

6.7 DEFICIENCIES

This report has identified deficiencies at Excavation Areas E, G, and L4 that are violations of the Grant of Environmental Restriction and Easement for the MTL Site for OU1.

On 13 June 2001 MDEP and the Army issued a Request for Information (RFI) to CRBCA to determine the cause for the missing Excavation Area E benchmarks. On 25 June 2001 CRBCA responded to the RFI and stated that regrading and landscaping activities had occurred in Excavation Area E. Because of missing benchmarks and the regrading of Excavation Area E, a total of 60 soil samples have been collected from Area E, and the regraded area adjacent to Area E, during sampling events in June and September 2001. Soil samples were collected from 0 to 3 inches in depth and from 12 to 15 inches in depth and were analyzed for PAHs. All sample results have been submitted to MDEP. All PAH results for the samples collected from 12 to 15 inch depth met the ROD cleanup goals. Three soil samples collected from the top 3 inch layer outside the boundary of Area E exhibited benzo(a)pyrene concentrations above ROD cleanup goals.

Three Grant violations were also noted for Excavation Area G, and were due to an excavation by CRBCA in July 1999. During the excavation to install utilities, a steam tunnel was discovered, cut open and was partially removed. The area was backfilled with the soil that was originally excavated, and additional clean backfill was placed on top to bring the surface back to grade. During a survey it was determined that there was a six inch to eight inch surface grade reduction on the south side of Excavation Area G resulting from this work, which was a violation of the Grant relating to the required amount of clean cover material (one foot) over the area. CRBCA later demonstrated that the current grade actually represents more than one foot of cover because of filling in the steam tunnel. However, CRBCA did not submit a written determination of the restored grade of all affected benchmarks (second Grant violation) certified in writing by a registered surveyor. In addition, benchmarks are currently missing at Excavation Area G, which is another Grant violation.

One of the four benchmarks is currently missing at Excavation Area L4.

An Ecological Risk Assessment is to be conducted in 2002 by CENAE to more fully characterize the nature and extent of contamination and the associated risk to ecological receptors for OU2.

No deficiencies have been noted for OU3.

6.8 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that Annual Institutional Control Reports and five-year reviews continue. All areas that remain in the Grant that have any land use restrictions and still have some contamination that results in the prohibition of unrestricted use are the subject of future statutory reviews. The next five-year review should include all of OU1, including the Charles River Park parcel and the Charles River.

The violations of the Grant at Excavation Areas G and E are being addressed by CRBCA under the oversight of MDEP. A Work Plan for Excavation Area E was prepared by CRBCA to conduct limited sampling and excavation of potentially contaminated soils outside of the restricted area. The Work Plan was reviewed and subsequently approved by MDEP in November 2001. Following completion of any excavation activities, new benchmarks will be installed and surveyed. Excavation Area G violations will be corrected by replacing the benchmarks and resurveying the elevation of the benchmarks. An amendment to the Grant documenting the changes in benchmark locations and elevations at Excavation Areas E and G will be prepared by CRBCA and submitted for approval by MDEP and subsequent recording at the Registry of Deeds.

The Town of Watertown has obtained spare benchmarks and is making arrangements to replace the missing benchmark at Excavation Area L4.

All replacement benchmarks will be installed in accordance with the revised benchmark specification proposal prepared by CRBCA and approved by MDEP.

6.9 PROTECTIVENESS STATEMENTS

OU1, with the exception of Excavation Area E, has been determined to be protective of human health and the environment. Since the remedial action of Excavation Area E was completed

in 1997, the Excavation Area E has been disturbed. A limited amount of soil exceeding the applicable cleanup goals is slated to be removed by CRBCA under a work plan that has been approved by the MDEP under the terms of the Grant. This will ensure that Area E is protective of human health and the environment.

The protectiveness of OU2 cannot be determined because an Ecological Risk Assessment is ongoing.

OU3 remedies have been found to be protective based on interviews, information found in the Grant of Environmental Restriction and Easement, the four Grant Amendments, analytical data and a site inspection.

6.10 NEXT REVIEW

All areas that remain in the Grant that have any land use restrictions and still have some contamination that results in the prohibition of unrestricted use are the subject of future statutory reviews. The next five-year review should include OU1, including the Charles River Park parcel, and the Charles River (OU2). The next review should be performed within five years of the completion of this review. The completion date is the date on which USEPA issues its letter to the U.S. Army either concurring with its findings, or documenting reasons for non-concurrence.

7. REFERENCES

Commonwealth of Massachusetts Executive Office of Environmental Affairs Department of Environmental Protection Request for Information from Anne Malewicz to Jonathan Spergel, Esq., Manko, Gold, & Katcher LLP dated 13 June 2001.

Commonwealth of Massachusetts Executive Office of Environmental Affairs Department of Environmental Protection Approval letter to the First Grant Amendment Application from Robert Donovan to Richard Heany, Charles River Business Center Associates, LLC dated 5 February 1999.

Commonwealth of Massachusetts Executive Office of Environmental Affairs Department of Environmental Protection letter regarding the Former Army Materials Technology Laboratory Grant of Environmental Restriction –Area G from Anne Malewicz to Honathan Spergel, Esq., Manko, Gold & Katcher LLP dated 7 May 2001.

Department of the Army, Headquarters, U.S. Army Materiel Command letter from Stanley R. Citron to John Beling, USEPA and Andy Cohen, Commonwealth of Massachusetts Executive Office of Environmental Affairs Department of Environmental Protection dated 5 July 2001.

ENSR, Real Estate Transfer Package, Army Materials Technology Laboratory, Watertown, Massachusetts. September 1998.

Foster Wheeler Environmental Corporation, Explanation of Significant Differences Charles River Park Area Outdoor Soil Remediation Unit Army Materials Technology Laboratory Watertown, Massachusetts, 14 May 2001.

Kirkpatrick & Lockhart LLP Army Materials Technology Laboratory Institutional Control Checklist First Annual Report August 1999.

Kirkpatrick & Lockhart LLP Army Materials Technology Laboratory Institutional Control Checklist Second Annual Report August 2000.

Kirkpatrick & Lockhart LLP Army Materials Technology Laboratory Institutional Control Checklist Third Annual Report August 2001.

Manko, Gold & Katcher LLP letter regarding Arsenal, Watertown, Massachusetts from Jonathan Spergel to Stephan Corridan of O'Neill Properties Group, L.P. dated 15 May 2001.

Manko, Gold & Katcher LLP Response to 13 June 2001 Request for Information, Former Army Materials Technology Laboratory, Watertown, Massachusetts from Jonathan Spergel to Craig Durrett, Massachusetts Department of Environmental Protection dated 25 June 2001.

Plexus Scientific Corporation, Final Supplemental Phase 2 Remedial Investigation Charles River, Prepared for the U.S. Army Environmental Center, March 1998.

TRC Environmental Corporation, Application for Amendment of the Grant of Environmental Restriction and Easement at the Building 39 Area, Building 229 Area, and Building 656 Area, and Excavation Area B at the former Army Materials Technology Laboratory Watertown, Massachusetts. Prepared for Charles River Business Center Associates, LLC and Oxford Engineers & Consultants, Inc. 22 January 1999.

TRC Environmental Corporation, Revision 2, Application for Amendment of the Grant of Environmental Restriction and Easement at the Building 36 Area, Building 37 Area, and Building 97 Area, Building 117 Area, Building 118 Area, Building 292 Area, Building 312 Area, and Building 313 Area at the former Army Materials Technology Laboratory Watertown, Massachusetts. Prepared for Charles River Business Center Associates, LLC and Oxford Engineers & Consultants, Inc. 1 June 1999.

TRC Environmental Corporation, Application for Amendment of the Grant of Environmental Restriction and Easement at Excavation Area B at the former Army Materials Technology Laboratory Watertown, Massachusetts. Prepared for Charles River Business Center Associates, LLC and Oxford Engineers & Consultants, Inc. 17 January 2000.

USEPA, (United States Environmental Protection Agency), Region 1 letter regarding Army Materials Technology Laboratory, Area G Excavation from John Beling and Vincent Maraventan to Stan Citron and Robert Chase of the United States Army dated 9 May 2001.

USEPA, (United States Environmental Protection Agency), Region 1 letter regarding Army Materials Technology Laboratory, Area G Excavation from John Beling to Jonathan Spergel of Manko, Gold & Katcher dated 14 May 2001.

URS Corporation letter regarding Excavation Area "G" The Arsenal on the Charles Watertown, Massachusetts, from Bruce Hoskins, P.E., L.S.P. to Richard Almquist, Jr. of Oxford Engineers & Consultants, Inc. dated 5 July 2001.

WESTON, (Roy F Weston, Inc.), Final Record of Decision Soils and Groundwater Operable Unit Army Materials Technology Laboratory. Prepared for the U.S. Army Environmental Center Aberdeen Proving Ground. September 1996.

WESTON, (Roy F. Weston, Inc.), Final Record of Decision Area I Army Materials Technology Laboratory. Prepared for the U.S. Army Environmental Center Aberdeen Proving Ground. August 1996.

WESTON, (Roy. F. Weston, Inc.), Task Work Plan Addendum Outdoor Soil Remediation Army Research Laboratory- Watertown, Watertown, Massachusetts. Prepared for the U.S. Army Corps of Engineers, New England District. October 1996.

WESTON, (Roy F. Weston, Inc.) Final Remedial Action Completion Report for Outdoor Soil Remediation- Building 131 Army Research Laboratory-Watertown, Watertown, Massachusetts. December 1996.

WESTON, (Roy. F. Weston, Inc.), Final Remedial Action Report: Zones 1-4 for Outdoor Soil Removal Army Materials Technology Laboratory, Watertown, Massachusetts. Prepared for the U.S. Army Corps of Engineers, New England District. May 1998.

WESTON, (Roy F. Weston, Inc.) Explanation of Significant Difference (ESD) for Outdoor Soil Removal Army Materials Technology Laboratory, Watertown, Massachusetts. Prepared for the U.S. Army Corps of Engineers, New England District. June 1998.

WESTON, (Roy F. Weston, Inc.), Remedial Action Report for Charles River Park Army Materials Technology, Watertown Massachusetts. Prepared for the U.S. Army Corps of Engineers, New England District. April 1999.

APPENDIX A

FIVE YEAR REVIEW FORMS

INTERVIEW RECORD			
Site Name: <i>Army Materials Technology Ctr</i>		EPA ID No.: <i>MA 0213820939</i>	
Subject: <i>5-yr review</i>		Time:	Date: <i>4/20/01</i>
Type: <input checked="" type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input checked="" type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit:			
Contact Made By:			
Name: <i>Bob Chase</i>	Title: <i>BEAC Environmental Coord</i>	Organization: <i>US Army</i>	
Individual Contacted:			
Name: <i>Pam Neekens</i>	Title: <i>Project Manager</i>	Organization: <i>Watson</i>	
Telephone No.:	Street Address:	City, State, Zip:	
Fax No.:			
E-Mail Address:			
Summary Of Conversation			
<p><i>Bob discussed the two fiscal year end reports that Mark Boyle of Town of Watertown. Bob stated that since the shape of the Watertown's library's Administrative record is not good to try and get documents out of the National Archives. He also informed us that Foster Wheeler's Work Plan for the Charles River Park work was almost finished. Also stated that in November 2000 couldn't reach a decision on river and another risk assessment in summer of 2002.</i></p>			

INTERVIEW RECORD

Site Name:

EPA ID No.:

Subject:

Time:

Date:

Summary Of Conversation (Cont.)

Page ___ of ___

INTERVIEW RECORD

Site Name: <i>Materials Technology Laboratory</i>		EPA ID No.: <i>MA C2138 20939</i>	
Subject: <i>Update on Aromat section</i>		Time: <i>11:00am</i>	Date: <i>5/8/01</i>
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit: <i>Western's Manchester office</i>			
Contact Made By:			
Name: <i>Pam Hoskins</i>	Title: <i>Project Manager</i>	Organization: <i>Western</i>	
Individual Contacted:			
Name: <i>Bruce Hoskins</i>	Title: <i>LSP of Record</i>	Organization: <i>URS Corp</i>	
Telephone No.: <i>84603-893-0614</i>	Street Address:		
Fax No.: <i>603-893-6240</i>	City, State, Zip:		
E-Mail Address: <i>Bruce_hoskins@urscorp.com</i>	<i>Salem NH</i>		

Summary Of Conversation

Bruce discussed the Grant and the four Amendments to the Grant since Western has left the site.

INTERVIEW RECORD

Site Name:

EPA ID No.:

Subject:

Time:

Date:

Summary Of Conversation (Cont.)

Page ___ of ___

INTERVIEW RECORD			
Site Name: <i>Matsuda Technology Laboratory</i>		EPA ID No.: <i>MA 02138 20939</i>	
Subject: <i>Area L4</i>		Time: <i>11:30</i>	Date: <i>11-3/16/01</i>
Type: <input checked="" type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit:			
Contact Made By:			
Name: <i>Harv Campbell</i>		Title: <i>Project Engineer</i>	Organization: <i>Log F Weston</i>
Individual Contacted:			
Name: <i>Mark Boyle</i>		Title: <i>WADC Rep</i>	Organization: <i>Town of Waterdown</i>
Telephone No.: <i>617-972-6417</i>		Street Address:	
Fax No.:		City, State, Zip:	
E-Mail Address:			
Summary Of Conversation			
<p><i>Discussed if anything has been done to Area L4 since Weston had left the site.</i></p>			

INTERVIEW RECORD

Site Name:

EPA ID No.:

Subject:

Time:

Date:

Summary Of Conversation (Cont.)

Page ___ of ___

INTERVIEW RECORD

Site Name: <i>Materials Technology Laboratory</i>	EPA ID No.: <i>MA0213820939</i>	
Subject: <i>Site visit / inspection</i>	Time: <i>9:00 am</i>	Date: <i>5/30/01</i>
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit: <i> Arsenal</i>		

Contact Made By:

Name: <i>Karen Campbell</i>	Title: <i>Project Engineer</i>	Organization: <i>Ray F. Holden</i>
-----------------------------	--------------------------------	------------------------------------

Individual Contacted:

Name: <i>Dynn Kramer</i>	Title: <i>Construction Manager</i>	Organization: <i>O'Neill Properties</i>
Telephone No.: <i>617-926-9256</i>	Street Address: <i>395 Arsenal Street Bldg B1</i>	
Fax No.: <i>617-926-9271</i>	City, State, Zip: <i>Westtown MA 02472</i>	
E-Mail Address: <i>ikramer@oneillproperties.com</i>		

Summary Of Conversation

Went to areas L4, B, E, G, Bldg 313, Bldg 60.

INTERVIEW RECORD

Site Name:

EPA ID No.:

Subject:

Time:

Date:

Summary Of Conversation (Cont.)

Page ___ of ___

INTERVIEW RECORD

Site Name: Materials Technology Laboratory	EPA ID No.: MA 02138 20939	
Subject: Charles River Park Excavation	Time: 10:00	Date: 6/13/01
Type: <input checked="" type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit:		

Contact Made By:

Name: Karen Campbell	Title: Project Engineer	Organization: Boylston
----------------------	-------------------------	------------------------

Individual Contacted:

Name: Bob Donati	Title: Project Manager	Organization: Foster Wheeler
------------------	------------------------	------------------------------

Telephone No.: 603-617-457-8247	Street Address:
Fax No.:	City, State, Zip:
E-Mail Address:	

Summary Of Conversation

Discuss excavation that Foster-Wheeler has done at the Charles River Park in Area M, P/A and the River Bank.

INTERVIEW RECORD

Site Name:

EPA ID No.:

Subject:

Time:

Date:

Summary Of Conversation (Cont.)

Page ___ of ___

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the five-year review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: <u>Army Medical Technology Lab</u>	Date of inspection: <u>5/30/01</u>
Location and Region: <u>Watertown MA</u>	EPA ID: <u>MA0213820939</u>
Agency, office, or company leading the five-year review: <u>US Army Corps of Engineers</u>	Weather/temperature: <u>Sunny 65°F</u>
Remedy Includes: (Check all that apply) <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager _____ <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 20px;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	
2. O&M staff _____ <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 20px;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____ _____	

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____
Name _____ Title _____ Date _____ Phone no. _____
Problems; suggestions; Report attached _____

Agency _____
Contact _____
Name _____ Title _____ Date _____ Phone no. _____
Problems; suggestions; Report attached _____

Agency _____
Contact _____
Name _____ Title _____ Date _____ Phone no. _____
Problems; suggestions; Report attached _____

Agency _____
Contact _____
Name _____ Title _____ Date _____ Phone no. _____
Problems; suggestions; Report attached _____

4. **Other interviews (optional)** Report attached.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Documents <input type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
2.	Site-Specific Health and Safety Plan <input type="checkbox"/> Contingency plan/emergency response plan Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
3.	O&M and OSHA Training Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____ Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	Gas Generation Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
6.	Settlement Monument Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
7.	Groundwater Monitoring Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
8.	Leachate Extraction Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	Daily Access/Security Logs Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A

IV. O&M COSTS

1. O&M Organization

- State in-house Contractor for State
 PRP in-house Contractor for PRP
 Other _____

2. O&M Cost Records

- Readily available Up to date
 Funding mechanism/agreement in place
Original O&M cost estimate _____ Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A

A. Fencing

- 1. Fencing damaged** Location shown on site map Gates secured N/A
Remarks _____

B. Other Access Restrictions

1. Signs and other security measures Location shown on site map N/A
 Remarks Bench marks at Area B, E, G + L4 corners.
Some benchmarks are missing at Area E, G + L4.

C. Institutional Controls

1. Implementation and enforcement
 Site conditions imply ICs not properly implemented Yes No N/A
 Site conditions imply ICs not being fully enforced Yes No N/A

Type of monitoring (e.g., self-reporting, drive by) Independent inspection by outside consultant.
 Frequency Annual
 Responsible party/agency U.S. Army
 Contact Bob Chase

Name	Title	Date	Phone no.

Reporting is up-to-date Yes No N/A
 Reports are verified by the lead agency Yes No N/A

Specific requirements in deed or decision documents have been met Yes No N/A
 Violations have been reported Yes No N/A

Other problems or suggestions: Report attached
Annual inspections reports 1999 and 2000 did not reveal violations at Areas E and G and L4.

2. Adequacy ICs are adequate ICs are inadequate N/A
 Remarks Adequate when followed.

D. General

1. Vandalism/trespassing Location shown on site map No vandalism evident
 Remarks _____

2. Land use changes onsite N/A
 Remarks _____

3. Land use changes offsite N/A
 Remarks _____

VI. GENERAL SITE CONDITIONS

A. Roads Applicable N/A

1. **Roads damaged** Location shown on site map Roads adequate N/A
 Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface

1. **Settlement (Low spots)** Location shown on site map Settlement not evident
 Areal extent _____ Depth _____
 Remarks _____

2. **Cracks** Location shown on site map Cracking not evident
 Lengths _____ Widths _____ Depths _____
 Remarks _____

3. **Erosion** Location shown on site map Erosion not evident
 Areal extent _____ Depth _____
 Remarks _____

4. **Holes** Location shown on site map Holes not evident
 Areal extent _____ Depth _____
 Remarks _____

5. **Vegetative Cover** Grass Cover properly established No signs of stress
 Trees/Shrubs (indicate size and locations on a diagram)
 Remarks _____

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
 Remarks _____

7.	Bulges Areal extent _____ Height _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Bulges not evident	
8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____ _____	<input type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____
9.	Slope Instability Areal extent _____ Remarks _____ _____	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of slope instability
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
2.	Bench Breached Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
3.	Bench Overtopped Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	Settlement Areal extent _____ Depth _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
2.	Material Degradation Material type _____ Areal extent _____ Remarks _____ _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation

3.	Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion	
4.	Undercutting Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting	
5.	Obstructions Type _____ <input type="checkbox"/> Location shown on site map Size _____ Remarks _____	<input type="checkbox"/> No obstructions Areal extent _____	
6.	Excessive Vegetative Growth Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Remarks _____	Areal extent _____	
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Gas Vents <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs O&M	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A
2.	Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs O&M	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A
3.	Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs O&M	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A
4.	Leachate Extraction Wells <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs O&M	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A

5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A
Remarks _____				
E. Gas Collection and Treatment				
		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1.	Gas Treatment Facilities			
<input type="checkbox"/> Flaring		<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
<input type="checkbox"/> Good condition		<input type="checkbox"/> Needs O&M		
Remarks _____				
2.	Gas Collection Wells, Manifolds and Piping			
<input type="checkbox"/> Good condition		<input type="checkbox"/> Needs O&M		
Remarks _____				
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
<input type="checkbox"/> Good condition		<input type="checkbox"/> Needs O&M	<input type="checkbox"/> N/A	
Remarks _____				
F. Cover Drainage Layer				
		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1.	Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks _____				
2.	Outlet Rock Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks _____				
G. Detention/Sedimentation Ponds				
		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1.	Siltation	Areal extent _____	Depth _____	<input type="checkbox"/> N/A
<input type="checkbox"/> Siltation not evident				
Remarks _____				
2.	Erosion	Areal extent _____	Depth _____	
<input type="checkbox"/> Erosion not evident				
Remarks _____				
3.	Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks _____				
4.	Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks _____				

H. Retaining Walls		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Deformations Horizontal displacement _____ Rotational displacement _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident Vertical displacement _____
2.	Degradation Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
I. Perimeter Ditches/Off-Site Discharge		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Siltation Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident Depth _____
2.	Vegetative Growth <input type="checkbox"/> Vegetation does not impede flow Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A Type _____
3.	Erosion Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident Depth _____
4.	Discharge Structure Remarks _____	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Settlement Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident Depth _____
2.	Performance Monitoring <input type="checkbox"/> Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____ <input type="checkbox"/> Evidence of breaching	

IX. GROUNDWATER/SURFACE WATER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
A. Groundwater Extraction Wells, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs O&M <input type="checkbox"/> N/A Remarks _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____		
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks _____ _____		

3. **Spare Parts and Equipment**
 Readily available Good condition Requires upgrade Needs to be provided
Remarks _____

C. Treatment System Applicable N/A

1. **Treatment Train (Check components that apply)**
 Metals removal Oil/water separation Bioremediation
 Air stripping Carbon adsorbers
 Filters
 Additive (e.g., chelation agent, flocculent) _____
 Others _____
 Good condition Needs O&M
 Sampling ports properly marked and functional
 Sampling/maintenance log displayed and up to date
 Equipment properly identified
 Quantity of groundwater treated annually _____
 Quantity of surface water treated annually _____
Remarks _____

2. **Electrical Enclosures and Panels (properly rated and functional)**
 N/A Good condition Needs O&M
Remarks _____

3. **Tanks, Vaults, Storage Vessels**
 N/A Good condition Proper secondary containment Needs O&M
Remarks _____

4. **Discharge Structure and Appurtenances**
 N/A Good condition Needs O&M
Remarks _____

5. **Treatment Building(s)**
 N/A Good condition (esp. roof and doorways) Needs repair
 Chemicals and equipment properly stored
Remarks _____

6. **Monitoring Wells (pump and treatment remedy)**
 Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs O&M N/A
Remarks _____