84. The findings from this first annual inspection are summarized in the remaining sections of this correspondence.

As required, this report will be placed in the Keystone facility's operating record per §257.105(g)(9), noticed to the State Director per §257.106(g)(7), and posted to the publicly accessible internet site per §257.107(g)(7). Placement of this first annual inspection report into the facility's operating record must be accomplished no later than January 18, 2016 per §257.84(b)(3)(i). Deadlines for completion of subsequent annual inspection reports will be tied back to the actual date of placement of the previous year's report into the operating record.

BACKGROUND

The collective Ash Disposal Site consists of the contiguous East Valley and West Valley components and is operated/maintained in accordance with Pennsylvania Department of Environmental Protection (PADEP) Solid Waste Permit No. 300837. Stage I of East Valley was constructed first and became operational in 1985. Stage I was initially constructed in the northern part of East Valley, with Stage II being later constructed in

the southern half of East Valley and piggy-backed over the Stage I area. West Valley comprises Stage III of the disposal site, and it along with Stage II of East Valley, are the currently active portions. Disposal of CCR materials in West Valley began in 2002. When completed, West Valley will piggy-back over the western part of the East Valley Disposal Site. Stage IV of the disposal site is permitted and in the early stages of construction. It will be constructed in the southern part of West Valley and will be a horizontal and vertical expansion of the Stage III area. When ultimate development conditions are reached, Stage IV will piggy-back over Stage III as well as the western limits of East Valley (Stage I and Stage II). At such time when the permitted disposal capacity has been fully expended and final grades attained, any uncapped areas of the disposal site will be capped and closed in accordance with the approved Closure Plan.

As of the October 2015 inspection date, CCR materials were being placed in the active Stage II (East Valley) and Stage III (West Valley) areas of the disposal site.

With respect to the Ash Disposal Site, CB&I's evaluation has focused on the following items as outlined in §257.84(b)(1)(i-ii):

- *A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record; and*
- *A visual inspection of the CCR unit to identify signs of distress or malfunction.*

Specific to CB&I's preparation of the annual inspection report, and per §257.84(b)(2)(i-iv), the following aspects have been addressed:

- *Any changes in geometry of the structure since the previous annual inspection;*
- *The approximate volume of CCR contained in the unit at the time of the inspection;*
- *Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and*
- *Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.*

OPERATING RECORDS REVIEW

Principal items included, but were not limited to: various elements of the 1996 Major Permit Modification Package; the 2014 Annual Landfill Operations Report; and Solid Waste Permit No. 300837. As this was the first annual CCR Rule-derived inspection, the operating record did not contain any prior annual or weekly inspections for review. During the October 15, 2015 inspection, Mr. Varsho interviewed facility personnel (Mr. David Feid and Mr. Mark Jacklin) to verify the information contained within the operating record.

Environmental Control System Overview

i. Bottom Liner System

a. East Valley is underlain by a single synthetic liner system.
b. West Valley has a double-liner system with one component being a geosynthetic clay liner.

ii. Leachate Collection System

a. The East Valley and West Valley leachate collection systems are represented by piping networks located above the liner system. East Valley leachate is routed to the existing Pump Station and then pumped to the station's Industrial Wastewater Treatment (IWT) plant. West Valley leachate flows by gravity directly to the IWT. Following processing at the IWT and eventually at the Final Wastewater Treatment (FWT) plant, the treated effluent is discharged in accordance with the station's National Pollutant Discharge Elimination System (NPDES) Permit.

iii. Stormwater Management

a. "Contact" stormwater at both East Valley and West Valley is collected in the West Valley Equalization Pond to allow for solids settling and is then routed to the IWT for treatment.

b. Non-contact stormwater at both East Valley and West Valley is routed to dedicated NPDES-permitted outfalls for direct discharge to surface water.

Summary of Landfill Construction

i. Moving forward, the remaining active areas of East Valley and West Valley will continue to receive CCR. Construction of the permitted West Valley expansion area will continue as well.

Review of Prior Inspections

i. Weekly inspections: No previous weekly inspections have been conducted; per the Rule, these inspections were to be initiated during the week of October 19, 2015.

ii. Annual inspections: No previous annual inspections have been conducted; this current inspection represents the first performed in accordance with the Rule.

Summary of CCR Volumes

i. Based on review of the 2014 Annual Landfill Operations Report (covering operations through December 2014), the total in-place CCR volume was estimated at approximately 27,300,000 cubic yards (cy).

SITE INSPECTION

The site inspection was performed on October 15, 2015 by Mr. Varsho, and during which time efforts were focused on identification of standard geotechnical signs of distress or malfunction. Specific aspects such as slumping at the toe of slope, tensile cracking, abnormal or excessive erosion on the side slopes, slope bulging, and groundwater/surface water seepage or ponding were assessed. If present, these readily visible signs are potential indicators of structural weakness of the CCR Landfill unit.

Visual Signs of Distress or Malfunction

i. No visual signs of distress or malfunction were observed during the inspection. Stormwater drainage features, slope appearance and stability, leachate conveyance mechanisms, and overall site conditions were assessed. Closed portions of the East Valley exhibited well established vegetative cover.

Review of Environmental Control Systems

i. With no evidence to the contrary, the bottom liner systems at East Valley and West Valley are believed to be in good operating condition and functioning as intended. At the time of the inspection, conveyance systems to the IWT were operating as designed.

CONCLUSIONS

Changes in Geometry

i. As of April 2015 (refer to figure in Attachment 1), peak fill elevations in the active disposal area were at approximately 1,350 feet mean sea level. Since this is the first annual inspection, comparative changes in geometry were not directly relevant.

CCR Volume

i. The total permitted disposal capacity for the combined East Valley and West Valley areas is 49,926,000 cy. As of December 2014, the remaining capacity was estimated at approximately 22,626,000 cy, thus resulting in the estimated in-place CCR volume of approximately 27,300,000 cy (cited above).

Appearance of an Actual or Potential Structural weakness of the CCR Unit

i. At the time of inspection, there were no signs of distress or malfunction that would indicate actual or potential structural weakness at East Valley or West Valley.

Changes that may Affect the Stability or Operation of the CCR Unit

i. There have been no changes to the East Valley or West Valley areas that pose a threat or concern to the stability of the land form.

RECOMMENDATIONS

1. Continue operation and maintenance as currently performed.
2. Verify intermediate fill slopes do not exceed permit conditions/limitations.

There were no deficiencies or releases identified during the 2015 annual inspection that required the owner or operator to perform corrective actions as required under §257.84(b)(5).

PROFESSIONAL ENGINEER'S CERTIFICATION

In accordance with §257.84(b) of the Rule, I hereby certify based on a review of available information within the facility's operating records and observations from my personal on-site inspection (including the photographs contained in Attachment 2), that the Keystone Ash Disposal Site does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the East Valley and West Valley CCR Units. Both units are being operated and maintained consistent with recognized and generally accepted good engineering standards and practices.

Certified by: _____

Date: 1/12/16

Jesse Varsho, P.E., P.G.

Professional Engineer Registration No. PE084004

CB&I Environmental & Infrastructure, Inc.

ATTACHMENTS

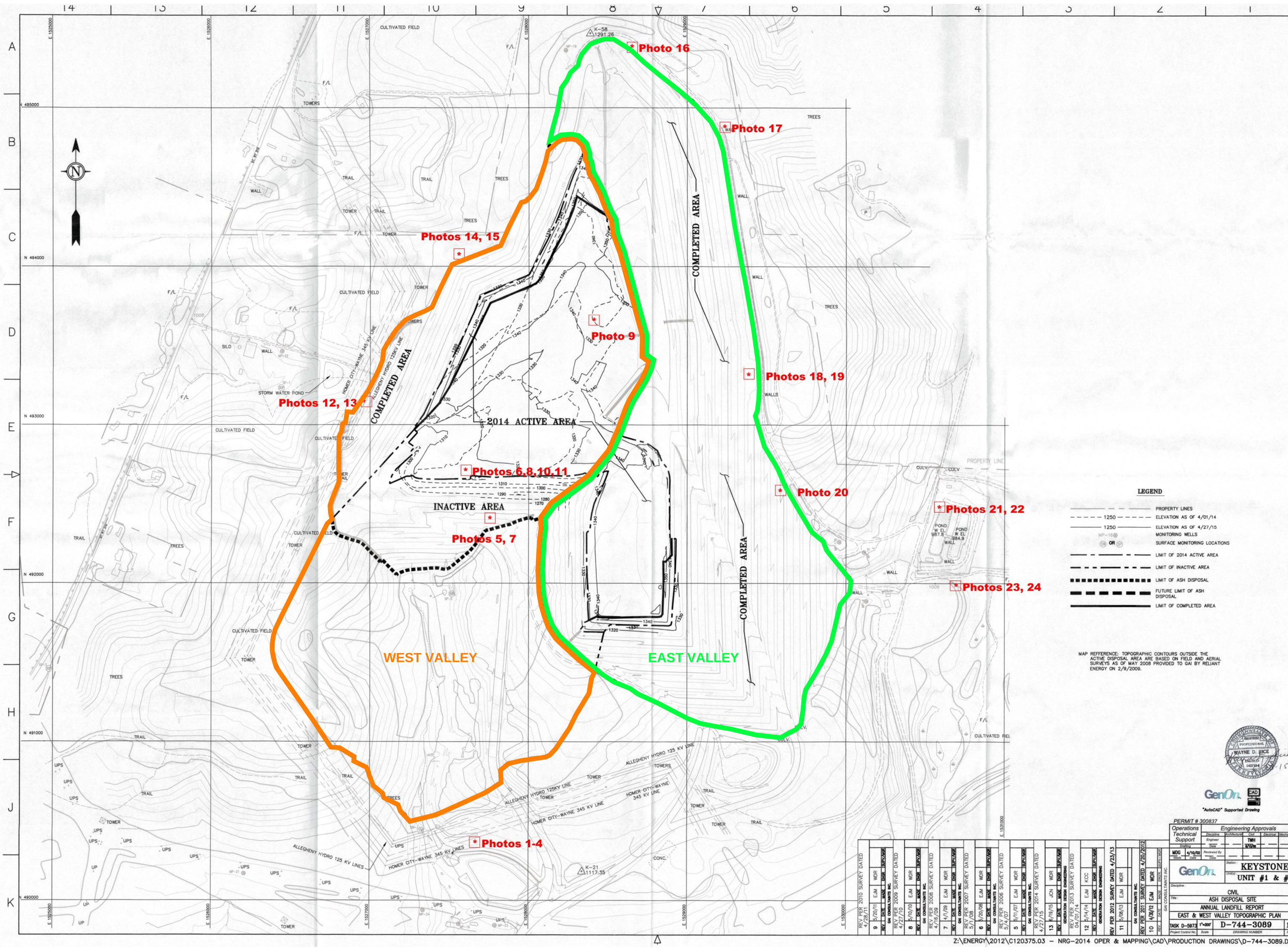
1. Site Map
2. Inspection Photo Log

REFERENCES

1. Residual Waste Major Permit Modification, Keystone Station Disposal Site, July 1996.
2. 2014 Keystone Generating Station Annual Landfill Operations Report, June 2015.
3. 40 Code of Federal Regulations, Part 257.

Attachment 1

Site Map



REV PER 2010 SURVEY DATED 4/28/11 — 9 — 5/20/11 — EJM — WDR — GAI CONSULTANTS INC.

REV PER 2009 SURVEY DATED 4/27/10 — 8 — 5/10/10 — EJM — WDR — GAI CONSULTANTS INC.

REV PER 2008 SURVEY DATED 4/16/09 — 7 — 4/1/09 — EJM — WDR — GAI CONSULTANTS INC.

REV PER 2007 SURVEY DATED 5/1/08 — 6 — 5/20/08 — EJM — WDR — GAI CONSULTANTS INC.

REV PER 2006 SURVEY DATED 5/4/07 — 5 — 5/11/07 — EJM — WDR — GAI CONSULTANTS INC.

REV PER 2014 SURVEY DATED 4/27/15 — 13 — 8/19/15 — JCN — WDR — GAI CONSULTANTS INC.

REV PER 2013 SURVEY DATED 04/01/14 — 12 — 8/14/14 — EJM — KCC — GENERATION DESIGN ENGINEERING

REV PER 2012 SURVEY DATED 4/23/13 — 11 — 5/08/13 — EJM — WDR — GAI CONSULTANTS INC.

REV PER 2011 SURVEY DATED 4/20/2012 — 10 — 4/30/12 — EJM — WDR — GAI CONSULTANTS INC.

WAYNE D. RICE — REGISTERED PROFESSIONAL — COMMONWEALTH OF PENNSYLVANIA — 049184

GenOn

CAD — "AutoCAD" Supported Drawing

PERMIT # 300837

Operations Technical Support	Engineering Approvals				
	Discipline	Architectural	Civil	Electrical	Mechanical
	Engineer		TWH		
Drawing	Date		9/10/15		
MDG 4/10/02	Reviewed By				
Mode Date	Date				

GenOn — Station: KEYSTONE — UNIT #1 & #2

Discipline: CIVIL

Title: ASH DISPOSAL SITE
ANNUAL LANDFILL REPORT
EAST & WEST VALLEY TOPOGRAPHIC PLAN

TASK D-5973 — 1"=200' — D-744-3089 — 13

Project Control No. — Scale — DRAWING NUMBER — REV

Z:\ENERGY\2012\C120375.03 – NRG-2014 OPER & MAPPING\CAD\PRODUCTION DRAWINGS\D-744-3089.DWG

Attachment 2

Photo Log

Photograph No. 1 **Date:** October 15, 2015 **Direction:** Northwest	
Description: Leachate Weir Box and Valving Station at West Valley Equalization Pond.	

Photograph No. 2 **Date:** October 15, 2015 **Direction:** East	
Description: West Valley Equalization Pond principal discharge structure.	

Photograph No. 3 **Date:** October 15, 2015 **Direction:** North	
Description: "Contact" stormwater inlet to West Valley Equalization Pond.	

Photograph No. 4 **Date:** October 15, 2015 **Direction:** North	
Description: Wide-angle view of inlet and interior slopes of West Valley Equalization Pond.	

Photograph No. 5 **Date:** October 15, 2015 **Direction:** North	
Description: Leachate collection system cleanouts along interim toe of West Valley southern slope.	

Photograph No. 6 **Date:** October 15, 2015 **Direction:** West	
Description: Southern crest of interim slope in area of active fill operations; no visual evidence of tensile cracking.	

Photograph No. 7 **Date:** October 15, 2015 **Direction:** South	
Description: Partial view of the West Valley expansion area.	

Photograph No. 8 **Date:** October 15, 2015 **Direction:** Southeast	
Description: Interim slopes and benches for East Valley; active lifts at top.	

Photograph No. 9 **Date:** October 15, 2015 **Direction:** North	
Description: Active fill operations with ash and gypsum.	

Photograph No. 10 **Date:** October 15, 2015 **Direction:** East	
Description: Southern crest of slope in area of active fill operations; no visual evidence of tensile cracking along interim slopes.	

Photograph No. 11 **Date:** October 15, 2015 **Direction:** Northeast	
Description: Active fill operations; upper lifts at East Valley in the distance.	

Photograph No. 12 **Date:** October 15, 2015 **Direction:** Northwest	
Description: View of slope and toe of slope transitioning between waste fill and existing topography along western perimeter of West Valley completed area slopes.	

Photograph No. 13 **Date:** October 15, 2015 **Direction:** North	
Description: Access road along western perimeter of West Valley; no evidence of sloughing along toe of completed area slope.	

Photograph No. 14 **Date:** October 15, 2015 **Direction:** North	
Description: Continued traverse along western perimeter access road; no evidence of sloughing along completed area toe of slope.	

Photograph No. 15 **Date:** October 15, 2015 **Direction:** North	
Description: Western perimeter of West Valley; no evidence of sloughing along toe of slope and transitioning to benches along completed area slopes.	

Photograph No. 16 **Date:** October 15, 2015 **Direction:** Southeast	
Description: Non-contact stormwater drainage channel along northern perimeter of East Valley.	

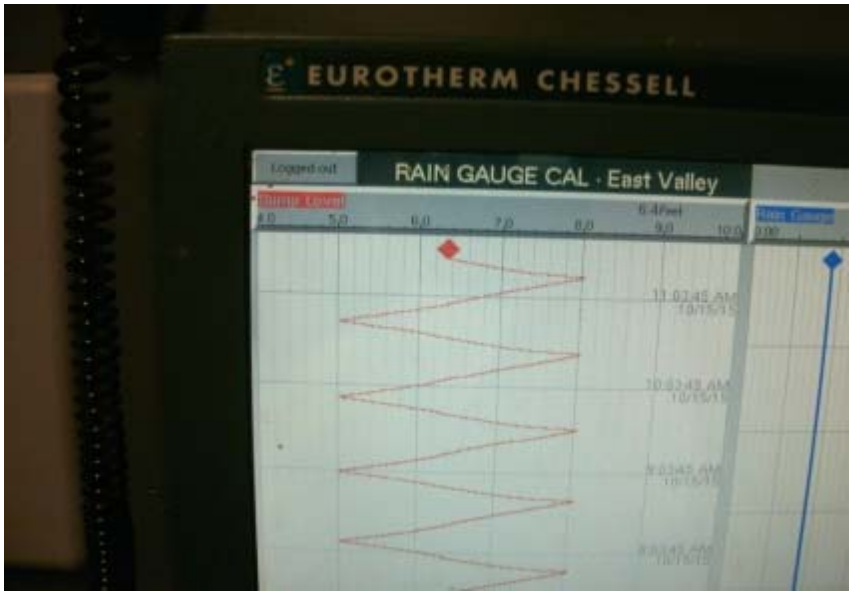
Photograph No. 17 **Date:** October 15, 2015 **Direction:** Southeast	
Description: Completed area slopes and benches along eastern side of East Valley.	

Photograph No. 18 **Date:** October 15, 2015 **Direction:** South	
Description: Culvert within non-contact stormwater drainage channel along eastern perimeter of East Valley.	

Photograph No. 19 **Date:** October 15, 2015 **Direction:** Southeast	
Description: Completed area slopes and benches along eastern side of East Valley.	

Photograph No. 20 **Date:** October 15, 2015 **Direction:** Northwest	
Description: Additional view of completed area slopes and benches along eastern side of East Valley.	

Photograph No. 21 **Date:** October 15, 2015 **Direction:** N/A	
Description: East Valley Pumping Station; equipment used to convey collected leachate to the Station's Industrial Wastewater Treatment plant.	

Photograph No. 22 **Date:** October 15, 2015 **Direction:** N/A	
Description: Chart recorder for sump level at East Valley Pumping Station.	

Photograph No. 23 **Date:** October 15, 2015 **Direction:** East	
Description: Flow measurement weir at NPDES-permitted Outfall 008; discharge point for non-contact stormwater from East Valley.	

Photograph No. 24 **Date:** October 15, 2015 **Direction:** South	
Description: NPDES Outfall 008 identification marker.	