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GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
MAXEY FLATS PROJECT
2597 MAXEY FLAT ROAD
HILLSBORO, KENTUCKY 41049

ROBERT VANCE
SECRETARY

March 27, 2008

Ms. Pam Scully, SRPM, Kentucky/Tennessee Section
North Site Management Branch
Waste Management Division
USEPA-Region IV
Sam Nunn Atlantic Federal Center
Tower-11th Floor (Mail Code: 4WD-NSMB)
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Subject: Maxey Flats Project –2007 Annual Report

Dear Ms. Scully;

The Commonwealth of Kentucky is submitting the 2007 Annual Report for the Maxey Flats Disposal Site to fulfill the requirements of Section 4.0 of the Performance Verification Standard Plan (PSVP). The report was prepared by the Maxey Flats Section and summarizes information from the period of January 2007 through December 2007.

If you have any questions, please contact me at (606) 784-6612.

Sincerely,

E-Signed by Wilburn, Scott
VERIFY authenticity with ApproveIt

Scott Wilburn
Environmental Control Supervisor
Maxey Flats Project

e-attachment

cc: Derek Matory, USEPA
Jon Richards, USEPA
Bennie Underwood, *de maximis, inc.*
Nicole Barkasi, *de maximis, inc.*
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MAXEY FLATS PROJECT
ANNUAL REPORT
2007

March 27, 2008

Environmental and Public Protection Cabinet
Department for Environmental Protection
Division of Waste Management
Superfund Branch

Maxey Flats Project
2597 Maxey Flat Road
Hillsboro, KY 41049
606-784-6612

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List of Acronyms

BoRP	Balance of Remedial Phase
Commonwealth	Commonwealth of Kentucky
DCSW	Drainage Channels Surface Water
IRP	Initial Remedial Phase
IMP	Interim Maintenance Period
MFP	Maxey Flats Project
O&M	Operation and Maintenance Requirement Summary
PSVP	Performance Standards Verification Plan
PSSW	Perennial Streams Surface Water
RA	Remedial Action
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

List of Appendices

(Files on CD separate from Main Report)

1.0 Introduction

The Commonwealth is submitting this report in accordance with Section 4.0 of the PSVP. The report summarizes sampling and maintenance activities listed in the PSVP and the O&M.

2.0 Scope of Work

The IMP is ongoing pursuant to the Consent Decree (Civil Action Number 95-58) signed by the USEPA, the Maxey Flats Steering Committee (Settling Private Parties), and the Commonwealth. The Commonwealth is responsible for completion of the BoRP that includes the Interim Maintenance Period, Final Closure Period and Associated Remedial Activities and Performance Monitoring.

The Interim Maintenance Period Work Plan describes the tasks to be completed including:

- Surface/ground water monitoring
- IRP cap maintenance and replacement
- Trench leachate management and monitoring
- Subsidence monitoring and surveys
- Erosion evaluation
- General site maintenance
- Contaminated liquid and waste disposal
- Data collection, analysis, and reporting
- Site drainage and erosion control features
- Installation of a horizontal flow barrier, if necessary

3.0 Surface Water Monitoring

The 2007 tritium averages for the East Detention Basin, locations 144, 106, 122C and 102D are the highest detected since Maxey Flats Project entered the IMP. Sample location 144 is the first monitoring location that samples water from both the restricted area runoff and the east hillside seeps. For 2007 location 144 increased nearly 20 pCi/ml when compared to the previous four year average. All water flowing past location 144 directly influences monitoring at 106B, 122C and 102D. All other Surface Water Monitoring locations were at or below annual averages and would not be impacted by flow past 144. Although analyses indicate an increase of tritium contamination within the 144 flow path; this increase is statistically insignificant. The increases could be contributed to other factors such as counting controls and seasonal precipitation.

3.1 East Detention Basin

The first point of monitoring surface water runoff from the MFP is at the East Detention Basin (EDB). Sampling is performed at the EDB based on storm events of 2.8 inches of rainfall in a 24-hour period. In order for the sequential sampler to collect a storm event sample, the sampler is programmed to collect a sample based on 0.11 inches of rainfall per hour. A total of 32 samples were collected in 2007 and analyzed for tritium. Results ranged from -0.21 to 1.87 pCi/ml providing an average of 0.55 pCi/ml. Annual averages for 2003, 2004, 2005, and 2006 were of 0.13 pCi/ml, 0.14 pCi/ml, 0.16 pCi/ml and 0.16 pCi/ml respectively.

3.2 Perennial Streams Surface Water

Perennial Streams Surface Water (PSSW) monitoring is conducted at five locations in three streams inside and outside the MFP's boundary. These locations are monitored using sequential samplers that collect a four aliquot, daily composite.

Sample location 122A serves as the background sample; it is located on Rock Lick Creek up-gradient from site influence. Tritium results for 2007 at this location ranged from -0.44 to 0.74 pCi/ml, producing an average of 0.02 pCi/ml. Annual averages for 2003, 2004, 2005 and 2006 were 0.06 pCi/ml, 0.06 pCi/ml, 0.05 pCi/ml and 0.05 pCi/ml respectively.

Sample location 106 is located on No Name Branch, a tributary to Rock Lick Creek. Location 106 receives direct influence from drain 144. Tritium results for 2007 at this location ranged from 0.23 to 14.47 pCi/ml, producing an average of 5.24 pCi/ml. Annual averages for 2003, 2004, 2005 and 2006 were 4.46 pCi/ml, 4.55 pCi/ml, 4.23 pCi/ml and 3.41 pCi/ml respectively.

Sample location 122C is located on Rock Lick Creek, downstream of 106 influence. Tritium results for 2007 at this location ranged from -0.04 to 6.81 pCi/ml, producing an average of 1.27 pCi/ml. Annual averages for 2003, 2004, 2005 and 2006 were 0.99 pCi/ml, 1.10 pCi/ml, 1.01 pCi/ml and 0.86 pCi/ml respectively.

Sample location 103E is located on Drip Springs Creek and receives influence from Drain 107. Tritium results for 2007 at this location ranged from 0.04 to 5.24 pCi/ml, producing an average of 0.62 pCi/ml. Annual averages for 2003, 2004, 2005 and 2006 were 0.53 pCi/ml, 0.90 pCi/ml, 0.67 pCi/ml and 0.47 pCi/ml respectively.

Sample location 102D is the only PSSW sampler located outside the Buffer Zone. Due to its location below the confluence of three streams and its location outside the Buffer Zone, 102D is designated as the compliance point for site runoff. In addition to the 4-mrem/year dose limit, this location is also compared to the USEPA tritium in drinking water standard of 20 pCi/ml. Tritium results for 2007 at this location ranged from -0.21 to 2.60 pCi/ml, producing an average of 0.93 pCi/ml. Annual averages for 2003, 2004, 2005 and 2006 were 0.67 pCi/ml, 1.10 pCi/ml, 0.79 pCi/ml and 0.62 pCi/ml respectively.

A total of 1,796 PSSW samples were collected and analyzed for tritium during this period with no anomalous data reported. For 2007 all PSSW locations were below the average annual tritium concentration action limit of 20 pCi/ml; assuring that the 4 mrem/yr drinking water standard has been met.

3.3 Drainage Channels Surface Water

Sample location C107 is located at the base of the West Drain which discharges into Drip Springs Creek. For 2007 this location yielded 155 samples for tritium analysis. Results ranged from 0.57 pCi/ml to 34.30 pCi/ml and averaged 13.28 pCi/ml. Annual averages for 2003, 2004, 2005 and 2006 were 9.86 pCi/ml, 14.58 pCi/ml, 16.97 pCi/ml and 8.62 pCi/ml respectively.

Sample location 143 is located near the base of the South Drain which discharges into Rock Lick Creek. For 2007 this location yielded 243 samples for tritium analysis. Results ranged from -0.17 pCi/ml to 0.68 pCi/ml and averaged 0.07 pCi/ml. For comparison, averages for 2003, 2004, 2005 and 2006 were 0.22 pCi/ml, 0.21 pCi/ml, 0.10 pCi/ml and 0.10 pCi/ml respectively.

Sample location 144 is located at the base of the East Drain which discharges into No Name Branch. For 2007 this location yielded 307 samples for tritium analysis. Results ranged from 0.39 pCi/ml to 256.70 pCi/ml and averaged 70.03 pCi/ml. For comparison, averages for 2003, 2004, 2005 and 2006 were 63.36 pCi/ml, 60.66 pCi/ml 40.03 pCi/ml and 43.35 pCi/ml respectively.

3.4 Sampling Equipment Status

Samples were collected in accordance with the PSVP unless problems occurred beyond the site's control such as freezing lines, washouts, equipment failure, no flow, or power outages.

4.0 Groundwater Monitoring

4.1 Alluvial Wells

Alluvial well samples for 2007 were collected as outlined in the PSVP. During this reporting period, a total of 20 samples were collected and analyzed for tritium. All alluvial wells were sampled except for AW-1 and AW-7 which were sampled four times (once each quarter) and AW-8 which was not sampled as a result of the Five Year Review. Only AW-1 and AW-7 had results above 1.00 pCi/ml; the highest tritium levels detected from these locations during the IMP are 8.11 pCi/ml and 6.27 pCi/ml respectively.

In accordance to the US EPA Five Year Review in 2007 the frequency of Alluvial well monitoring has changed to conducting annual sampling at AW-6, 10 and 12 and quarterly sampling AW-1 and 7. Sampling of all other alluvial wells has been discontinued.

Access to the alluvium within the buffer zone is controlled by the Commonwealth, therefore the alluvial wells are not considered a drinking water source and do not represent a potential radiological dose to the public.

4.2 USGS Monitoring Wells

Sixteen monitoring wells known as the USGS Monitoring Wells are located along the west perimeter fence. The wells are maintained by the USGS with continuous level data loggers and are hand measured on a quarterly basis. In the years 2003-2007, October water levels for the sixteen USGS monitoring wells indicate only two wells UF-5 & ESI-1 with fluctuation greater than one inch. Historic data indicates considerable water level fluctuation for both UF-5 and ESI-1.

The 2007 tritium results for the USGS wells were all typical of historical data and trends except for UF-10A which for April was one order of magnitude lower than typical. No basis has been identified for the atypical analysis of UF-10A.

5.0 Data Management

A data package is prepared for each group of samples analyzed on site. The data package contains the tritium instrument's QC charts (efficiency and background), chain of custody forms, raw data sheets and data reduction sheets. Data is reviewed and validated through on-site procedures. An employee of the Commonwealth whose normal duties are not involved with the Maxey Flats Project validates the data on a monthly basis. Following data validation, the data is entered into the site's database and transmitted to USEPA, USDOE, *de maximis, inc*. and the Commonwealth. These packets are available on site for review. Results are contained on the accompanying CD in Appendix A.

6.0 Rainfall Data

Presently there are three rain gauges on site; East Detention Basin (EDB), Well UF-37 and the main office. The official annual rainfall data is obtained from the rain gauge located at the EDB. This data was chosen because the gauge is used in conjunction with the sampler at the EDB. A total of 31.63 inches of rainfall was measured at the EDB gauge during 2007. The 2007 rainfall total was below the annual area precipitation average of 44.08 inches (see Appendix B on attached CD). The amount of annual precipitation over the past five years appears to have negligible impact on trench levels and perimeter USGS wells.

7.0 Initial Remedial Phase Cap Maintenance

7.1 Geo-membrane Liner and Boots

The annual inspection of the geo-membrane liner covering the trench cap began in March 2007 and was completed in April 2007. Air lancing of the field seams and visual inspection of the factory seams were conducted as required in O&M, Sections 3.1.1, Geo-membrane Liner Maintenance and 3.1.2, Geo-membrane Liner Boots. During the annual inspection a total of 35 defects were found and repaired as compared to 55 defects in 2006, 42 defects in 2005 and 19 defects in 2004.

The trench sump boots were inspected during the monthly liner inspections and during the collection of trench sump liquid level measurements. The inspections revealed no defects to the liner material of the sump boots. However, deterioration of many extrusion welds was observed.

As part of the US EPA Five Year Review, a third party liner evaluation was performed. The evaluation, conducted by Fuller, Mossbarger, Scott and May Engineers (FMS&M) in April 2007 included Historical Documentation Review, Walk Over, Seam Destruction Tests, Engineering Evaluation, and Reporting. The evaluation did not include extrusion welds. The Final report from FMS&M stated that the liner condition is between good and excellent using the Koerner Scale.

7.2 Headwall Maintenance

Headwall maintenance includes the four headwalls and associated items along the North Channel and the northeast corner piping, geo-membrane liner batten and the liquid collection system.

During this reporting period, debris/leaves were removed numerous times from the trash grate and restricting plate of the upstream headwall of the northeast corner piping. Removal of the leaves/debris will be a continuous maintenance issue for the site.

7.3 Subsidence Monitoring and Repair

Subsidence inspections were conducted monthly in accordance with the O&M, Section 3.3.3, and Subsidence Monitoring. No subsidences were observed in 2007 that required corrective action. One location on both Liner Panel 84 and 85 is being closely monitored and will likely require corrective action in the near future.

Curd Surveying, Inc. performed the annual engineering subsidence survey of the trench cap in May 2007. Elevations were obtained for the 28 subsidence control points established during the remedial work. The variations between the 2006 and 2007 subsidence control points ranged from +0.03 feet to -0.04 feet. The variations between the 2004 (baseline) and the 2007 subsidence control points ranged from -0.02 feet to -0.18 feet. No particular area of significant subsidence was indicated.

7.4 Diversion Berms

The diversion berms were inspected twice a month as required by the O&M. Excluding possible liner repairs, all were found to be in satisfactory condition.

7.5 Anchor Trenches

The anchor trenches were inspected twice a month as required by the O&M. A significant hole was located during the annual inspection near the north perimeter channel on the north edge of LP 363. This hole has not been permanently patched. There is an excessive amount of moisture in the soil which would make the welding process ineffective. The inability to effectively patch this hole does not impact the protectiveness of the liner to prevent infiltration.

7.6 Drainage Channels

All drainage channels were inspected during this period as required by the O&M. Control of weeds and vegetation in the Articulating Block mats and at the gabions was performed by spraying the areas with weed killer and/or manually removing the vegetation.

7.7 Articulating Concrete Block Mat (AB Mat) System

The AB mat system was inspected monthly as required by the O&M. Buildup of sediment within the AB-mats has reduced their ability to reduce velocity of water flowing to the EDB and increased the need for vegetation control. This buildup of sediment should be expected as this is an inherent design feature of AB mats. The cable linking the blocks is showing signs of stress; this will continue to be closely monitored. The signs of stress indicate movement which could impact liner integrity.

7.8 Former Leachate Storage Facility Area

The covered area of the former leachate storage facility was found to be in satisfactory condition. The area shows no signs of subsidence or any damage to the geo-membrane liner or boots around the tank extensions.

7.9 Inspections

A total of 94 inspections were performed during the period of January 2007 through December 2007. No unsatisfactory reviews were recorded that presented a major problem, mostly leaf collection and liner defects. All unsatisfactory items received attention to return them to satisfactory status.

7.10 Equipment Status

The primary extrusion weld gun is no longer operational. The backup extrusion weld gun has been placed into service and is performing well. The non-operational gun is in need of major repair and will be placed in backup status once its repairs are completed. All other liner repair equipment remains in good working condition.

8.0 Trench Leachate Management and Monitoring

Trench sump liquid level measurements were obtained in accordance with the PSVP, Section 2.3, Sump Measurement. The purpose of collection and evaluation of the trench sump leachate levels are to detect recharge conditions that may require leachate management and provide data for future evaluation of the horizontal flow barriers.

A comparison of the baseline to the manual measurements collected in October 2007 indicates little change in freeboard. The average loss of freeboard for all sumps is less than one percent. Only two sumps indicate a greater than 10% loss of freeboard. Sump 7-4 and Sump 46-1 have a freeboard percentage loss of 43% and 16%, respectively. Trending of both sumps indicates 7-4 is losing 8.5% freeboard per year and 46-1 is losing 4.5% freeboard per year. An investigation and close monitoring of sump 7-4 will occur during 2008.

In accordance to a recommendation within the US EPA Five Year Review, the frequency of obtaining liquid level measurements from the sumps has changed from Quarterly to Semi-Annually.

9.0 Contaminated Liquid and Solid Waste

Contaminated liquid and waste generated on-site will be disposed of in accordance with the IMP Work Plan; Section 3.2, Treatment of Other Contaminate Liquids and Section 3.3, Waste Burial.

No liquid removed from the trench cap area required management during this reporting period. No solid waste was disposed of on-site during this reporting period. Solid and liquid waste generated from laboratory, radiological activities and site maintenance is temporarily stored in a secured area. Permanent disposal will be arranged based on volume and waste type.

10.0 Erosion Monitoring

Erosion monitoring consists of obtaining elevation measurements and observations of the east drainage channel. The USGS staff monitored the East Main Drainage Channel twice during the reporting period. In addition, the south and west drainage channels were surveyed by USGS staff as a requirement of the second five year review. The results were reported to USEPA. Tables for the 2003-2007 East Drain erosion measurements and the calculated areas are presented in Appendix C (attached CD). An update to existing erosion measurements and the calculated areas for the south and west drainage channels are also included in Appendix B.

There was no major water erosion or mud/rock slides evident in any of the channels during this reporting period.

11.0 IMP Work Plan Revisions, Changes and Correspondence

Revisions and changes to the IMP Work Plan are required to be submitted in writing to USEPA for approval. During this reporting period, three change requests were submitted and implemented:

- Technical Change 6 – requests that the USGS erosion monuments be used to evaluate the East Main Drain instead of the IRP installed monuments. This allows for the use of different erosion monuments and methodology than stipulated in the IMP Work Plan to evaluate the East Main Drainage Channel.
- Technical Change 7 – requests a reduction in the frequency of sump liquid measurements from quarterly to semi-annually.
- Technical Change 8 – requests a reduction in the number of alluvial wells sampled and sampling frequency.

12.0 Custodial Care Activities

12.1 Vegetation

All vegetation was maintained below required height limits.

12.2 Building and Grounds Maintenance

Construction of sampling houses at 122C, 106B and 103E were completed this construction period. The sampling equipment storage building was remolded and a sidewalk was poured beside the main office building. All established buildings received routine maintenance. The sampling structure at the EDB is scheduled for replacement in 2008.

12.3 Security Fence

The security fence surrounding the site remains in satisfactory condition with minor maintenance required. All vehicle access gates were replaced with cantilever gates and an operator was installed on the Main Entrance Gate. Additional operator upgrades are being considered for the two additional vehicle gates.

12.4 Roadway Maintenance

The perimeter road, 122A road, 106 and 144 roads were resurfaced with gravel this year. A new road was constructed along Drip Springs Hollow to allow for easier access to monitoring wells and surface water sample locations.

13.0 Cathodic Protection

The cathodic protection for the underground waste disposal tank was checked monthly. All readings were within the accepted range according to the operating instructions. Tom Stewart, Certified Cathodic Protection Tester, completed the annual inspection of the Cathodic Protection System on February 22, 2007. The system received a passing score with results indicating the cathodic protection system is functioning as designed.

14.0 US EPA Five Year Review 2007

The US EPA Five Year Review concluded that: “No Deficiencies were noted during the initial statutory five-year review”, “No Recommendations or required actions are needed to correct deficiencies based on this five-year review,” and “The selected remedy at the MFDS is expected to be protective of human health and the environment at the conclusion of the RA, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.” It was also determined that construction of the proposed flow barrier in the area of the north cut off channel will not be necessary.

15.0 Conclusion

This concludes the textual outlining of the IMP activities at the Maxey Flats Project for 2007. If you would like to receive copies of inspections or deliverables not included in this report, please contact the MFP office.