Prepared for

Loudon County Solid Waste Disposal Commission
Loudon County, Tennessee

ASSESSMENT REPORT

ROOT CAUSE OF THE 3 NOVEMBER 2010 WASTE SLOPE FAILURE AND REHABILITATION RECOMMENDATIONS

MATLOCK BEND LANDFILL, LOUDON COUNTY, TENNESSEE

Prepared by



engineers | scientists | innovators

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EXECUTIVE SUMMARY

A waste slope failure (failure) occurred on 3 November 2010 in Module G of the Matlock Bend Landfill (MBL), Loudon County, Tennessee. The MBL is a Class I municipal solid waste (MSW) landfill permitted to the Loudon County Solid Waste Disposal Commission (LCSWDC) by the Tennessee Department of Environment and Conservation (TDEC). The active areas within the MBL were designed, constructed, and is currently operated by Santek Environmental, Inc. (Santek) under contract to the LCSWDC. As a result of the failure, TDEC issued a Director's Order (Order) to LCSWDC and Santek. The order identified specific requirements, including the preparation of a root cause assessment report that included both short- and long-term recommendations regarding the stabilization of the MBL. Geosyntec Consultants (Geosyntec) was retained by the LCSWDC to provide an independent third-party investigation of the failure and to prepare this Assessment Report (Report) to comply with the Order.

As part of its assignment, Geosyntec met with Santek and TDEC to review project files, obtain photographs of the site, secure site inspection records, obtain grading and asbuilt drawings, and operating results. These results allowed Geosyntec to develop a preliminary assessment regarding the cause of the failure, which then led to specific investigation and analysis approaches regarding the cause and extent of the instability. With regards to the root cause assessment, Geosyntec believes that the compilation of the site records support the conclusion that the root cause of the failure was due primarily to increased liquid levels in the landfill that were not being effectively conveyed to the LCS. These liquids are believed to be in part a result of the relatively large amount of sludge that was being placed, mixed, and compacted at the MBL. The sludge-mixed waste was likely wetter and weaker than waste placed in other portions of the landfill and weaker than waste that is typically expected at MSW landfills. Once the waste in the failure area started to creep downhill due to the ongoing waste placement activities, Geosyntec believes that the sludge-rich zones started to "smear" along localized planes. This had the effect of further reducing the ability of vertical percolation of the liquids to the LCS and tended to result is local zones of weakened waste. As more movement occurred the problem was exacerbated, resulting in an accumulation of more liquids and the "enlargement" of the weakened sludge-rich zone. This continued movement likely facilitated the release of the liquids, which contributed



to the "flow slide" on 3 November 2010. Importantly, the failed material slowly flowed downhill over the existing waste and essentially buried the existing toe of the Module G slope and the anchor trench. Geosyntec does not believe that the existing anchor trench or the liner integrity were compromised as a result of the failure, as confirmed by post-failure survey measurements.

Geosyntec identified both short- and long-term rehabilitation strategies for Module G that will help provide TDEC, the LCSWDC, and Santek with a measurable assurance that adequate short- and long-term stability can be achieved in the failure area. Specifically, Geosyntec developed specific short- and long term recommendations regarding the installation of a permanent dewatering trench, the construction of a stability berm beyond the Module G anchor trench to act a stabilizing buttress, the grading of waste within the buttressed Module G, and monitoring of surface movements and liquid levels. Geosyntec has also reviewed a Sludge Management Plan developed by Santek (and included in this Report) that will allow site-specific blending and mixing protocols for the sludge and waste at the MBL. By following these recommendations, Geosyntec believes that the long-term stability of the MBL can be achieved.

Geosyntec prepared this Report to comply with the TDEC Order. Specific schedule and timelines regarding the implementation of these recommended measures are proposed to be developed upon review of this Report by TDEC and approval of specific stabilization strategies. Geosyntec believes that implementation of many of these strategies can be nearly immediate, while others may take a few weeks to fully develop and implement. After meeting with TDEC, Geosyntec will work with LCSWDC and Santek to develop a site-specific implementation strategy and will follow-up on target objectives and deliverables.



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1.0 INTRODUCTION AND ORGANIZATION

1.1 Terms of Reference

This Assessment Report (Report) was prepared by Geosyntec Consultants (Geosyntec) at the request of the Loudon County Solid Waste Disposal Commission (LCSWDC) to comply with the requirements identified in the 12 January 2011 *Director's Order, Tennessee Department of Environment and Conservation, Case No. SWM10-0009, SNL 53-0203 (Matlock Bend Landfill)* (Order). In the Order, the Tennessee Department of Environment and Conservation (TDEC) made specific demands of the LCSWDC and Santek Environmental, Inc. (Santek). Santek operates the Matlock Bend Landfill (MBL or Landfill) under contract to the LCSWDC. The demands identified in the Order relate to a 3 November 2010 waste slope failure (failure) at the MBL. The Order requires that an independent third party be retained to prepare an assessment report for submittal to TDEC that addresses: (i) the root cause of the failure; (ii) short-term recommendations; and (iii) long-term recommendations.

1.2 Background

As mentioned previously, the MBL is currently operated by Santek under contract to the LCSWDC. In addition to being responsible for operations at the MBL, Santek has been under contract to the LCSWDC for the design, permitting, and construction of the portions of the MBL that are constructed to the modern "Subtitle D" landfill requirements. Since August 1997, the MBL has been permitted as a Class I landfill by TDEC. By permit, the MBL accepts solid waste from residential, commercial, and industrial customers. Dominantly, these customers are from Loudon County, including the City of Loudon and Lenoir City. At the time of the 3 November 2010 failure, waste was being placed into Module G of the MBL. Portions of Module G were first constructed and lined in 2009, commencing in the eastern portion of the permitted cell. Since that time period, most of the incoming waste to the MBL was placed into this portion of Module G. The adjacent western section of Module G was recently lined and was being prepared to accept waste.

Over this two-year operational time period, the incoming waste stream into Module G consisted of approximately 40 percent sludge from industrial clients. Santek has historically managed the sludge component of the incoming waste stream by mixing with the other commercial, industrial, and residential waste streams. In February 2010,

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TDEC acknowledged the relatively high amount of incoming sludge and noted several leachate breakouts at the site. Santek responded by repairing the leachate breakouts and made changes to improve operations in Module G, including more aggressive procedures for mixing the sludge and MSW waste. In July 2009, there was a small waste slope failure in Module G and since that time TDEC noted additional leachate breakouts within the area. Santek revised operational procedures and made modifications to the leachate collection system in Module G at that time to address the TDEC concerns and to better manage leachate at the site. On 3 November 2010, a waste slope failure occurred, estimated by Santek and TDEC to involve approximately 100,000 yd³ of waste. As noted by TDEC, a portion of the head scarp of the slide was located at the approximate location of the July 2010 failure. Additionally, TDEC noted that the toe of the slide was located in areas where leachate breakouts previously occurred. Some of the waste involved in the failure was deposited on an unlined portion of the site.

In response to the failure, Santek took the following immediate actions:

- notified TDEC and LCSWDC on 3 November of the failure and the immediate remedial actions proposed by Santek;
- constructed a berm on 3 November at the toe of the failed area to contain all the waste involved in the failure;
- constructed stormwater diversion berms around the failed area on 3 and 4 November to minimize stormwater run-on into the failed area;
- installed pumps on 4 November within the contained area to pump collected liquids to pipes in the leachate collection system;
- completed excavation activities on 11 November to investigate the potential impacts to the anchor trench and liner system within Module G; and
- initiated efforts to safely regrade the waste (including the highwall at the head scarp) and place soil cover over the exposed waste.

Santek addressed each of these tasks aggressively and the last of the rehabilitation activities (i.e., soil cover over exposed waste) was completed by approximately 20

November. Since that time, Santek has worked in collaboration with TDEC, LCSWDC, and Geosyntec to: (i) assist in assessing the cause of the failure; (ii) implement short-term excavation activities to control and manage leachate; (iii) maintain the integrity of the soil cover that was placed in the failed area; and (iv) install and survey surface monitoring points used to assess areas of ongoing slope movements.

Geosyntec visited the site on 9 November 2010 and met with representatives of Santek and with Mr. Steve Field of the LCSWDC. Geosyntec met with the entire LCSWDC on the evening of 9 November 2010 at its regularly scheduled monthly meeting. In an 18 November 2010 letter to Geosyntec, the LCSWDC reported that TDEC requested that an independent investigation of the failure be performed and that the assessment encompass and address the following five points: (i) root cause investigation and assessment of the MSW slope failure; (ii) subsequent plan on how to fix and stabilize the cell; (iii) information about operational/design elements or waste handling practice changes; (iv) confirmation of liner integrity and functionality of the leachate collection system within the affected area; and (v) an interim report for delivery to TDEC. Geosyntec met with the LCSWDC on 23 November 2010 to make a presentation titled Preliminary Assessment, Landfill Slope Failure, Matlock Bend Landfill, Loudon County, Tennessee. Since this meeting, Geosyntec has had numerous contacts with TDEC and with Santek. As requested by TDEC, Geosyntec prepared and submitted a 4 January 2011 report titled Interim Status Report, Slope Failure at the Matlock Bend Landfill (Interim Status Report). Geosyntec augmented the Interim Status Report and prepared this current Report to meet the requirements identified in TDEC's Order, and is specifically intended to: (i) assess the root cause of the failure; (ii) identify short-term recommendations; and (iii) provide long-term recommendations.

1.3 Report Organization

Following this introductory section, the remainder of this Report is organized to provide the information required by TDEC in the Order. Specifically, the remaining sections are organized as follows.

Section 2 - Initial Compilation of Information and Preliminary Assessment:
 This section presents a compilation of information from Santek's operating records that may facilitate assessing the cause of the failure, including



construction records, operational records, TDEC inspection reports, and several post-failure observations.

- Section 3 Assessment of Root Cause: Building on information from Section 2, this section presents the results of slope stability analyses and the results of a slope monitoring program that were instituted after the failure. These results were used to develop and support an assessment of the root cause of the failure.
- Section 4 Short-term Recommendations: With a knowledge of the likely cause
 of failure, it was possible to identify activities that could be implemented by
 Santek in the short-term to improve stability in the failure area, while
 supplemental long-term stabilization alternatives could be developed and
 assessed. Section 4 was prepared to identify these short-term rehabilitation
 activities.
- Section 5 Long-term Recommendations: This section identifies specific long-term rehabilitation measures that could be implemented to improve the long-term stabilization of the area and to minimize the likelihood of another slope failure. Both design and operational recommendations are identified.
- Section 6 Summary and Conclusions: This final section provides a brief summary of the project and concluding comments regarding the failure and the stabilization measures that have either occurred or that are proposed.

Appendices to this Report present several of the documents referenced in the text of the Report and include the following:

- Appendix A: Waste Receipt Records;
- Appendix B: TDEC Site Inspection Reports;
- Appendix C: Anchor Trench Survey Results;
- Appendix D: Leachate Generation and Precipitation Records;
- Appendix E: Slope Monitoring Point Records;
- Appendix F: Slope Stability Calculation Results; and



• Appendix G: *Proposed Sludge Management Procedures for the Matlock Bend Landfill* (after Santek, 2011).

2.0 COMPILATION OF INFORMATION AND PRELIMINARY ASSESSMENT

2.1 <u>History of Activities in the Area</u>

As part of the background investigation, Geosyntec obtained records from Santek and other sources regarding the development of Module G, waste characterization and acceptance since 2009, recent seismic activity, and any noted pre-failure observations that may be relevant to this assessment. A summary of the compiled information follows.

Development of Module G: As mentioned previously, the MBL was permitted in August 1997 to operate as a Class I landfill by TDEC. However, Module G was not constructed until 2009, and even then only a portion of Module G was lined to accept waste. A plan view of the site, showing the delineation of the modules is presented in Figure 1. This figure also delineates the approximate boundaries of the failure area. Figure 2 presents an enlarged plan view to show the waste slope failure area. A section line (i.e., Section 2+00) is also delineated on this figure. Figure 3 provides a crosssection along Section 2+00. This figure also shows: (i) liner base grades in Modules B and G along the section line; (ii) waste grades from the 29 September 2009 annual aerial survey; (iii) grades from a 1 October 2010 annual aerial survey; (iv) post-failure location of the initial containment/stabilization berm and the approximate post-failure topography; and (v) post-failure surface topography from the 27 November 2010 aerial It is noted that the post-failure aerial topography was obtained after construction of the initial containment/stabilization berm and after much of the immediate-action remedial grading was initiated. Furthermore, it is noted that the prefailure (i.e., working) interim slopes within Module G were being constructed at approximately a 4.5 horizontal to 1 vertical (4.5H:1V) slope or flatter. This slope is significantly flatter than the approximately 3H:1V slopes observed elsewhere at the site.

Waste Characterization and Acceptance Since 2009: Santek provided information to Geosyntec regarding the types and amounts of waste received at the MBL since 2009. This information is provided in Appendix A. It appears that over the approximately two-year time period that waste was placed into Module G, that the ratio of "MSW and Other Special Waste" to "Sludge" is approximately 60/40. Santek reported that upon receipt at the MBL, the sludge waste was mixed in-place with MSW and other special

waste before it was placed and compacted. Santek reported that at times, the frequency of sludge receipts would exceed those of MSW. During these time periods, Santek reported that it was often difficult to have sufficient quantities of materials to mix with the sludge, although they would eventually get the materials mixed so that they could be adequately compacted. The relatively flat interim slopes previously referenced likely relate to operational practices that were implemented in consideration of the high sludge content of the incoming waste.

<u>Potential Seismic Activity</u>: The Eastern Tennessee Seismic Zone (ETSZ) is known to produce small but measureable earthquakes in the Knoxville, TN area. It is acknowledged that local earthquakes could serve as a "trigger" for slope instability. Geosyntec reviewed several local and national websites that report local seismic activity, including http://www.ceri.memphis.edu/index.shtml and did not find any reports of seismic activity in the area prior to the failure.

Pre-failure Observations: In discussions with Santek on-site personnel, it was reported that they had had problems with leachate breakouts for several months before the failure. This information is consistent with information presented in the TDEC Inspection Reports (to be discussed subsequently). Santek also reported that they had observed some small cracking of the ground surface that they would have to track in periodically to re-seal the surface. Importantly, Santek reported that on the day before the failure (i.e., 2 November 2010), they had observed some significant local bulging and leachate breakouts at the "bench" located at approximate elevation 955 (see Figure 3), despite the relatively flat 4.5H:1V interim slopes. Attempts were made to locally regrade this waste during the day, but it was noted as being relatively wet and difficult to compact. The failure occurred in the area of the local bulge and leachate breakout early the following morning (i.e., 3 November 2010).

2.2 Correspondence from TDEC

Santek provided to Geosyntec copies of the TDEC inspection reports for the MBL for the time period of 7 January 2008 through 3 November 2010. These reports are attached in Appendix B. These records indicate that leachate breakouts were noticed on several different inspection visits, but also that Santek had taken steps to address the problems each time the breakouts occurred. TDEC also acknowledged the relatively



high percentages of sludge and that mixing was being achieved, but that the mixing was difficult.

2.3 <u>Leachate Collection System Rehabilitation</u>

Santek provided Geosyntec with a copy of the September 2010 report prepared by Atlantic Coast Consulting, Inc. (ACC) titled *Final Certification Report, Construction Quality Assurance Services, Matlock Bend Landfill, Module G Leachate Drainage Modification, Loudon County, Tennessee* (CQA Report). This report identifies the modifications that were made to the leachate collection system (LCS) in the lower reaches of Module G, near the Module G/B intersection. ACC monitored the repairs to the LCS and confirmed that the LCS was performing properly at the end of the modification. TDEC was provided a copy of this CQA Report on 30 September 2010, so it is not included in this Report.

2.4 **Photographs and Post-slide Observations**

Santek and TDEC provided CDs that contained photographs of the site at and around the time of the failure. Most of the photographs are dated to show when the photo was obtained. As TDEC has photographic documentation of the failure and access to the Santek photographs, the photographs were not reproduced as part of this Report. CDs of the photographs (or reprinted hardcopies) will be provided upon request. These photographs document the overall shape of the failure mass and the consistency of the waste. The following significant observations are noted on Geosyntec's initial site visit on 9 November 2010:

- The slope of the surface of the waste within the failure area was very flat. It was
 difficult to measure the slop, but in general, it appeared to be on the order of five
 degrees.
- There were pockets of standing leachate within the failed waste mass and the waste at the toe of the failed area was noticeably wet.
- Concentrated zones of sludge could be observed near the bottom of the excavated waste mass, but in general the waste appeared to reasonably well homogenized in the failure area.

• Waste at the toe of the failed area was being excavated and relocated to other recently lined areas on the northern side of Module G. The excavated waste slope at the toe of the failed area was temporarily cut to a relatively steep 2 horizontal to 1 vertical (2H:1V) slope. This excavated slope generally appeared to be relatively stable, in that it did not give the appearance of actively moving.

2.5 Investigation of Anchor Trench

One of the initial significant concerns regarding the failure was whether the liner system in Module G had been impacted as a result of the failure. Santek worked aggressively to assess the location and condition of the anchor trench. After the failure, Santek worked to relocate the waste that had been deposited off of the lined area to the newly lined northern side of Module G. As the excavation approached the location of the Module G anchor trench, the alignment of the as-built location of the anchor trench was flagged and operators were careful in excavating waste from this area. operators were able to carefully excavate the waste and "daylight" the anchor trench on 11 November 2010. The current alignment of the anchor trench was located by field survey. Santek plotted these survey locations on the previously surveyed as-built alignment of the Module G anchor trench. Review of these results indicates that the Module G anchor trench is in the same location as when it was originally constructed. The Santek comparison survey results are presented in Appendix C. confirm that the failure did not adversely impact the anchor trench. Geosyntec interprets the fact that the anchor trench was not impacted as direct evidence that there is similarly no adverse impact to the liner system.

2.6 Assessment of Leachate Generation Rate

Geosyntec requested that Santek provide records regarding the leachate generation rates over the recent past. Leachate generation and precipitation records from the MBL dating from January 2008 through October 2010 were provided. A summary of these records and related time trend plots are provided in Appendix D. Review of this information provides the following observations:

• There is a strong correlation between the incremental precipitation and leachate generation. In other words, for months when there is a significant amount of rain, there is a similar significant amount of leachate generated.

- The cumulative time trend plot indicates that the leachate generation quantity increases at a slightly reduced rate compared to the precipitation. This trend is to be expected as the thickness of waste increases.
- There does not seem to be any marked reduction in the leachate generation trend that would be indicative that the LCS is not functioning.

2.7 Preliminary Assessment

In consideration of the information presented in this section, Geosyntec previously indicated to TDEC in the Interim Status Report that: (i) the waste slope failure was likely caused by the coupled effects of infiltrating precipitation and high percentages of sludge, resulting in a flow slide; and (ii) the waste slope failure did not adversely impact the liner or the operation of the LCS. The more thorough review of information identified in this section does not change this preliminary assessment. In fact, as will be seen in the following section, Geosyntec believes that the preliminary assessment is completely consistent with the data that have been collected and provided to date. Furthermore, the combination of liquids and sludge will be shown to be important contributors to the root cause assessment.

3.0 ASSESSMENT OF ROOT CAUSE

3.1 <u>Initial Slope Stability Analyses</u>

Initial slope stability analyses were performed that considered the pre-failure slope geometry within Module G, as well as the post-failure geometry of the slide mass. The focus of these initial analyses was to assess the relative sensitivity of the calculated factor of safety (FS) to assumed waste properties of unfailed waste and the waste within the failure area. These analyses also assessed the relative impact of the assumed level of liquids (i.e., water/leachate) in the waste. The initial results indicate the following significant observations regarding the likely failure mechanism and the role of liquids on the failure:

- Likely Failure Mechanism: The initial slope stability analysis results indicate that the most likely potential failure surface is not the result of a deep-seated failure mechanism that would impact the liner and anchor trench. Rather, calculation results indicate that the most critical potential failure surface likely exists approximately 20 to 25 feet above the elevation of the anchor trench. The significance of these results is that the toe of the pre-slide waste slope in Module G may not have been impacted by the waste slope failure. Rather, these results indicate that failure mass may have simply slid over the top of this waste slope, essentially burying the existing waste slope and the anchor trench in the process of sliding off of the lined area. These initial observations are consistent with the previously reported findings that the anchor trench was not impacted by the failure.
- Role of Liquids: Liquids in the waste include precipitation and moisture that might be released from the sludge upon compaction. Regardless of the source of the liquids, they have the ability to adversely impact slope performance in that they reduce the effective stresses in the waste and can potentially reduce the waste strength. As noted previously, leachate breakouts were a persistent problem in Module G and the post-failure observations included wet waste and pockets of essentially "free liquids" that were not being effectively conveyed to the LCS. The slope stability calculation results considered relatively high levels of liquid in the waste. Two important observations regarding these liquids are noted: (i) the resulting approximately five percent slope of the post-failure



surface of the waste in the failure area is indicative of a "flow type" slide that is driven by the release of liquid and not an inherently "low strength" material; and (ii) the resulting relatively steep post-slide excavated slope at the toe of the failed area indicates that these liquids have now (at least temporarily) drained, thus allowing the strength of waste to effectively buttress the upper reaches of the failure area.

The subsequently reported slope monitoring program and initial dewatering trenches were specifically planned to confirm these calculation results, which form the initial basis for the root cause assessment of failure. All slope stability calculation results (including these initial results) are referenced subsequently and provided in appendices.

3.2 Slope Monitoring System

Shortly after the failure, the entire failure area was regraded, including the waste highwall that formed the head scarp of the slide. Soil cover was then placed to help control leachate and to minimize problems related to odors and vectors. To help identify the limits of the failed area and to observe the potential for ongoing movements in the underlying waste, a surface slope monitoring program was developed by Geosyntec. The locations of surface monitoring points were provided to Santek, at which point they were installed and monitored by the independent site surveyor. Results were provided to Santek who compiled the readings and provided the survey results to Geosyntec for assessment. The locations of the survey points are shown in Figure 4. The survey records are tabulated and time history presentations of the individual and group survey points are presented in Appendix E. These results confirm the lateral limits of the failure and are generally consistent with the previously identified failure mechanism, which concluded that the flow slide occurred above the elevation of the anchor trench. The waste in the lower reaches of the failed area show little indication of ongoing movement or creep. While most of the surface monuments show very little indication of ongoing creep movement, the surface monuments located in the center of the slide area indicate relatively small, but measureable, amounts of downhill creep. These survey results have been monitored carefully and the slopes in the vicinity of these monuments have not shown any indication of another impending waste slope failure. The pattern of the ongoing slope movements were used to help assess the root cause of failure.

3.3 Excavation of Water Control Trenches

The investigation of the potential failure mechanism using a conventional geotechnical drill rig and/or gas well rig was considered, but was somewhat complicated by the soft character of the ground surface caused by the amount of liquids in the waste. This would likely limit the size of equipment that could be mobilized to conduct the investigation. In addition, the quantity of liquids in the waste was anticipated to impact the stability of the borehole/trench used to facilitate a deep investigation through the failure area. An alternative exploration program was developed that capitalized on the geometry of the potential failure zone. Specifically, slope stability analysis results previously referenced indicated a relatively shallow flow-type failure mechanism. Utilizing this geometry, two trenches were located in the central portion of the failure area where the depth from the current regraded ground surface to the bottom of the failure surface was estimated to be less than ten feet. It was anticipated that the waste in this 10-ft thick zone would be very wet and likely have some free liquids, as the bottom of the sliding surface may currently consist of "smeared" sludge and waste that would impede the vertical flow of liquids to the LCS. To help control the liquids within the waste mass and to investigate the potential failure mechanism, Santek excavated a northeast-southwest trending trench through the waste during the week of 20 December. The trench was backfilled using limestone wrapped in a geotextile separator to facilitate drainage and gas vents were installed and extended to the ground surface at several locations. A second exploratory trench was advanced on 5 January 2011. TDEC was onsite to meet with Santek and Geosyntec and to witness part of the excavation. Upon completion, this trench was backfilled using a geotextile-wrapped limestone and a few gas vents were again installed. The location of the two trenches is shown on Figure 5. Based on first-hand observations during the excavation of the second trench, Geosyntec made the following observations:

- Commencing from the western side of the failed area, the trench was easily
 excavated and the waste was relatively dry. As the trench proceeded to the east,
 the waste became wetter and the depth of the wet waste increased. Free liquids
 were observed to flow into the trench, which impeded the placement of the
 geotextile and limestone.
- Despite the difficulty in rock placement, free liquids were observed to flow from the exposed end of the geotextile-wrapped limestone. There were noticeable



zones of sludge near the bottom of the trench and the liquids seemed to be flowing into the trench on top of the sludge layer in many locations. In some cases the sludge was soft and thick enough to be "extruded" into the trench.

• The large amount of free liquids and the soft waste limited the depth of the excavation. It was anticipated that this trench could be advanced to a sufficient depth to "breech" the failure surface and facilitate the vertical conveyance of some of the free liquids into the LCS. Rather, it seems that the trench will serve a function to allow lateral transmission of the liquids in the rock and the subsequent conveyance of the liquids to the leachate collection sump.

3.4 Final Slope Stability Calculation Results

The initial slope stability calculation results referenced previously provided significant insight into the potential failure mechanism. The subsequent slope monitoring results and the observations from the dewatering trench excavation tended to confirm the hypotheses from the original slope stability assessment. A comprehensive evaluation of the global slope stability within Module G was performed as part of this Report. Results are presented in Appendix F and summarized as follows:

- Analyses were performed along Section 2+00, which was aligned along the long (i.e., northwest-southeast trending) axis of the failure area. The analysis cross-section included the constructed liner grades and anchor trench, as well as the waste grades from the 2009 and 2010 aerials. It was possible to develop an analysis cross-section in the area immediately prior to 3 November 2010 slide.
- Calculation were performed to assess sensitivity to liquid levels, location and orientation of weak interface, and waste/sludge strength. Results indicate that the most likely failure surface coincides with a relatively shallow failure surface within the waste mass and that the resulting calculated FS is very sensitive to liquid levels within the waste.
- It appears that the most likely failure surface would have daylighted at the crest of the small bench at approximate elevation 955. However, as there was an approximately 4.5H:1V existing slope below this bench, the waste tended to flow over this crest towards to northwest until it could develop a self-supporting toe that would buttress the remainder of the waste in the failed area.

• As the failure was likely caused by an increase in liquid level, the failure likely dissipated much of these liquids, resulting in a short-term increase in strength of the waste mass (at least until the liquid levels build up once again.

Geosyntec notes that the very flat post-failure grades in the waste support the opinion that this was dominantly a flow failure, indicating that liquids accumulating in this portion of Module G were not effectively being conveyed to the LCS. It s likely that the base of the flow slide involved zones of sludge that are now "smeared" along the failure surface, thus further restricting the vertical percolation of liquids into the LCS.

With a knowledge of the causal mechanism, the approximate location of liquids, and the condition of the waste in the failure area, it was possible to perform slope stability analyses to assess potential rehabilitation strategies. These results are also presented in Appendix F. These results indicate that a stable slope within the failure area can be achieved if the liquid levels are effectively controlled and if an intact buttress is constructed at the toe of the failure area. Subsequent short- and long-term recommendations for rehabilitation present alternative strategies for providing adequate stability in this area, as well as contingency strategies should additional problems be encountered.

3.5 Assessment of Root Cause of Failure

The observations made by TDEC prior to the failure, the local stability problem encountered on 2 November 2010, and the results of the post-failure observations and analyses all support an understanding of the root cause of the 3 November 2010 failure of the MBL. The root cause assessment includes the following:

- The root cause of the failure was due primarily to increased liquid levels in the Landfill that were not being effectively conveyed to the LCS. It is anticipated that these liquids were in part a result of the large amount of sludge that was being placed, mixed, and compacted at the MBL.
- The sludge-mixed waste was likely wetter and weaker than waste placed in other portions of the landfill and weaker than waste that is typically expected at MSW landfills. This provides a likely explanation of the flatter-than-expected working slopes in Module G, as well as a reason why the "conventional"



techniques for managing liquids and leachate breakouts were not as effective as anticipated in the months prior to the failure.

- Once the waste in the failure area started to creep downhill due to the ongoing waste placement activities, it is likely that the sludge-rich zones started to "smear" along localized planes. This had the effect of further reducing the ability of the liquids to vertically percolate into the LCS and tended to result in local zones of weakened waste. As more movement occurred the problem was exacerbated, resulting in an accumulation of more liquids and the "enlargement" of the weakened sludge-rich zone.
- This continued movement likely facilitated the release of the liquids, which contributed to the "flow slide" on 3 November 2010. As the material slowly flowed downhill over the elevation 955 crest, the high liquid levels in the upper reaches of Module G tended to dissipate, which then contributed to a short-term increase in strength. The liquids tended to migrate downhill and accumulated in the failed waste mass. Because the resulting flow surface was so flat, it only required a small buttressing resistance to temporarily increase the stability of the failure waste. The dissipation of the liquid levels in the failed waste also explains why the sludge-rich waste is currently "stable" and able to stand on much steeper (i.e., 2.5H:1V) slopes at the toe of the failure area.

Geosyntec believes that the observations and data that have been compiled are completely consistent with this assessment of the root cause. Importantly, this root cause also provides significant insight regarding the potential rehabilitation strategies for Module G that will help provide TDEC, the LCSWDC, and Santek with a measurable assurance that adequate short- and long-term stability can be achieved in the failure area

4. SHORT-TERM RECOMMENDATIONS

Excavation of Permanent Dewatering Trench

As summarized in the previous section, the accumulation of liquids is believed to be at the heart of the failure. Therefore, the effective control of these liquids is believed to be a major component of the solution. One part of the solution is to minimize the accumulation of the liquids, which can be achieved by stormwater run-on control and the effective use of interim cover, tarps, etc. These are largely operational factors under the direct control of Santek. A complementary concept to minimizing the future migration of liquids into the module regards dewatering the existing waste. To effectively dewater the waste in Module G, two potential solutions are recommended.

- Permanent Dewatering Trench: The installation of the two temporary trenches in Module G facilitated the conveyance of liquid from the failure area to the leachate collection sump. To provide even better control of liquids, it is recommended that a permanent dewatering trench be installed between the two previously installed trenches. This trench would be wider and deeper, specifically deep enough to extend below the failure surface and allow liquids within Module G to be conveyed to the LCS. Effectively, this dewatering trench would serve as a passive drain for the accumulated liquids in the failure area. The operation of the trench would require no maintenance once installed. The trench would be constructed to breach the failure surface and replace the excavated waste with a geotextile-wrapped, free-draining rock. The trench would be excavated across the entire width of the failure area.
- Vertical Gas Wells: An alternative solution for conveying liquids to the LCS is to use large-diameter gas wells to breach the failure surface. This technique is expected to be successful, but the number of wells is at present not known. Furthermore, because these wells will "attract" liquids, they would likely have to be developed as dual (i.e., liquid and gas) extraction wells. This implies that as the area is filled, the wells will need to remain "active" and have to be extended vertically as additional waste is placed in Module G.

One of the biggest advantages of either of these techniques is that piezometers, observation wells, observation trenches, etc. can be used to verify that liquids are being effectively managed and controlled. Geosyntec recommends that some form of liquid-



level observation be included with either of these selected alternatives. Over time, it is anticipated that the liquid levels will reduce in the failure area. If they do not, than additional actions will need to be taken to assure that liquid control measures are functional.

4.2 Stabilization Options

Liquid level control is perhaps the most important stabilization option, as this effectively "stabilizes" the waste. Short of removing all of the waste within the failure area (an option not favored by Geosyntec), there are other options that should be considered. The best of these options is the use of a stability berm at the toe of Module G. The stability berm serves the following two important functions:

- *Toe Buttress*: A stability berm at the toe of Module G effectively provides a buttress at the toe of the failure area. This buttress can be constructed of either soil or waste to achieve a strong "block" at the toe of the slide. Subsequent potential failure surfaces (should they develop) would have to shear through this buttress before another waste slope failure could occur. Recall that one of the immediate actions after the failure was the rapid construction of a toe buttress at the toe of the failed waste to help contain the waste. Calculation results regarding slope stability confirm that the toe buttress is effective at improving the short- and long-term stability without excavating additional waste in the failure area (see Appendix F).
- Flat Waste Slopes over the Failure Area: One of the benefits of the toe buttress, is that it then allows waste to be placed against the buttress and over the existing waste in the failure area, effectively reducing the slope of the waste surface while increasing the vertical stress. These two factors work to increase stability. With comparison to a non-buttressed slope, the flatter slope effectively reduces the driving forces, while the additional mass increases the vertical stress, which increases the shear strength of the frictional waste materials. This increased vertical stress also tends to consolidate the waste, thus reducing the moisture content of the waste. This beneficial effect is realized throughout the waste column, including across the zone that was smeared during the failure.

4.3 Stabilization Berm Considerations

For the rehabilitation of Module G, several stabilization berm options were considered. Stability analyses were performed to assess the impact of the strength of the berm, the height of the berm, and the location of the berm. The primary options that were considered as primary options include: (i) waste berm within Module G; (ii) soil berm outside of the limits of Module G; and (iii) waste berm outside of the limits of Module G. Each of these options has distinct advantages and disadvantages from the perspective of construction, airspace utilization, and permitting, as will be discussed briefly.

- Waste Berm within Module G: The advantage of this option is that no airspace would be lost and that construction could proceed quickly within an existing permitted area. Additionally, since well-compacted waste can be stronger than soil, the benefits of the stronger waste can be realized. The primary disadvantage of this option is that construction would be occurring directly adjacent to the toe of the excavated failed waste, which complicates construction and requires a larger berm for a given increase in stability compared to the option where a berm is constructed outside of the limits of the existing cell.
- Soil Berm outside the Limits of Module G: This option has the advantage of requiring a lower height for a given increase in the calculated FS, compared to an in-cell option. This also has the advantage of being able to be implemented quickly and without the need for additional permitting. The disadvantages of this option include the loss of airspace and the need to line the inside edge of the berm and provide leachate collection at the base of the inside edge of the berm.
- Waste Berm outside the Limits of Module G: This option includes the advantages of the soil berm option and has an added advantage that it would be possible to utilize higher strengths if a select waste (i.e., non-sludge) is used to construct the berm. The problem regarding lining of the inside face of the berm is eliminated and replaced by the need to install/extend a liner at the base of the failure area to facilitate leachate collection. Because the construction of the waste berm is beyond the limits of Module G, it will be possible to locally remove waste from Module G to inspect the integrity of the LCS in Module G. Because the LCS will require modification to implement this alternative, it will



be convenient (and necessary) to make this inspection and assessment. As the areas outside of Module G (i.e., Modules H and I) are currently permitted, but as yet unlined, a permit modification to allow installation of the base liner in a small section of existing Module H is required.

Geosyntec believes that the option of a waste berm outside of the limits of Module G represents the best short- and long-term solution regarding stabilization of Module G. Stability calculations indicate that an approximately 30-ft high waste berm provides a sufficient buttress. Additionally, these results indicate that 4H:1V waste slopes that are tied into the buttress and which include 10-ft wide benches at 30-ft vertical intervals can provide an acceptable long-term calculated FS for Module G. This recommendation is predicated with the acknowledgment that a permit modification is necessary and that well-compacted, MSW that does not contain sludge is available for construction of the berm. Geosyntec understands that Santek has submitted a Minor Permit Modification Application to TDEC to accommodate this recommendation, recognizing that the alignment and labeling of Modules H and I are included in this application.

4.4 <u>Investigation and Rehabilitation of Leachate Collection System</u>

As previously noted, a review of the records from the LCS at the MBL indicate that the historical and recent pre-slide leachate generation rates are completely consistent with the rates anticipated for a landfill in a similar stage of operation. Leachate generation is strongly consistent with precipitation events. Therefore, there is not an indication of a "wholesale failure" of the LCS. Nevertheless, the root cause premise indicates that locally, the liquids within Module G are not being effectively conveyed to the LCS within Module G. Based on observations from the site, Geosyntec believes that this is due to the adverse impacts of the sludge within the module and not to a failure of the LCS. The recommended construction of the dewatering trenches and the monitoring of liquid levels in the landfill are anticipated to provide verification of the role of the sludge in affecting liquids management. Geosyntec acknowledges that the LCS design for the MBL includes a "cascading" series of leachate collection pies and trenches. There is little redundancy in the current LCS at the facility. Furthermore, Geosyntec recognizes that the LCS for Module G was recently modified to improve performance. The root cause assessment indicates that the liner was not adversely impacted, but Geosyntec recognizes that the leachate collection piping network may have been impacted by the waste that flowed over the top of riser pipes. Therefore, Geosyntec



recommends that waste at the base of Module G be excavated to allow inspection and confirmation of the integrity of the LCS. This activity would be conducted once a final decision regarding the stability berm is made by TDEC, so that the leachate system modification required by the toe buttress construction can be made at the completion of the inspection. The inspection will focus of the integrity of the LCS pipes, the amount of gravel around the pipes, and the confirmation of liquid conveyance in the LCS at the inspection location. The failure to physically observe leachate flowing on the LCS would necessitate further investigation of the LCS. It is imperative to the long-term stabilization that the LCS in Module G is confirmed to be fully functional.

4.5 Grading and Interim Cover

Currently, soil cover has been placed in the failed area to help minimize odor and vector impacts. As part of these short-term rehabilitation measures, it will be necessary to excavate waste and to then place waste into the buttressed cell. The stability calculations specifically considered grades of 4H:1V with 10-ft wide benches incorporated at 30-ft high vertical intervals. In addition, to provide somewhat of a redundant increase in stability, Geosyntec has recommended that sludge not be mixed with waste within the outer 50 feet of a landfill permanent slope and that newly placed waste be "keyed" into existing waste. Additional discussion regarding these recommendations is presented in the section regarding the Sludge Management Plan and long-term grading recommendations.

4.6 <u>Monitoring System</u>

As discussed previously, a series of surface monuments have been monitored regularly since the failure. It is recommended that a similar slope monitoring system be developed as part of the rehabilitation measures. The details of this system will be finalized when the findings, results, and recommendations presented in this Report are discussed with TDEC, as it is anticipated that TDEC may have specific requirements after its review of this Report. The concept of the slope monitoring system will be to install monuments in strategic areas that will not be adversely impacted by waste placement operations. This will likely mean that some points will be installed to monitor performance in advance of waste placement to confirm the impacts of these stabilization efforts and then new survey monuments established after waste placement to continue the stabilization monitoring activities. Survey monuments will also be

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installed on the stability berm itself. The frequency of the readings will be established depending on the location and the time-history of movements in specific areas, but will likely include at least one reading for each two-week time period. In addition to the slope monitoring program, liquid levels will also be monitored, as previously discussed. These results will be incorporated into the final stabilization and performance monitoring program.

5. LONG-TERM RECOMMENDATIONS

5.1 Sludge Management Plan

As described in the root cause assessment, liquids appear to have had the biggest impact on the stability of Module G. The fact that these liquids also occurred in a module that accepted large amounts of sludge was viewed to also represent a major factor in the instability. Measures were previously identified to control the liquids. To help control (and minimize) the potential adverse impacts of sludge that is received at the MBL, Geosyntec recommended that Santek develop a site-specific and waste-specific sludge management plan for the MBL. Santek has prepared a document titled Proposed Sludge Management Procedures for the Matlock Bend Landfill (Sludge Management This document is provided in Appendix G. Geosyntec has reviewed this document and believes that the proposed approach is appropriate for the management of sludge at the MBL. The Sludge Management Plan includes specific measures for quantifying the amount of sludge that will be placed in the landfill and requires that waste-specific mixing protocols be developed. At this stage, it is premature to identify specific procedures, however, upon approval by TDEC of the identified strategy, Geosyntec will work with Santek to develop the recommended sludge mixing and placement protocols. The Sludge Management Plan also identifies the 50-ft wide offset distance from the outer permanent slopes for sludge placement, as this is anticipated to minimize the impacts of leachate breakouts and future instability.

5.2 Staging of Waste and Sludge Placement

The slope stability calculation package included in Appendix F provides results for the stability berm and the interim waste slopes that are used to improve the stability of Module G. The Sludge Management Plan in Appendix G describes specific recommendations for mixing and staging waste placement. As these topics were previously described, they will not be repeated herein. Suffice to say that if these guidelines are followed, Geosyntec believes that long-term stability is provided and that the likelihood of additional stability problems at the MBL is minimized.

5.3 Stabilization Berm Requirements

Options for the stability berm have been identified in Section 4. It is anticipated that TDEC will provide approval of at least one of these options. Construction requirements



will be identified prior to implementation. Specific points that will be addressed include the selection of materials for the berm and compaction requirements for the construction materials. As described previously, Geosyntec believes that a well-compacted, 30-ft high stabilization berm comprising sludge-free MSW is the best option considering the relative advantages and disadvantages of the various options. This option was selected to provide what is believed to be the optimal short- and long-term options regarding slope stability.

5.4 Stormwater Run-on Control

As stormwater management is of paramount importance at any landfill site, it should go without saying that appropriate measures are required to control surface water run-on. With regards to the stabilization of Module G, Geosyntec recommends that the existing stormwater run-on control systems be revisited and that the integrity of these systems be aggressively maintained. As described in the root cause assessment, liquids played a critical role in the failure, whether these liquids were directly, indirectly, or not related to surface water run-on. It is imperative that liquids be diverted to the maximum extent possible from the failure areas in Module G, as the failure has likely caused a local impediment to the vertical infiltration of liquids into the LCS.

5.5 Leachate Collection System Modification

Geosyntec understand that Santek has submitted a Minor Permit Modification Application (Minor Mod) for the construction of Module I-A located outside and contiguous to Module G. This modification will facilitate the construction of the stability berm. The activities identified in the Minor Mod will also require that the LCS for Module G be modified to accommodate the modified grading plans. As described previously, Geosyntec recommends that the existing operation of the LCS in Module G be confirmed prior to (or simultaneously with) implementation of the Minor Mod activities. In addition, Geosyntec recommends that future modules at MBL be designed to accommodate sideslope risers in the LCS design and/or redundant features in the event of the inadvertent compromise of the "cascading" LCS currently in place at the MBL.

5.6 Modifications to Modules G and B

As mentioned in the previous section, Geosyntec understands that Santek has requested a Minor Mod for Module G and Module I-A. This modification will accommodate the construction of a 30-ft high stability berm on a newly lined area in Module I-A and the placement of waste in Module G that engages the stability berm. Waste would be placed on a 4H:1V interim (or final) sideslope, incorporating 10-ft wide benches at 30ft vertical intervals. The proposed grading plans discussed between Geosyntec and Santek would result in placing waste over the entire failure area to increase the normal stress and enhance stability. In addition, this grading will also extend above the elevation of the failure area to the current crest of Module G and Module B, resulting in the supplemental "buttressing" of areas in the upper reaches of these slopes that currently show potentially adverse indications of sludge placement (i.e., local bulging). Buttressing these areas as part of the Module G stabilization activities is a component of the overall site strategy. Finally, Geosyntec understands that Santek is considering a potential modification of the subsequent cells at the MBL and has submitted a Major Permit Modification (Major Mod) request to TDEC (currently in suspended review). Santek provided proposed grading plans for the MBL in the Major Mod. As these proposed future grading plans provide even more buttress to the failure area, Geosyntec concurs that the long-term development of the MBL as proposed by Santek in the Major Mod does not present any adverse impacts to the failure area, nor does the failure area adversely affect the proposed long-term development plans, provided (of course) that the other short- and long-term recommendations are followed.

5.7 <u>Monitoring System</u>

As described in Section 4, short-term monitoring of slope movement and liquid levels are recommended. Until the slope movements are confirmed to have stopped and the water levels drop below the elevation of the failure surface, Geosyntec recommends that performance monitoring of the slopes and the water levels be included at the MBL. Details of these plans will be provided after discussion with TDEC regarding the short-and long-term approved plans for the site.

6. SUMMARY AND CONCLUSIONS

6.1 **Summary**

This report was prepared to provide an assessment of the root cause of the 3 November 2010 waste slope failure at the MBL. Data were provided by TDEC, Santek, and Geosyntec as part of this assessment. Importantly, TDEC noted chronic problems in the recent past within Module G regarding leachate breakouts and a recent local instability. TDEC also recognized that the MBL has relatively high percentages of sludge in the incoming waste streams. The data were consistent and proved invaluable in assessing the root cause. In summary, the root cause assessment was presented in Section 3.5 of this Report. Specifically, Geosyntec believes that the root cause of the failure was due primarily to increased liquid levels in the landfill that were not being effectively conveyed to the LCS. It is anticipated that these liquids were a result of the large amount of sludge that was being placed, mixed, and compacted at the MBL. The sludge-mixed waste was likely wetter and weaker than waste placed in other portions of the landfill and weaker than waste that is typically expected at MSW landfills. Once the waste in the failure area started to creep downhill due to the ongoing waste placement activities, it is likely that the sludge-rich zones started to "smear" along localized planes. This had the effect of further reducing the ability of liquids to vertically percolate to the LCS and tended to result in local zones of weakened waste. As more movement occurred the problem was exacerbated, resulting in an accumulation of more liquids and the "enlargement" of the weakened sludge-rich zones. continued movement likely facilitated the release of the liquids, which contributed to the "flow slide" on 3 November 2010. Importantly, the failed material slowly flowed downhill over the existing waste and essentially buried the existing toe of the Module G slope and the anchor trench. Geosyntec does not believe that the existing anchor trench or the liner integrity was compromised as a result of the failure, as confirmed by postfailure survey measurements.

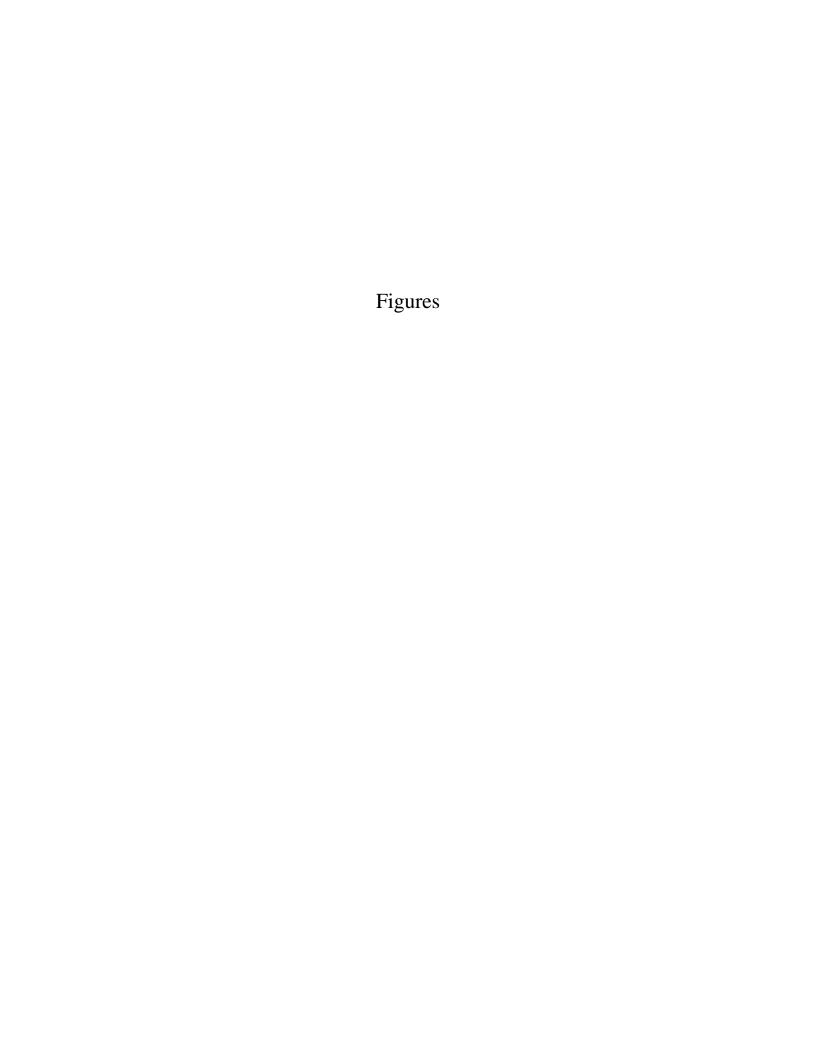
6.2 Conclusions

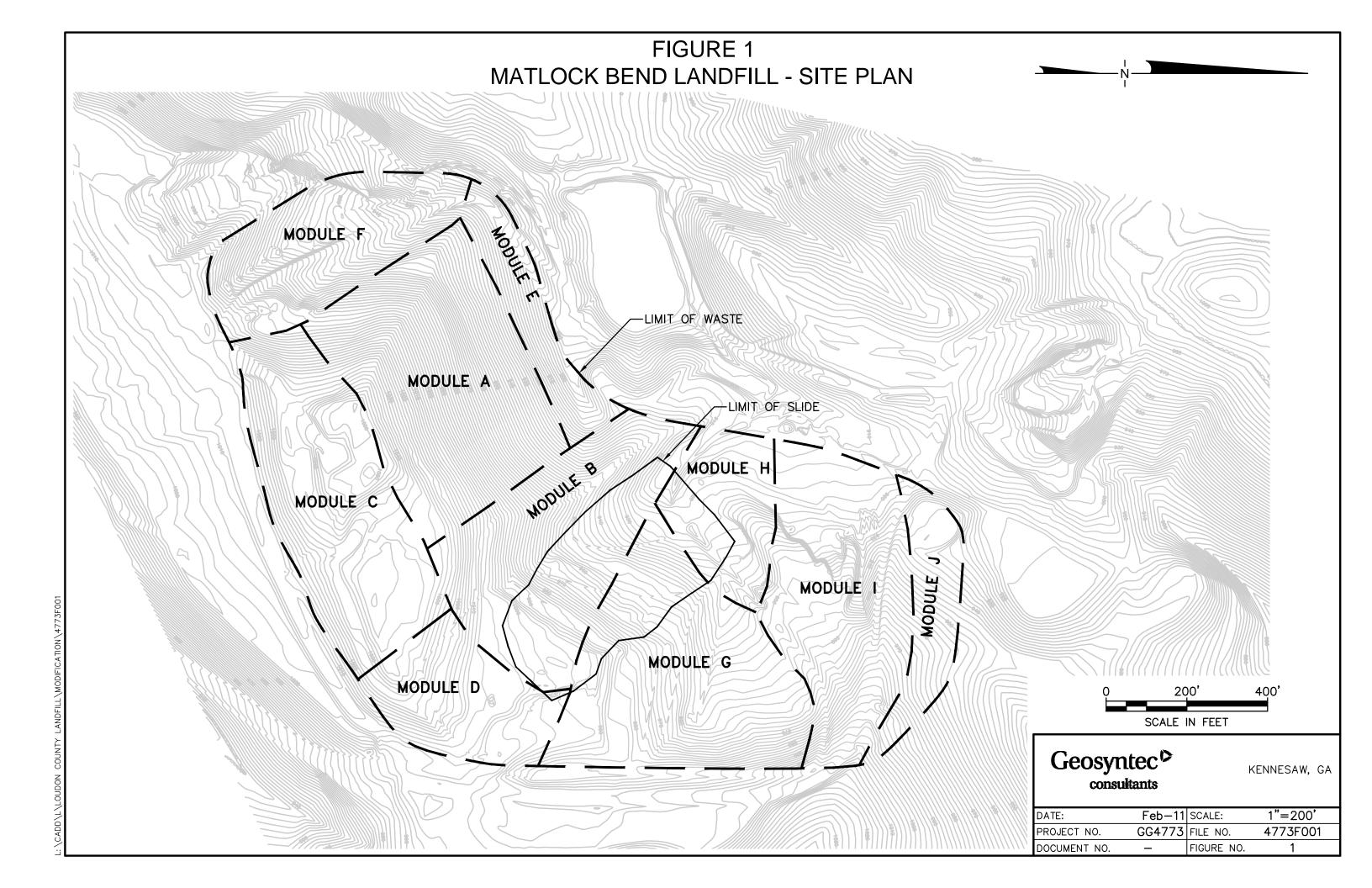
Geosyntec believes that the observations and data that have been compiled are completely consistent with the assessment of the root cause. Importantly, this root cause also provides significant insight regarding the potential rehabilitation strategies for Module G that will help provide TDEC, LCSWDC, and Santek with a measurable

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assurance that adequate short- and long-term stability can be achieved in the failure area. Specifically, Geosyntec has provided specific short- and long-term recommendations regarding the installation of a permanent dewatering trench, the construction of a stability berm beyond the Module G anchor trench, the grading of waste within the buttressed Module G, and monitoring of surface movements and liquid levels. Geosyntec has also reviewed a Sludge Management Plan developed by Santek (and included in this Report) that will allow site-specific blending and mixing protocols for the sludge and waste at the MBL. By following these recommendations, Geosyntec believes that the long-term stability of the MBL can be achieved.

Geosyntec has prepared this Report to comply with the TDEC Order. Specific schedule and timelines regarding the implementation of these recommended measures will be developed upon review of this Report by TDEC and approval of specific stabilization strategies. Geosyntec believes that implementation of many of these strategies can be nearly immediate, while others may take a few weeks to fully develop and implement. After meeting with TDEC, LCSWDC, and Santek Geosyntec will work to develop a site-specific implementation strategy and will follow-up on target objectives and deliverables.





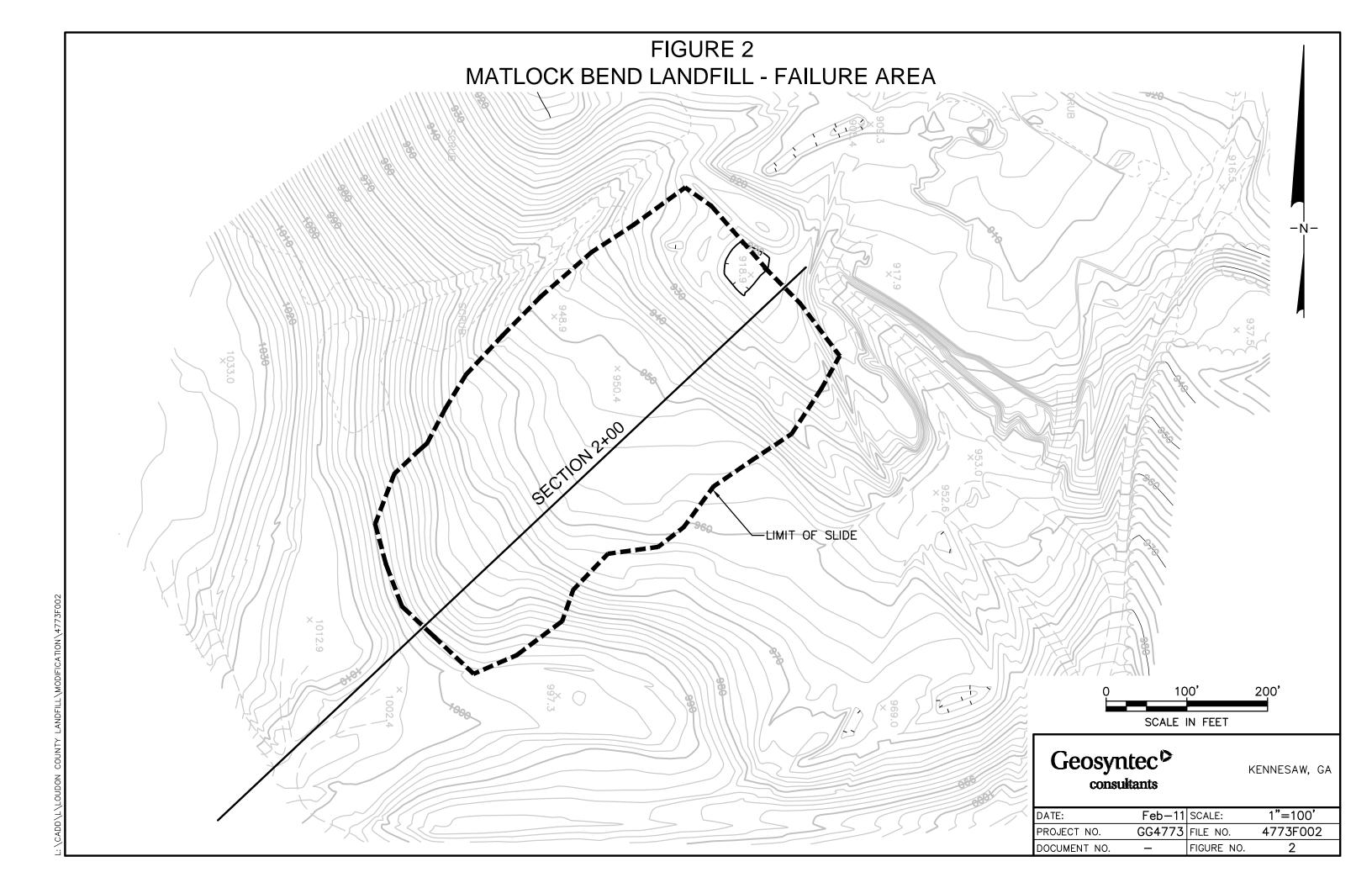
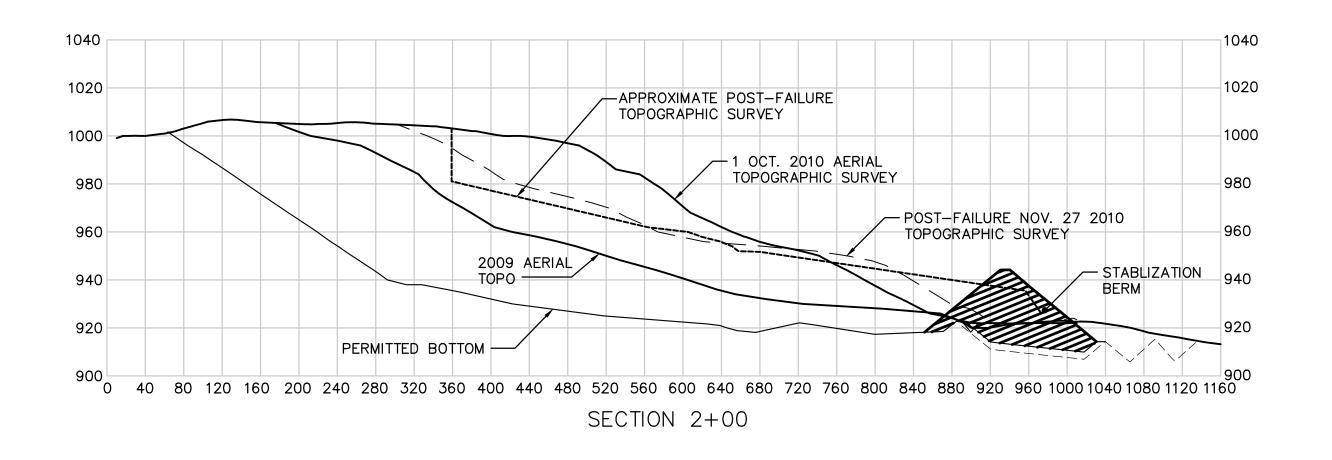
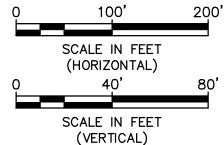


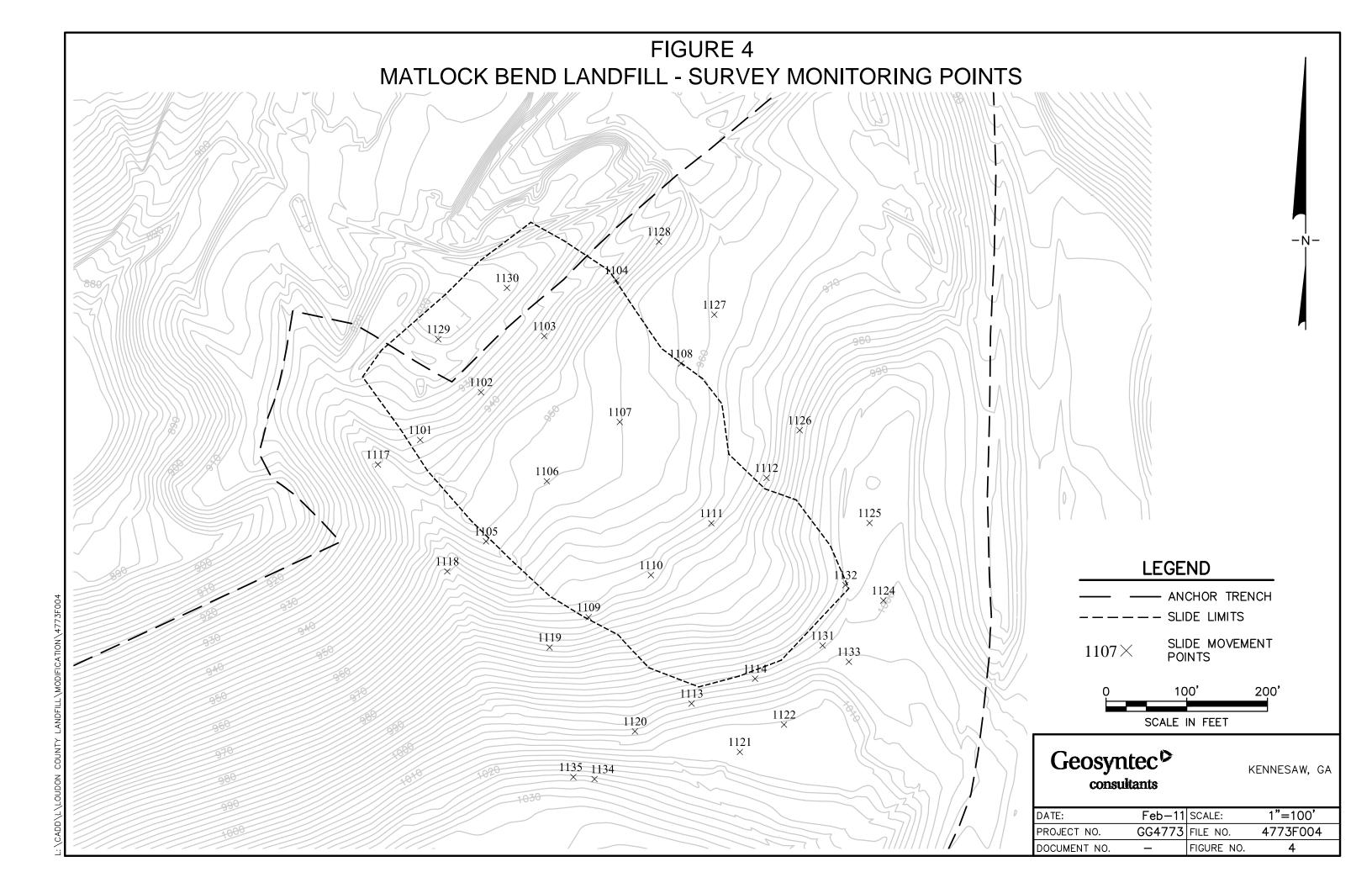
FIGURE 3 MATLOCK BEND LANDFILL CROSS SECTION ALONG SECTION 2+00

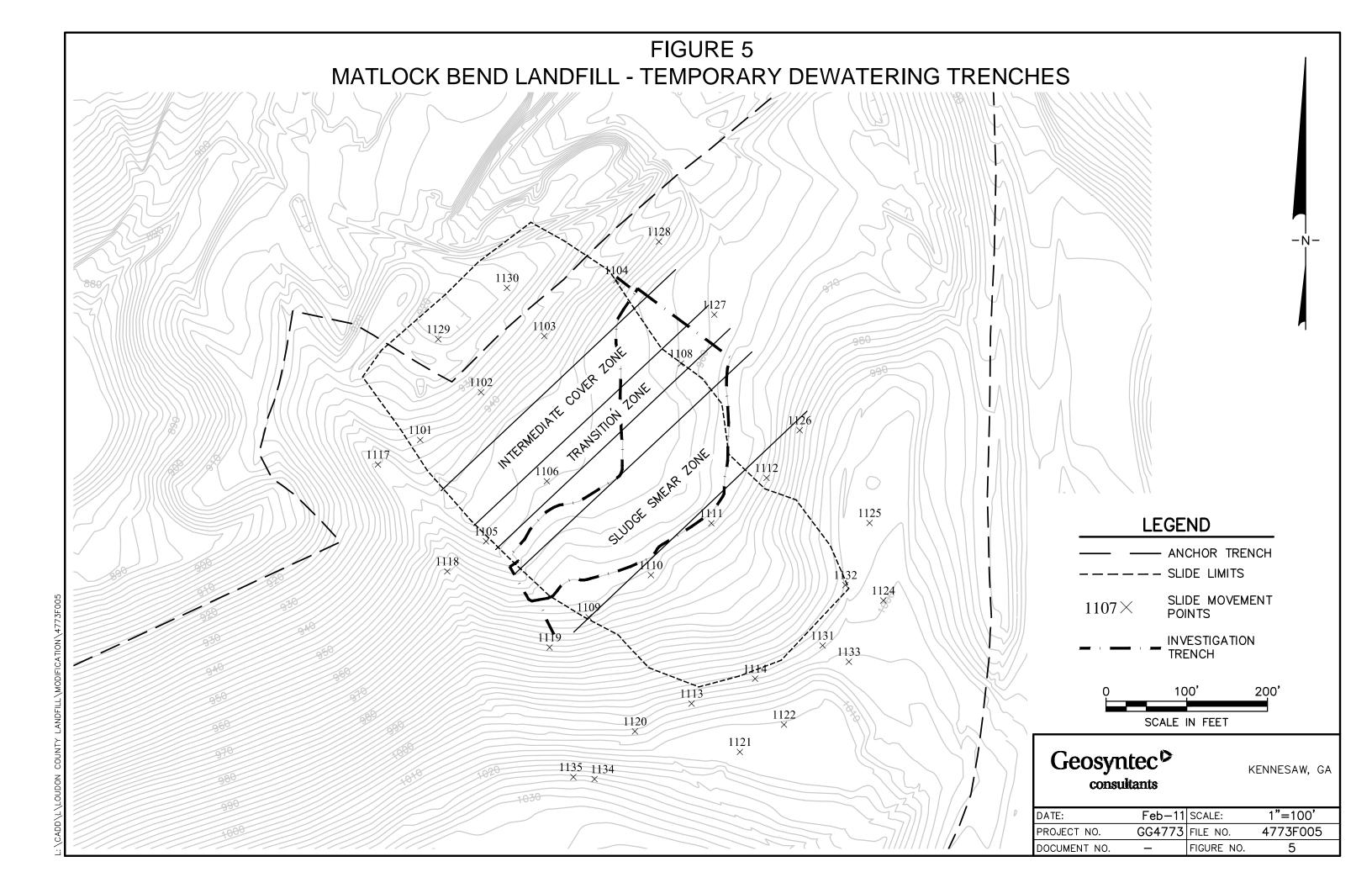




Geosyn		KENNESAW, GA		
DATE:	Feb-11	SCALE:	1"=100'	
PROJECT NO.	GG4773	FILE NO.	4773F003	
DOCUMENT NO.	_	FIGURE NO.	3	

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Appendix A Waste Receipt Records



Loudon County Landfill Waste Tons & Percentages for the Last Twelve (12) Months; 11-09 thru 10-10

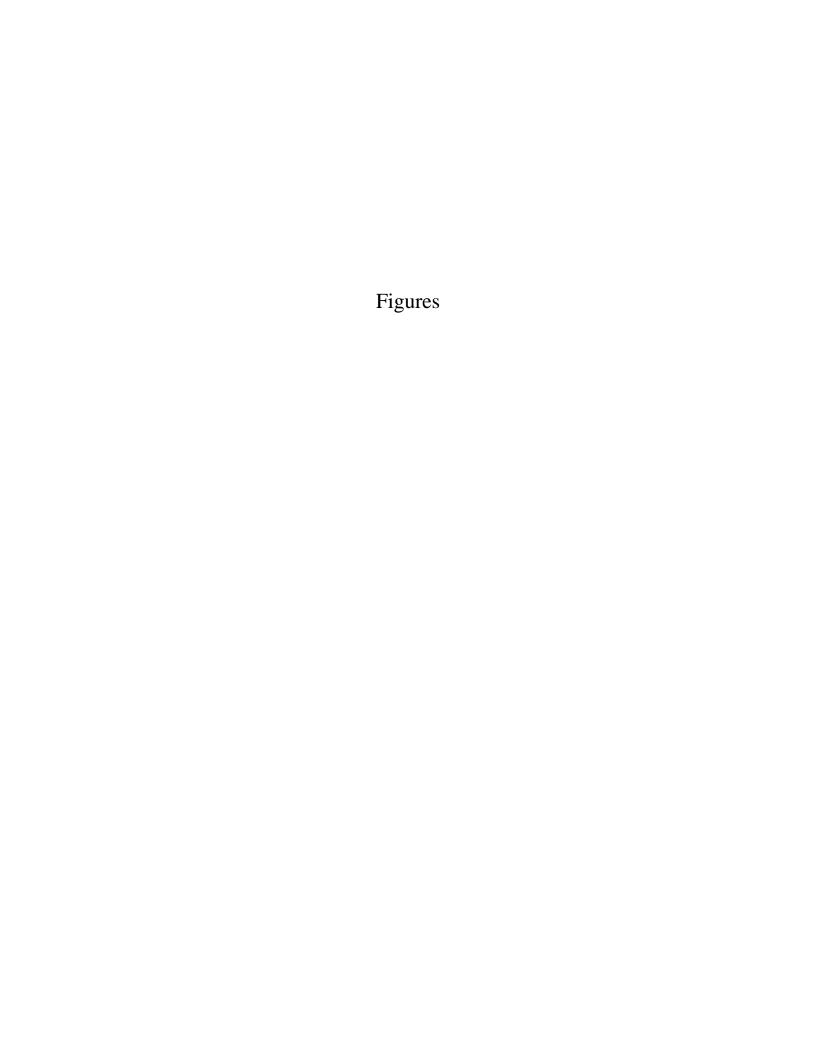
12 Month Jan-10 Feb-10 Mar-10 Apr-10 May-10 Jun-10 Jul-10 Aug-10 Sep-10 Oct-10 Average Waste Type Nov-09 Dec-09 MSW 6,078 4,511 3,692 3,872 4,157 4,025 4,039 3,943 4,323 4,421 4,621 4,016 4,308 Other 167 151 138 205 167 185 130 317 155 199 219 192 185 C&D 128 207 102 219 587 764 684 783 599 699 556 390 477 MSW & C&D Total 4,970 6,373 4,869 3,932 4,296 4,911 4,975 4,853 5,043 5,077 5,320 5,395 4,598 **Special Waste** SPW; Hubble 113 72 80 87 61 82 67 89 81 91 64 111 83 0 W/S 900 794 117 0 0 0 0 0 0 0 0 151 Ash W/S 0 0 16 0 12 2 0 0 0 2,214 245 26 670 W/S; Viskase 117 160 139 135 179 151 140 133 123 143 142 144 141 Tate & Lyle 0 0 0 0 0 0 0 0 0 0 164 183 29 0 0 0 0 Kimberly Clark 0 0 0 5.056 1.013 705 0 0 565 **Auto Fluff** 0 0 0 0 0 0 0 596 1,235 768 376 248 251 1,129 1,027 5,279 1,813 Other Special Waste 351 222 259 209 2,175 1,809 3,027 1,463 Sludge W/S; Tate & Lyle 2,842 2,486 2,296 2,501 2,412 2,588 2,625 3,128 2,409 2,465 1,797 2,104 2,471 Kimberly Clark 1,432 1,309 1,461 1,078 458 1,392 3,699 20 30 1,892 2,405 3,452 1,552 Viskase WWT 82 74 56 75 79 71 84 71 84 87 85 73 77 3,870 3,812 3,654 2,949 6,408 3,220 2,523 4,287 4,100 Sludge Total 4.357 4.052 4.444 5,629 4,336 5.486 4.896 3.876 4.311 8.498 6.619 6.095 **Total Special Waste** 4.163 3.200 6.618 8.656 5,563 9,286 **Total Tons** 11.859 9,766 8,096 8,172 8,112 11,470 13,541 9,414 11,939 11,491 13,254 10,533 Waste Percentages MSW % 54% 50% 49% 53% 61% 54% 42% 37% 54% 45% 47% 35% 47% Other Special Waste % 10% 11% 3% 3% 39% 19% 18% 23% 14% 4% 3% 2% 16% Sludge % 37% 40% 47% 45% 36% 56% 27% 37% 37% 42% 39% 44% 24% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%

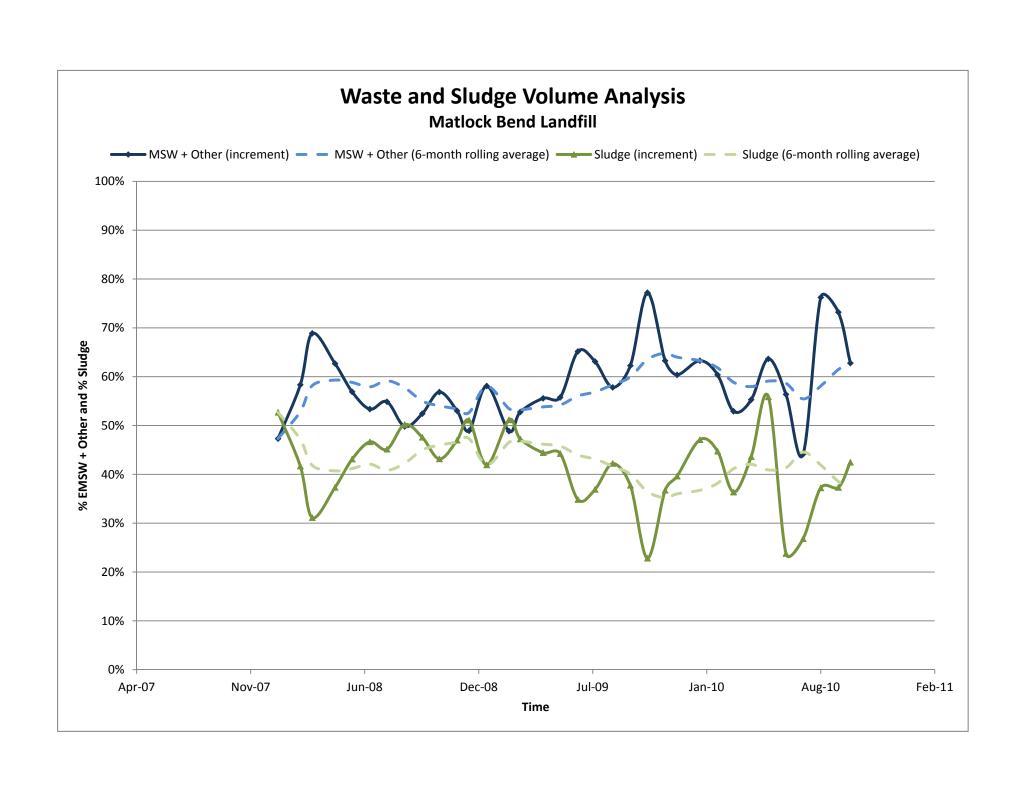
Loudon County Landfill Waste Tons & Percentages for the Twelve (12) Months; 01-09 thru 12-09

12 Month Feb-09 Mar-09 Apr-09 May-09 Jun-09 Jul-09 Aug-09 Sep-09 Oct-09 Nov-09 Dec-09 Average Waste Type Jan-09 6,224 **MSW** 3,577 3,503 4,279 4,094 4,757 6,307 7,029 6,639 6,431 6,078 4,511 5,286 Other 106 47 146 218 286 284 236 289 272 167 151 199 191 C&D 87 146 44 78 97 78 65 125 90 128 207 98 31 MSW & C&D Total 3,696 4,469 5,583 3,770 4,316 5,053 6,691 7,391 6,940 6,846 6,586 6,373 4,869 Special Waste 100 SPW; Hubble 82 97 80 76 106 108 52 96 111 113 72 91 11 36 12 0 0 0 0 0 388 1.180 900 794 277 W/S - W/CAsh W/S 942 1.239 707 614 331 431 190 56 0 0 393 197 11 W/S: Viskase 180 180 164 154 136 123 158 140 117 160 151 152 145 Tate & Lyle 4,399 1,473 1,708 0 0 0 202 1,484 1,945 2,025 2,465 230 1,328 Kimberly Clark 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Auto Fluff 0 0 0 0 0 0 0 0 0 0 0 0 916 Other Special Waste 5,632 3,010 1,183 2,332 2,250 2,606 2,482 2,866 1,442 1,130 1,026 2,240 Sludge W/S; Tate & Lyle 3,984 5,003 2,924 3,237 2,685 2,009 2,061 1,895 2,171 2,290 2,842 2,486 2,799 Kimberly Clark 2,723 1,958 2,064 2,003 2,865 5,192 2,448 1,309 2,388 3,026 3,633 9 1.432 Viskase WWT 78 93 76 73 61 69 75 81 80 85 82 74 77 5,057 6,785 2,372 Sludge Total 7,022 5,315 5,792 4,967 5,774 7,163 4,704 4,356 3,869 5,265 12,417 10,032 7,573 10,029 5,620 3,814 **Total Special Waste** 6,240 7,647 8,043 8,256 5,486 4,895 7,504 **Total Tons** 16,187 13,728 10,708 11,963 13,096 14,264 15,648 16,969 12,465 10,401 11,859 9,764 13,088 Waste Percentages MSW % 23% 27% 39% 47% 41% 50% 42% 36% 47% 55% 63% 54% 43% Other Special Waste % 35% 22% 11% 19% 17% 18% 16% 17% 7% 14% 10% 11% 17% Sludge % 40% 42% 51% 47% 44% 44% 35% 37% 42% 38% 23% 37% 40% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%

Loudon County Landfill Waste Tons & Percentages for the Twelve (12) Months; 01-08 thru 12-08

12 Month Feb-08 Mar-08 Apr-08 May-08 Jun-08 Jul-08 Aug-08 Sep-08 Oct-08 Nov-08 Dec-08 Average Waste Type **MSW** 4,288 3,527 4,345 5,222 4,781 5,431 4,955 5,872 4,978 3,958 3,472 3,926 4,563 Other 120 41 55 51 91 201 123 160 194 151 111 124 118 C&D 3 2 3 5 3 2 42 22 6 18 15 10 1 MSW & C&D Total 3,569 5,274 4,877 5,194 4,411 4,404 5,635 5,081 6,074 4,116 3,602 4,065 4,692 Special Waste 134 SPW; Hubble 106 100 127 127 113 105 94 126 130 102 74 111 10 9 25 28 19 29 812 22 0 78 200 W/S - W/C1,075 295 Ash W/S 691 809 745 729 1.043 449 1.618 1.003 972 1,228 738 1.324 1.287 W/S: Viskase 159 175 179 136 131 128 141 182 163 184 154 154 120 Tate & Lyle 1,521 0 1,541 1,329 1,745 1,410 1,725 923 1,678 1,867 1,636 1,932 1,442 Kimberly Clark 0 0 0 0 0 0 52 0 0 0 0 0 4 Auto Fluff 0 0 0 0 0 0 0 0 0 0 0 0 0 2,620 2,590 2,367 3,255 Other Special Waste 993 2,725 3,553 3,544 2,688 3,818 2,904 2,884 3,556 Sludge W/S; Tate & Lyle 283 186 351 263 23 232 22 4,052 6,512 5,409 4,405 4,768 2,209 Kimberly Clark 4,131 2,720 4,200 6,973 6,969 3,977 5.660 6,048 5,555 551 518 1,288 3,110 Viskase WWT 73 94 90 104 90 87 92 103 84 92 72 81 110 6,162 9,691 Sludge Total 6,016 4,421 3,161 4,551 7,308 7,101 7,155 6,021 5,765 7,959 6,276 9,417 10,032 10,653 9,839 **Total Special Waste** 7,010 7,041 5,752 6,918 13,236 9,842 8,668 11,515 9,160 **Total Tons** 11,420 10,610 10,155 12,192 14,294 15,667 15,734 19,309 15,037 13,955 12,270 15,580 13,852 Waste Percentages MSW % 39% 34% 43% 35% 29% 29% 34% 43% 34% 36% 32% 31% 26% Other Special Waste % 9% 25% 26% 19% 23% 17% 23% 18% 18% 27% 24% 23% 21% Sludge % 45% 53% 42% 31% 37% 43% 47% 45% 50% 48% 43% 47% 51% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%





Appendix B TDEC Site Inspection Reports



NAME OF SITE London Count Landfill	REGISTRATION NUMBER DATE
LOCATION (physical)	PURPOSE X Complete () Follow-up
Of thing 72 wast of Landon	() Complaint () Other
OWNERIOPERATOR County S, W. Commission Block	TYPE OF FACILITY PICLASS II () CLASS II () CLASS IV
July Contract Contrac	V2 () CLASS III () CLASS IV V2 V1 V2
Inadequate vector control 8010	Leachate improperly managed 8330
Access not limited to operating hours 8020	Inadequate leachate collection
Inadequate artificial or natural barrier 8030	system 8340
Inadequate information signs 8040	Leachate observed at the site 8350
Unsatisfactory access road(s)/parking	Leachate entering runoff 8360
area(s) 8050	Leachate entering a water
Certified personnel not present	course 8370
during operating hours 8060 Unapproved salvaging of waste 8070	Inadequate gas migration control system 8380
Evidence of open burning 8080	system 8380 lnadequate maintenance of gas
Inadequate fire protection 8090	migration control system 8390
Unsatisfactory litter control 8110	Potential for explosions or
Inadequate employee facilities 8120	uncontrolled fires 8420
No communication devices 8130	Waste not confined to a
Inadequate operating equipment 8140	manageable area 8430
Unavailability of backup equipment 8150	Improper spreading of waste 8440
Unavailability of cover material 8160	Improper compacting of waste 8450
Inadequate maintenance of	Unsatisfactory initial cover 8460
runon/runoff system(s) 8170	Unsatisfactory intermediate
Inadequate erosion control 8180	cover 8470
Inadequate dust control 8190	Unsatisfactory final cover 8480
Unauthorized waste accepted 8210 Unapproved special waste accepted 8220	Excessive pooling of water 8490
Unapproved special waste accepted 8220 Tires improperly handled 8230	Unsatisfactory stabilization of cover 8510
Medical waste improperly handled 8240	cover 8510 Dumping of waste into water 8520
Dead animals improperly handled 8250	Unsatisfactory records or reports 8530
Washout of solid waste 8270	Groundwater monitoring system
No permanent benchmark 8280	improperly maintained 8540
Inadequate random inspection	Operation does not correspond
program 8290	with engineering plans 8570
Mishandling of special waste 8300	Operation does not correspond
Buffer zone standard violated 8310	with permit condition(s) 8580
Inadequate maintenance of leachate	Permit, plans, operating manual
management system 8320	not available 8590
	No operating scales 8610
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PERSON INTERVIEWED A F Jhones	INSPECTED BY Rule norm
TITLE MV-4	TITLE Environmental Engineer
TIME OF DAY / 130-21/5 / EWEATHER CONDITIONS Sun	OCHELIANOE DATE
	ield Office - Canary Central Office - XC



NAME OF SITE	DECICES	ATION NUMBER		15.== 1
Loudon County Landfill	SAV/		į	Ebruary 2020
LOCATION (physical)	13,00	PURPOSE Complete	() Fol	iow-up
Of Hay 72 west of Landon		() Complaint	() Ott	
OWNER/OPERATOR .	(CLASS 1	() CLASS II
Buser: Loudon County S. W. Commission Operator: Sant	ex/Pun/Thomas		CLASS III	() CLASS IV
/ V1	7 V2	<u> </u>	<u> </u>	V1 V2
Inadequate vector control 8010	London	ta immenananka walio walio da	0000	
Access not limited to operating hours 8020		te improperly managed rate leachate collection	8330	
Inadequate artificial or natural barrier 8030	syst	_	8340	
Inadequate information signs 8040	·	te observed at the site	8350	
Unsatisfactory access road(s)/parking		te entering runoff	8360	 ·
area(s) 8050		te entering a water	0000	
Certified personnel not present	cou	_	8370	
during operating hours 8060	1	iate gas migration control		
Unapproved salvaging of waste 8070	syste		8380	Ĭ.
Evidence of open burning 8080		ate maintenance of gas	0000	
Inadequate fire protection 8090		ation control system	8390	
Unsatisfactory litter control 8110		I for explosions or	0000	
Inadequate employee facilities 8120		ntrolled fires	8420	1
No communication devices 8130		ot confined to a	0420	
Inadequate operating equipment 8140		ageable àrea	8430	
Unavailability of backup equipment 8150		r spreading of waste	8440	
Unavailability of cover material 8160	Imprope	r compacting of waste	8450	
Inadequate maintenance of		actory initial cover	8460	
runon/runoff system(s) 8170		actory intermediate	0400	
Inadequate erosion control 8180	cover		8470	•
Inadequate dust control 8190		actory final cover	8480	
Unauthorized waste accepted 8210		e pooling of water	8490	
Unapproved special waste accepted 8220		actory stabilization of		
Tires improperly handled 8230	cover	-	8510	
Medical waste improperly handled 8240		of waste into water	8520	
Dead animals improperly handled 8250		actory records or reports	8530	
Washout of solid waste 8270		ater monitoring system	3000	
No permanent benchmark 8280		perly maintained	8540	
inadequate random inspection		n does not correspond	00.0	
program 8290		engineering plans	8570	
Mishandling of special waste 8300		n does not correspond		
Buffer zone standard violated 8310		ermit condition(s)	8580	
Inadequate maintenance of leachate		lans, operating manual	30,00	
management system 8320		ailable	8590	-
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NAME OF SITE		T				
Loudon County Can Hill	-	REGISTRA	153-0203		DATE	12000
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Inadequate information signs 8040		syste		8340		
Unsatisfactory access road(s)/parking			te observed at the site	8350		
area(s) 8050	•		e entering runoff	8360		
Certified personnel not present		I	te entering a water	0070		ŀ
during operating hours 8060		coul		8370		
Unapproved salvaging of waste 8070			ate gas migration control			
Evidence of open burning 8080		syste		8380		
Inadequate fire protection 8090			ate maintenance of gas ation control system	9200		
Unsatisfactory litter control 8110			I for explosions or	8390		
Inadequate employee facilities 8120			ntrolled fires	8420		
No communication devices 8130			ntioned mes ot confined to a	04ZU		
Inadequate operating equipment 8140		1	ageable area	8430		
Unavailability of backup equipment 8150			r spreading of waste	8440		
Unavailability of cover material 8160		Imprope	r compacting of waste	8450		
Inadequate maintenance of			actory initial cover	8460		
runon/runoff system(s) 8170			actory intermediate	0400		
Inadequate erosion control 8180		cover	-	8470		İ
Inadequate dust control 8190			actory final cover	8480		
Unauthorized waste accepted 8210			e pooling of water	8490		
Unapproved special waste accepted 8220			actory stabilization of	0-100		
Tires improperly handled 8230	,	cover		8510		
Medical waste improperly handled 8240		1	of waste into water	8520		
Dead animals improperly handled 8250		1 -	actory records or reports	8530		
Washout of solid waste 8270			rater monitoring system	0300		
No permanent benchmark 8280			perly maintained	8540		
inadequate random inspection			n does not correspond	0040		
program 8290			engineering plans	8570		
Mishandling of special waste 8300			n does not correspond	00,0		
Buffer zone standard violated 8310			permit condition(s)	8580		
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NAME OF SITE	1		DECISTO	ATION NUMBER		····
Loudon County La	rdfill		1500L	.53-02.03	,	DATE
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OWNER/OPERATOR		h / C /	A Isa A s	7	CLASS 1	
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Inadequate vector control	8010		Leachai	te improperly managed	0000	*1 *2
Access not limited to operating hours	8020			late leachate collection	8330	
Inadequate artificial or natural barrier	9030		syste		2240	
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Unsatisfactory access road(s)/parking				te entering runoff	8360	
area(s)	8050			te entering a water	8300	
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during operating hours	8060			iate gas migration contro		
Unapproved salvaging of waste	8070		syste	-	6380	
Evidence of open burning	8080		, -	ate maintenance of gas	0000	
Inadequate fire protection	8090			ation control system	8390	
Unsatisfactory litter control	8110			for explosions or	2010	
Inadequate employee facilities	8120			ntrolled fires	8420	
No communication devices	8130			ot confined to a	V 140	
Inadequate operating equipment	8140		4	ageable erea	8430	
Unavailability of backup equipment	B150			r spreading of waste	8440	
Unavailability of cover material	8160			r compacting of waste	8450	
Inadequate maintenance of			Unsatisf	actory initial cover	8460	
runon/runoff system(s)	8170		Unsatisf	ectory intermediate		
Inadequate erosion control	8180		cover		8470	
Inadequate dust control	8190		Unsatisf	actory final cover	8480	
Unauthorized waste accepted	8210		Excessiv	e pooling of water	8490	
Unapproved special waste accepted	8220		Unsatisfa	actory stabilization of		
Tires improperly handled	8230		cover	•	8510	
Medical waste improperly handled	8240		Dumping	of waste into water	8520	
Dead animals improperly handled	8250			actory records or reports	8530	
Washout of solid waste	8270			ater monitoring system	• •	
No permanent benchmark	8280			perly maintained	8540	
Inadequate random inspection				n does not correspond		
program	8290			engineering plans	8570	
Mishandling of special waste	8300			n does not correspond		
Buffer zone standard violated	8310			permit condition(s)	8580	
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NAME OF SITE	,u• .	REGISTRA	TION NUMBER		DATE
Loudon County Grandfill		SNI	53-0203	,	Maull On
LOCATION (physical)			PURPOSE Complete	() Fóll	ow-up
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Unsatisfactory access road(s)/parking			e entering runoff	8360	
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during operating hours 806			ate gas migration control		
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Unavailability of backup equipment 815			geable area	8430	
Unavailability of cover material 816			r spreading of waste	8440	
Inadequate maintenance of	·		r compacting of waste actory initial cover	8450	I
runon/runoff system(s) 817	n		actory intermediate	8460	
Inadequate erosion control 818		cover		8470	
Inadequate dust control 819		1	actory final cover	8480	
Unauthorized waste accepted 821			e pooling of water	8490	
Unapproved special waste accepted 822			actory stabilization of	U 1 3U	
Tires improperly handled 823		cover		8510	
Medical waste improperly handled 824		1	of waste into water	8520	 i
Dead animals improperly handled 825			ectory records or reports	8530	
Washout of solid waste 827			ater monitoring system	2000	
No permanent benchmark 828			perly maintained	8540	Į
Inadequate random inspection			n does not correspond	45.0	
program 829	0		ngineering plans	8570	ľ
Mishandling of special waste 830		Operation	n does not correspond		
Buffer zone standard violated 831	o	with p	ermit condition(s)	8580	
Inadequate maintenance of leachate			lans, operating manual		
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Distribution: Facility - V		e - Canary	Central Office - XC		_



NAME OF SITE	1611		REGISTRA	ATION NUMBER		DATE	
LOCATION (physical)	mah!		I.SAII	53-1213		Ture 21	200
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Inadequate vector control	8010	,	Lassbat	in the second of		VI .	V2
Access not limited to operating hours	8020			e improperly managed	8330		
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Inadequate information signs	8040			e observed at the site	8340		
Unsatisfactory access road(s)/parking				e entering runoff	8350		
area(s)	8050			e entering a water	8360		
Certified personnel not present			cour		0070		1
during operating hours	8060			ate gas migration contro	8370		- 1
Unapproved salvaging of waste	8070		syste		8380		ļ
Evidence of open burning	8080			ate maintenance of gas	0300		[
Inadequate fire protection	8090		migra	ation control system	8390		ı
Unsatisfactory litter control	8110		Potential	for explosions or	0390	- -	-
Inadequate employee facilities	8120			ntrolled fires	0.420		ł
No communication devices	8130			ot confined to a	8420		-
Inadequate operating equipment	8140		,	geable area	8430		- }
Unavailability of backup equipment	8150			spreading of waste	8440	-	-
Unavailability of cover material	8160			compacting of waste	8450		
Inadequate maintenance of				actory initial cover	8460		-
runon/runoff system(s)	8170			ectory intermediate	0400		-
Inadequate erosion control	8180		cover	notory intermediate	8470		
inadequate dust control	8190			ctory final cover	8480		
Unauthorized waste accepted	8210		Excessive	e pooling of water	8490		-
Unapproved special waste accepted	8220		Unsatisfa	ctory stabilization of	0430		-
Tires improperly handled	8230		cover	otory otdomization of	8510	-	- 1
Medical waste improperly handled	8240			of waste into water	8520		- [
Dead animals improperly handled	8250		Unsatisfa	ctory records or reports	8530		-
Washout of solid waste	8270		Groundwa	ater monitoring system	5500		-
No permanent benchmark	8280		impror	perly maintained	8540		ļ
Inadequate random inspection			Operation	does not correspond	0040		-
ргодгат	8290		with er	ngineering plans	8570		
Mishandling of special waste	8300		Operation	does not correspond	0070		-
Buffer zone standard violated	8310		with pe	ermit condition(s)	8580		
Inadequate maintenance of leachate			Permit pla	ans, operating manual	0000		-
management system	8320		not ava		8590		
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TIME OF DAY / SACIE IT - > WEATHER C	ONDITIONS C	 	1201				-
		AMALL,	8013	COMPLIANCE DATE			
Distribution: Fac	ility - White	Field Office	e - Canary	Central Office - XC			
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NAME OF SITE COUNTY Land	11. 11				REGISTRA	TION NUMBER		DAT	 E
LOCATION (physical)	<u> {k: </u>		Щ		SNL	53-0203		This.	232
	str. don					PURPOSE Complete	() Fo	quewell	
QWNER/OPERATOR	JUDY X	_	<u> </u>			() Complaint		her	
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Access not limited to operating hours	8010	_	-		Leachat	e improperly managed	8330		
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area(s)	8050				Leachate	e entering runoff	8360		<u> </u>
Certified personnel not present	4950		₩-			entering a water			
during operating hours	8060		ll l		COUR		8370		
Unapproved salvaging of waste	8070	_	╫╴			ate gas migration contro			
Evidence of open burning	8080	-	H-		syste		8380		
Inadequate fire protection	8090	-	H-		miam	ate maintenance of gas	0000		
Unsatisfactory litter control	8110	-	 		Detential	ition control system	8390		
inadequate employee facilities	8120	****	H-	~~~~		for explosions or trolled fires	0.400		
No communication devices	8130		H			ntroned tires of confined to a	8420		
Inadequate operating equipment	8140	-	h—			geable area	0400		
Unavallability of backup equipment	8150		-	-		spreading of waste	8430		
Unavailability of cover material	8160		1		Improper	compacting of waste	8440		
Inadequate maintenance of					Unsatisfa	ictory initial cover	8450		
runon/runoff system(s)	8170				Linsatisfa	ctory intermediate	8460		
Inadequate erosion control	818C	_	ii		cover	crots investmentate	8470		
Inadequate dust control	8190	••••				ctory final cover	648Q		
Unauthorized waste accepted	8210					pooling of water	8 49 0		
Unapproved special waste accepted	\$220					ctory stabilization of	0490		
Tires improperly handled	8230		Τ΄		cover	orari archinedriali di	8510		
Medical waste improperly handled	8240					of waste into water	8520		
Dead animals improperly handled	6250	~~~			Unsatisfa	ctory records or reports	8530		
Washout of solid waste	8270		T		Groundwe	ater monitoring system	0030		
No permanent benchmark	8280		T		impros	perly maintained	8540		
Inadequate random inspection			Τ		Operation	does not correspond	¢∪~u		
program	8290				with er	gineering plans	8570		
Mishandling of special waste	8300		Τ		Operation	does not correspond	9070		
Buffer zone standard violated	8310		T		with pe	rmit condition(s)	8580		
Inadequate maintenance of leachate			T		Permit pla	ans, operating manual	242Q		
management system	8320		L		not ava		8590		
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IME OF DAY /// -/ 30 P WEATHER CO	SNOITIDING	{ \	con	du. 8	(A)	COMPLIANCE DATE			į
Distribution: Fac	ility - White	<u> </u>			- Canary				
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NAME OF SITE	REGISTRATION NUMBER	DATE / /2 2
Loudon County Landfill	SNI 53-0203	August 13 20
LOCATION (physical)	PURPOSE (C) Complete	() Follow-up
OWNER/OPERATOR	() Complaint	() Other
A well such to Cheformien Drombell	TYPE OF FACILITY (SCL)	ASS 1 () CLASS II
Qualy: Wildon Co. S. W. Commission Operator : Sa	11-64- 144 1444 () CL	ASS III () CLASS IV V1 V2
	· -	
Inadequate vector control 8010		8330
Access not limited to operating hours 8020	Inadequate leachate collection	9340
Inadequate artificial or natural barrier 8030 Inadequate information signs 8040		8340
		8350
Unsatisfactory access road(s)/parking area(s) 8050	•	8360
Certified personnel not present	Leachate entering a water course	8370
during operating hours 8060	Inadequate gas migration control	— —
Unapproved salvaging of waste 8070		8380
Evidence of open burning 8080	Inadequate maintenance of gas	
Inadequate fire protection 8090		8390
Unsatisfactory litter control 8110	Potential for explosions or	
Inadequate employee facilities 8120		8420
No communication devices 8130	Waste not confined to a	··-·
Inadequate operating equipment 8140	 (8430
Unavailability of backup equipment 8150		8440
Unavailability of cover material 8160		8450
Inadequate maintenance of		8460
runon/runoff system(s) 8170	Unsatisfactory intermediate	
Inadequate erosion control 8180		8470
Inadequate dust control 8190	Unsatisfactory final cover	8480
Unauthorized waste accepted 8210		8490
Unapproved special waste accepted 8220	Unsatisfactory stabilization of	
Tires improperly handled 8230		8510
Medical waste improperly handled 8240		8520
Dead animals improperly handled 8250		8530
Washout of solid waste 8270	Groundwater monitoring system	
No permanent benchmark 8280		8540
Inadequate random inspection	Operation does not correspond	
program 8290		8570
Mishandling of special waste 8300	Operation does not correspond	
Buffer zone standard violated 8310		8580
inadequate maintenance of leachate	Permit, plans, operating manual	
management system 8320		8590
	No operating scales	8610
COMMENTS: The second of the se	lot of class In	10.1.10/
1 Key how received a	10t of sludge from	Kimberly Clark
and Tate +1 le a bin were icht	coverethe the solum to	tord Shis.
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	of it is targed or &	MAN (A) A) FA
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PERSON INTERVIEWED	INSPECTED BY	
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TITLE MAY-	TITLE FROMMER LA	Frankler
TIME OF DAY (1/20) 1/2 NAMEATHER CONDITIONS	COMPLIANCE DATE	
1015 2 47.147 10 10.1	eld, Office - Canary Central Office - XC	
Distribution, racinty - vyrite in re	sid, Office - Carrary Central Office - AC	

RDAs 2202 and 2499



NAME OF SITE	
1	RESISTRATION NUMBER DATE
LOCATION (physical)	W1 53-0203 September 1220
OWNER OPERATOR of Couden	PURPOSE X) Complete () Fállow-up
OWNER/OPERATOR	() Complaint () Other Type OF FACILITY () CLASS II
Gira Constitution Commice In	TYPE OF FACILITY PELASS II () CLASS II () CLASS IV
	V2 V1 V2 V1 V2
Inadequate vector control 8010	
Access not limited to operating hours 8020	inadequate leachate collection 8330
inadequate artificial or natural barrier anan	11 1 1 1
Inadequate information signs 8040	
Unsatisfactory access road(s)/parking	
area(s) 8050	: Likechate entering runoff 8360
Certified personnel not present	course 8370
during operating hours 8060	Inedequate gas migration control
Unapproved salvaging of waste 8070	system 8380
Evidence of open burning 8080	insidequate maintenance of gas
Inadequate fire protection 8090	migration control system 8390
Unsatisfactory litter control 8110	Potential for explosions or
Inadequate employee facilities 8120	uncontrolled fires 8420
No communication devices 8130	Waste not confined to a
Inadequate operating equipment 8140	manageable area 8430
Unavailability of backup equipment 8150 Unavailability of cover material 8160	improper spreading of waste 8440
Inadequate maintenance of	Improper compacting of waste 8450
Prince bearing Harman	Unsatisfactory initial cover 8460
I Dodonisto operate a contra	- Urisatisfactory intermediate
Impedantial in a	cover 8470
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I Inopproved an artist in	Extressive pooling of water 8490
Tires improperly handled 8230	- Unsatisfactory stabilization of
Medical waste improperly handled	cover 8510
Liead animals improperly handled 8250	Dumping of waste into water 8520
Washout of solid waste 8270	Linsatisfactory records or reports 8530
No permanent benchmark 8280	Groundwater monitoring system improperly maintained 8540
inadequate random inspection	
program 8290	Operation does not correspond with engineering plans 8570
Mishandling of special waste 8300	With engineering plans 8570
Buffer zone standard violated 8310	with permit condition(s) 8580
Inadequate maintenance of leachate	Fermit, plans, operating manual
management system 8320	not available 8590
	No operating scales 8610
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TITLE	
TIME OF DAY	F-restanontal fragital
TIME OF DAY 111 1 WEATHER CONDITIONS	COMPLIANCE DATE
Distribution: Facility - White	11 11 11 11 11 11 11 11 11 11 11 11 11
	Field Office - Canary Central Office - XC
CN-0761 (Rev. 7-98)	



LOCATION (physical)	Hill		· ·		TION NUMBER 53-0203		Chilar 152
OWNER CORRATION	do				PURPOSE Comp	yawlmt ()o	ollow-up
Aure: Konden Co. S. W. Whomission	n Open	akr. S	mble	Pract The	TYPE OF FACILITY	ACLASS 1	() CLASS II
		V1	V2 /	, <u>, , , , , , , , , , , , , , , , , , </u>	<u> </u>	L) CCABO III	() CLASS IV V1 V2
Inadequate vector control	8010			Leachete	improperly manage	ed 8330	
Access not limited to operating hours	6020				rte issonate collection		
Inadequate artificial or natural barrier	8030			system		8340	
Inadequate information signs	8040	***************************************		Leachete	observed at the site		
Unsetisfactory access road(s)/parking area(s)				Leachate	entering runoff	8360	
Certified personnel not present	8050			Leachate	entering a water		
during operating hours				COURS	ie	8370	
Unapproved salvaging of waste	8060		-	Inadeque	ite gas migration cor	ntrol	·
Evidence of open burning	8070			Syster		6380	
Inadequate fine protection	8080 8080	·		inadaqua	te maintenance of g		
Unsatisfactory litter control	8110				tion control system	8380	
Inadequate employee facilities	8120				for explosions or		
No communication devices	8130	 -		1	trolled fires	8420	-
Inadequate operating equipment	8140				t confined to a		
Unavailability of backup equipment	8150				jesble area spreading of waste	8430	
Unavailability of cover material	8160				compacting of waste	8440 8450	
inadequate maintenance of					ctory initial cover	8460	
runon/runoff system(s)	8170				ctory intermediate	0 1 00	
Inadequate erosion control	8180			cover	orery interritorial	8470	
Inadequate dust control	8190			1	tory final cover	8480	
Unauthorized waste accepted	8210				pooling of water	8490	
Unapproved special waste accepted	8220				tory stabilization of	- 100	
Tires improperly handled	8230			COVer		8510	
Medical waste improperly handled	8240			Dumping o	of waste into water	8620	
Dead animals improperly handled	8250				tory records or repo		
Washout of solid waste	8270		·	Groundwa	ter monitoring syste		
No permanent benchmark	8280			Improp	erly maintained	8540	
Inadequate random inspection program					does not correspond	1	
Mishandling of special waste	8290				gineering plans	8570	
Duffer was a standard to the s	B300		~~		does not correspond	ŧ	
inadequate meintenance of leachate	6310				rmit condition(s)	8580	
	ann.				ins, operating manu		
	8320	-		not ave		8590	
				No operatir	ng scoles	8610	
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7171			(5)	nature)	run ou	1111-	
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TIME OF DAY / / 2/1 WEATHER CON	DITIONS	Car		8110	COMPLIANCE DAT		
Distribution: Facility		20011		- Canary	Central Office -)		



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Landon Coint Landill			TION NUMBER 53-0203	D/ And	mbar 102
LOCATION (physical)		12/YC		() Follow-u	711101 10 22
CA How 72 west it come	don		PURPOSE () Complete () Complaint	() Pollow-u	,
OWNER/OPERATOR			TYPE OF FACILITY VX) CLASS II
Owner: Condon Co S.W. Commission	Donator Cantel !	Paul Thims	()) CLASS IV.
	V1 V2	1 2		V1	
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Inadequate vector control	8010		te improperly managed	8330	
Access not limited to operating hours	8020		uate leachate collection	0240	i
Inadequate artificial or natural barrier Inadequate information signs	8030	syste		8340	
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Unsatisfactory access road(s)/parking	****		te entering runoff	8360	
area(s)	8050		te entering a water	2072	
Certified personnel not present		coul		8370	
during operating hours	8060		iate gas migration control		- S
Unapproved salvaging of waste	8070	syste		8380	
Evidence of open burning	8080		ate maintenance of gas		
Inadequate fire protection	8090		ation control system	8390	;
Unsatisfactory litter control	8110		l for explosions or		f
Inadequate employee facilities	8120		ntrolled fires	8420	
No communication devices	8130	Waste n	not confined to a		
Inadequate operating equipment	8140		ageable area	8430	
Unavailability of backup equipment	8150	Imprope	er spreading of waste	8440	
Unavailability of cover material	8160	Imprope	er compacting of waste	8450	
Inadequate maintenance of			actory initial cover	8460	
runon/runoff system(s)	8170		actory intermediate		
inadequate erosion control	8180	cove	-	8470	
I	8190	Unsatisf	actory final cover	8480	
	8210		ve pooling of water	8490	
1	8220		actory stabilization of		
	8230	cover	-	8510	İ
	8240		g of waste into water	8520	
	8250		actory records or reports	8530	
	8270		vater monitoring system	9990	
			pperly maintained	8540	
inadequate random inspection	8280			6040	
	9200		on does not correspond	0570	
9.00	8290		engineering plans	8570	
The second secon	8300		n does not correspond	2500	
	8310		permit condition(s)	8580	
Inadequate maintenance of leachate			olans, operating manual	5500	
management system	8320		vailable	8590	
		No opera	ating scales	8610	
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and new cell cons	truction area	, 0			S. Carlo
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TIME OF DAY () () WEATHER CON	IDITIONS	nny, 5	COMPLIANCE DATE	/	
Distribution; Facilit	v - White Field Offi	ice - Canary	Central Office - XC		
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NAME OF SITE			REGISTRA	ATION NUMBER		DATE	_
Loudon County Land	B11		SNI			can	1157
LOCATION (physical)	1			PURPOSE Complete	() Fol		
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OWNER/OPERATOR	1. 1	13.11	10 10	TYPE OF FACILITY	CLASS 1		JI 28A
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	<i>y</i> ∨1	V2 /				V1	V2
Inadequate vector control	8010		Leachat	te improperly managed	8330		
Access not limited to operating hours	8020	_	Inadequ	uate leachate collection		•	į.
Inadequate artificial or natural barrier	8030		syste	em	8340		
Inadequate information signs	8040		i	te observed at the site	8350		
Unsatisfactory access road(s)/parking				te entering runoff	8360		
area(s)	8050		Leachat	te entering a water			
Certified personnel not present			cou		8370		
during operating hours	8060		•	iate gas migration control			
Unapproved salvaging of waste	8070		syste		8380		
Evidence of open burning	8080			ate maintenance of gas	000-		
Inadequate fire protection Unsatisfactory litter control	8090			ation control system	8390		
Inadequate employee facilities	8110			I for explosions or	0400		
No communication devices	8120			introlled fires	8420		
Inadequate operating equipment	8130			not confined to a	9430		ļ
Unavailability of backup equipment	8140			ageable area	8430		推
Unavailability of cover material	8150 8160			er spreading of waste	8440 8450		
inadequate maintenance of	- TOO			er compacting of waste factory initial cover	8460		
runon/runoff system(s)	8170			actory initial cover actory intermediate	0400		
Inadequate erosion control	8160		COVE		8470		1
Inadequate dust control	8190			actory final cover	8480		— I
Unauthorized waste accepted	8210			e pooling of water	8490		N
Unapproved special waste accepted	8220			actory stabilization of	Q-100		
Tires improperly handled	8230		cover		8510		; ;
Medical waste improperly handled	8240			g of waste into water	8520		
Dead animals improperly handled	8250			actory records or reports	8530		
Washout of solid waste	8270	·		vater monitoring system	3000		
No permanent benchmark	8280			perly maintained	8540		
Inadequate random inspection				n does not correspond			
program	8290			angineering plans	8570		100
Mishandling of special waste	8300			n does not correspond			
Buffer zone standard violated	8310			permit condition(s)	8580		
Inadequate maintenance of leachate		,		plans, operating manual			[1
management system	8320	•		vailable	8590		
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TIME OF DAY SUR THER CO	NOITIONS /	-18. ch	n. d. 4	COMPLIANCE DATE	/		
Distribution: Faci	lity - White	Eleji Offi	e - Canary	Central Office - XC			
Cistiludion. Faci	nd - taune	Alein Out	e-juanary				

CN-0761 (Rev. 7-98)

RDAs 2202 and 2499



NAME OF SITE								
	10 11		-	REGISTRA	TION NUMBER		DATE	
Couden Comity Co	month!			SNL	<u> 53-0203</u>		January 2º	1200
Uff the 72 idest at Love	1.	•			PURPOSE Complete		- do-more	
OWNER/OPERATOR	eur_				() Complaint			
Owner Country County SW. Com	76h 160	- there	C. Las	110 0		CLASS 1	() CLASS	
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Incidential contact of	. U	VΊ	V2 /	1			V1 V2	[?]] {
Inadequate vector control	8010				e improperly managed.	8330		
Access not limited to operating hours	8020				ate leachate collection			
Inadequate artificial or natural barrier Inadequate information signs	8030			syste		8340		
Unsatisfactory access road(s)/parking	8040			,	e observed at the site	8350		. III.
area(s)	****				e entering runoff	8 360		
Certified personnel not present	8050				e entering a water			
during operating hours	0000			cour		8370		- 1 #
Unapproved salvaging of waste	8060				ate gas migration contro			
Evidence of open burning	8070			syste		8380		. 1
Inadequate fire protection	0808				ate maintenance of gas			
Unsatisfactory litter control	8090				ition control system	8390		
Inadequate employee facilities	8110				for explosions or			
No communication devices	8120			1	ntrolled fires	8420		
Inadequate operating equipment	8130				ot confined to a		\	
Unavailability of backup equipment	8140				geable area	8430	\succeq _	
Unavailability of cover material	8150				spreading of waste	8440		
Inadequate maintenance of	8160				compacting of waste	8450		
runon/runoff system(s)	0470				actory initial cover	8460	X ,	
Inadequate erosion control	8170				ectory intermediate	6.47 0		
Inadequate dust control	8180			cover		8470		1 1
Unauthorized waste accepted	8190 8210				ctory final cover	8480		
Unapproved special waste accepted	8220				e pooling of water	8490		
Tires improperly handled	6230				ctory stabilization of	0640		
Medical waste improperly handled	8240	 -		cover		861U		
Dead animals improperly handled	8250				of waste into water	8520		
Washout of solid waste					ctory records or reports	8530		
No permanent benchmark	8270				ater monitoring system	0540		
Inadequate random inspection	8280				perly maintained	8540		
program	8290			Operation	does not correspond	0670		
Mishandling of special waste	8300				ngineering plans	8570		
Buffer zone standard violated	8310				does not correspond	néon		
Inadequate maintenance of leachate	0310				ermit condition(s)	8580		
management system	8320		-		ans, operating manual	8590		
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TIME OF DAY / 50-2 WEATHER O	ONDITIONS	1:100	- L	165	COMPLIANCE DATE	Fab-	1,100	17/1
1/20 0000		C11075				tekny	M IX X	Y/)
Distribution: Fac	cility - White	e Fi	eld Offic	e - Canary	Central Office - XC		/	_ /



NAME OF SITE	1.		REGISTRA	TION NI IMBER		DATE
	St. it				Ä	P: 2
LOCATION (physical)	771		1.7/4/			
	1 nudan	_	•	Complete	e (SQ_FC4 at (\\O##	
OWNER/OPERATOR -		-			- · ·	
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	manar y		/ marja	VIEG) 000000 111	
Inadequate vector control	DO40			s Takina sulan mengala	0050	
	_				8330	
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Evidence of open burning	_					
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inadequate erosion control						
					8490	
Unapproved special waste accepted	****		Unsatisfa	actory stabilization of		
			1		8510	
Medical waste improperly handled			Dumping	of waste into water	8520	
Dead animals improperly handled			Unsatisfa	actory records or report	s 8530	
	Liber .	······	Groundw	rater monitoring system	١	
No permanent benchmark	8280 _		impro	perly maintained	8540	
			Operation	n does not correspond		
			with e	engineering plans	8570	
	8300					
	8310		with p	ermit condition(s)	8580	
			Permit, p	lans, operating manual		
management system	8320	· · ·	not av	/ailable	8590	
			No opera	ting scales	8610	
COMMENTS: COLUMN	(, 1	77				
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VEATHER (ZONULIONS 2	WITHVI	10			
Distribution: Fa	cility - White	Field Offi	ce - Canary	Central Office - X	C	



<u> </u>						
NAME OF SITE	1 11	//	REGISTRA	TION NUMBER		DATE
LOCATION (physical)	lastil	7	LSNL	<i>53-0203</i>		March 172
LOF Hay TO wes	t of Lo	undon		PURPOSE () Complete		ow-up
OWNER/OPERATOR		- 47.01	7 2 5			
CHAMER I Loudin Co. S. W. Compo	VIA UNIAA	Ve Suntah	/ Paul /	What	CLASS 1	() CLASS II
	/ V1	V2	7 7 7 7 7 7	VIAA	CLASS III	() CLASS IV
inadequate vector control	8010	*-	1:	_		V1 V2
Access not limited to operating hours			Leachat	e improperly managed	8330	
Inadequate artificial or natural barrier	8020			ate leachate collection		
Inadequate information signs	8030	-	syste		8340	
Unsatisfactory access road(s)/parking	8040			e observed at the site	8350	
area(s)	****			entering runoff	8360	
Certified personnel not present	8050		Leachate	entering a water		
dudes enemine hoursent			Cour		8370	
during operating hours	8060		Inadequa	ate gas migration contro		
Unapproved salvaging of waste	8070		syste		8380	
Evidence of open burning	8080		, -	ite maintenance of gas		
Inadequate fire protection	8090			tion control system	8390	Į
Unsatisfactory litter control	8110		Potential	for explosions or	0380	
Inadequate employee facilities	8120			trolled fires	0.400	
No communication devices	8130			ot confined to a	8420	
Inadequate operating equipment	8140	- —			0.40-	j
Unaveilability of backup equipment	8150			geable area	8430	
Unavailability of cover material	8160			spreading of waste	8440	
Inadequate maintenance of		- .	Improper	compacting of waste	8450	
runon/runoff system(s)	8170		Unsatism	ctory initial cover	8460	
inadequate erosion control	8180			ctory intermediate		
inadequate dust control			cover		8470	
Unauthorized waste accepted	8190	-	Unsatisfa	ctory final cover	8480	
Unapproved special waste accepted	8210		Excessive	pooling of water	8490	
Tires improperly handled	8220		Unsatisfa	ctory stabilization of	-	
Medical waste improperly handled	8230	· · · · · · · · · · · · · · · · · · ·	COVer		8510	1
Dead animals improperly ranging	8240		Dumping :	of waste into water	8520	
Dead animals improperly handled Washout of solid waste	8250			ctory records or reports	8530	
No someonation waste	8270			iter monitoring system	_	
No permanent benchmark	B280			erly maintained	8540	
inadequate random inspection				does not correspond		
program	8290		with an	gineering plans	8570	
Mishandling of special waste	8300		Operation	does not correspond	6570	
Buffer zone standard violated	8310		with no	rmit condition(s)	0500	
Inadequate maintenance of leachate			Parmit sta	nnii cundidun(\$)	8580 _	
management system	8320		not ava	ns, operating manual	0500	[
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COMMENTO	<u> </u>		No operati	uh acaiea	8610	
COMMENTS: SITE IS VBM	77		100 - 1-	1. 1		
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PERSON INTERVIEWED Signature)		INSF	ECTED BY			Lill "
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man in the same of			1-10	1110 11 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.14	21.00
TIME OF DAY / 5 WEATHER CON	IDITIONS (,,)	mu B	7/10	COMPLIANCE DATE	/	
Distribution: Facili	tv - White	Field Office	Cononi			
	-y = ++111K 0	TI OF TITLE	- Canary	Central Office - XC	_	

.CN-0761 (Rev. 7-98)

RDAs 2202 and 2499



NAME OF SIZE	REGISTRA	ATION NUMBER		RATE O
LOCATION (physical)	SNG		<u> </u>	1/// 450
Off broug D west of Condin		PURPOSE Complete	() Follo	
OWNERIGERATOR		() Complaint		
Ouror; Couron Co. S. W. Commission Odroto: Sange 1	ged Thomas	TYPE OF FACILITY	CLASS 1 CLASS III	() CLASS II () CLASS IV
V1 V2	REA (MOSTOR)	L	טונאסט ווו	V1 V2
Inadequate vector control 8010			0000	**
Access not limited to operating hours 8020		te improperly managed	8330	×
Inadequate artificial or natural barrier 8030	syste	late leachete collection	8340	
Inadequate information signs 8040		e observed at the site	8350	
Unsatisfactory access road(s)/parking		e entering runoff	8360	
area(s) 8050		e entering runon	0500	
Certified personnel not present	COU		8370	
during operating hours 8060		ate gas migration control		
Unapproved salvaging of waste 8070	syste		8380%	
Evidence of open burning 8080		ate maintenance of gas::		
Inadequate fire protection 8090		ation control system		
Unsatisfactory litter control 8110		l for explosions or	0.000	
Inadequate employee facilities 8120.	1	ntrolled fires	8420	
No communication devices 8130		ot confined to a	0.120	
Inadequate operating equipment 8140	1	ageable area	8430	•
Unavailability of backup equipment 8150		r spreading of waste	8440	
Unavailability of cover material 8160		r compacting of waste	8450	
Inadequate maintenance of		actory initial cover	8460	
runon/runoff system(s) 8170		actory intermediate		
Inadequate erosion control 8180	COVET	-	8470	
inadequate dust control 8190	Unsatisfa	actory final cover	8480	
Unauthorized waste accepted 8210	Excessiv	e pooling of water	8490	
Unapproved special waste accepted 8220	Unsatisfa	actory stabilization of		{
Tires improperly handled 8230	cover		8510	
Medical waste improperly handled 8240	Dumping	of waste into water	8520	
Dead animals improperly handled 6250		actory records or reports	8530	
Washout of solid waste 8270		ater monitoring system		1
No permanent benchmark 8280		perly maintained	8540	
Inadequate random inspection		n does not correspond		
program 8290		ngineering plans	8570	
Mishandling of special waste 8300		n does not correspond		i
Buffer zone standard violated 8310		ermit condition(s)	8580	
Inadequate maintenance of leachate		lens, operating manual		· .
management system 8320	not av		8590	
	No opera	ting scales	8610	
COMMENTS: 77		D. J.	79	
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PERSON INTERVIEWED IN	SPECTED BY	01/		
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TITLE	ITLE /	a di Amama	1 En	girle
14/m	1.12	MINING CAR	4-6-64	41.00
TIME OF DAY 2 1 28 JUNEATHER CONDITIONS (MAY, (200	COMPLIANCE DATE		
	ice - Canary	Central Office - XC		
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Louder County Land	11	REGISTRA	TION NUMBER 53-0203		DATE	8 2a
Att Hur Divest at Lando	m		PURPOSE Complete	() Fol	low-up	0 200
OWNER/OPERATOR			() Complain			
Owner . Condon Cus. Co. Commissio	m Operator i Sentek 18	au/ Thom	TYPE OF FACILITY	GLASS 1	() CL	ASS II
	// V1 V2	7	<u> </u>	CLASS III		ASS IV
Inadequate vector control	8010	1			V1	V2
Access not limited to operating hours	8020	Leachat	e improperly managed	8330		
inadequate artificial or natural barrier	8030		ate leachate collection			
Inadequate information signs	8040	syste		8340		i
Unsatisfactory access road(s)/parking	8040		e observed at the site	8350	X	
area(s)	8050	Leachate	e entering runoff	8360		
Certified personnel not present			entering a water			
during operating hours	8060	cour	= =	8370		
Unapproved salvaging of waste	8070	inadequa	ate gas migration contro	!		
Evidence of open burning	8080	syste		8380		
Inadequate fire protection	8090	inadequa	ate maintenance of gas			
Unsatisfactory litter control		migra	tion control system	8390	,	
Inadequate employee facilities	8110	Potential	for explosions or			
No communication devices	8120		trolled fires	8420]
Inadequate operating equipment	8130		ot confined to a			
Unavailability of backup equipment	8140		geable area	8430		
i incustichilière de la constanti de la consta	8150	Improper	spreading of waste	8440	-	
Inadequate maintenance of	8160	Improper	compacting of waste	8450		
ruman from a Eff and the	0.474	Unsatisfa	ctory initial cover	8460		
Inchesiate and the	8170	Unsatisfa	ctory intermediate			
Inadequate dust	8180	cover		8470		
I Inquith primed semake	8190		ctory final cover	8480		
linear resident and the linear	8210	Excessive	pooling of water	8490		
Fire a image and a little in a	8220	Unsatisfa	ctory stabilization of			
Modical west-	8230	cover	*	8510		
I look on mania in a constant of the constant	8240	Dumping	of waste into water	8520		
	8250	Unsatisfac	ctory records or reports	8530		<u> </u>
Mo normana kanada a	8270	Groundwa	ater monitoring system			
No permanent benchmark	8280	improp	erly maintained	8540		1
Inadequate random inspection		Operation	does not correspond	00.10		
	3290	with en	gineering plans	8570		1
Mishandling of special waste	3300	Operation	does not correspond	0070		
Buffer zone standard violated	3310	with pe	ermit condition(s)	8580		
Inadequate maintenance of leachate		r	ans, operating manual	0000]
management system	3320	not ava		8590		
•		No operati		8610		
COMMENTS: Ti	1/		9 000100	0010		1
There is still	1 some lead	Kado 1	com in the	* ~~		
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Den garbage at The	edge of the	linar.	Noon to tex	The h	ap six	٠
The 51loger and cover:	the own rache	1.7	7		1/1/2	~
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Der 15 pccepted lante pip	ila, dodinage layor	(ptc)	Leachard 13	MOW	Dir et	na
just below the edme in	Il De mi	//	dood do a se	11:0	ponge	<i></i>
The state of	1 TO NOW	22/1, 1	sold to pump	1/4/	W.	sel
ump or hand to a	leachate tante,	,				. [
PERSON INTERVIEWED	INSF	PECTED BY	1) 1//	·		
Signature) Fax 9 Mar		nature)	Kilk Orm	m		
MNS	TITL	E ÷	The second	سير	1.4	
1111 2 201		Faul		Engla	UN	
TIME OF DAY / (45-(1) 374 WEATHER COND	DITIONS Partly clou	do M	COMPLIANCE DATE	Tula c	77 6	اقتل امرام
Distribution: Facility	- White Field Office	-Canary	Central Office - XC	vary o	<u><2</u>	W Y
- · · · · · · · · · · · · · · · · · · ·	THEO THEO THE		Cantral Cittion VC			



LOCATION (physical)	St; 11	REGISTRATION NUMBER SNI 53-0203 DATE Sum 25
1 Of they 72 west at love	den.	PURPOSE Complete Follow-up
ALAUCIONE MICHIGIA		() Complaint () Other
Oustri Coudon Ca S. W. Co	monesion Open	TYPE OF FACILITY A CLASS ! () CLASS !! () CLASS !!! () CLASS !!! () CLASS !!!
	V1 / V2	THE CLASS III () CLASS III () CLASS
inadequate vector control	,	V1 V
Access not limited to operating hours	8010	Leachate improperly managed 8330
madequate artinoisi or natural barrior	8020 8030	inadequate leachate collection
interequate information signs	8040	system 8340
Unsatisfactory access road(s)/parking	0040	Leachate observed at the site 8350
area(2)	805 0	Leachate entering runoff 8360
Certified personnel not present		Leachate entering a water
quring operating hours	8060	course 8370
Unapproved salveging of waste	8070	Inadequate gas migration control
Evidence of open hurning	8080	_ system 8380
Inadequate fire protection	8090	_ Inadequate maintenance of gas
Unsatisfactory litter control	8110	_ migration control system span
Inadequate employee facilities	8120	Potential for explosions or
No communication devices	8130	uncontrolled fires 8420
Inadequate operation additionant	8140	vyaste not confined to a
Congratiability of packing continuous	8150	manageable area 8430
Unavailability of COVET metariot	8160	Improper spreading of waste 8440
INEGEQUATE Maintenance of		improper compacting of waste 8450
runon/runoff system(s)	8170	Unsatisfactory initial cover gage
madequate erosion control	8180	Unsatisfactory intermediate
Inadequate dust control	8190	COVER
Unauthorized waste accepted	8210	Unsatisfectory final cover 8480
Unapproved special waste accepted	8220	Excessive pooling of water saon
I I DO IN INCOMENA NADANA	8230	Unsatisfectory stabilization of
Medical waste improperly handled	8240	cover 8510
Dead animals improperly handled	8250	Dumping of waste into water 8520
Assistant of Police Maste	8270	Unsatisfactory records or reports 8530
No permanent benchmark	8280	Groundwater monitoring system
Inadequate random inspection	0200	Improperly maintained 9540
hindiguu	8290	Operation does not correspond
Mishandling of special waste	8300	With engineering plans 8570
Dutter Zone standard violated	8310	Operation does not correspond
nadequate maintenance of leacheto		With permit condition(s)
management system	8320	Permit, plans, operating manual
		not available 8590
COMMENTS: The		No operating scales 8610
The pachate	seems above	7
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thas probably been	two when to s	anything short the exactly
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		an The Islayes but it was too
nave o	vaste m	Pedrost when h
CARDAS God This but	need to con	1 places - They has opening
1	11 (4) (2)	solly to all he waste into one
face and, make sy	e all of 1	he waste in all areas is care
the and at the day		TO TO COVER
RSON INTERVIEWED	Loday, Ales	reed to work on proxim
gnature)	INS	PECTED BY DOCOW AND A PERMANENT
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ME OF DAY () SO I TO WEATHER CON	DITIONS	
The A A st A	2 11 11 h	COMPLIANCE DATE TOLE Q DATE
Distribution: Facility	y - White Field Office	· VIII / Addition
0761 (Rev. 7-98)).= = ;iii o c	- Canary Central Office - XC
0,01 (465. (-88)		/



NAME OF SITE	16		7			
Louden County las	ulti 11		REGISTRA	TION NUMBER		DATE
LOCATION (physical)	1		SIVE	53-0003		July 9 20
Af Any 72 west of Co	redon		-	PURPOSE () Complet () Complain		ollowup
CHARLE COUNTY GS 6. COMM		- i 1 3			()0	
Cold & Cross of Col China	SIUK (peratis	Market.	Tustik Give	31) CLASS 1) CLASS III	() CLASS II
de de la companya de	// V1	V2/		·×	/ CDASS III	() CLASS IV
Inadequate vector control	8010		Leachate	improperly managed		V1 V2
Access not limited to operating hours	8020		Inadenus	ite leachate collection	8330	
Inadequate artificial or natural barrier	8030		syste	ur reactions collected.	00 44	
Inadequate information signs	8040			observed at the site	8340	
Unsatisfactory access road(s)/parking area(s)			Leachate	entering runoff	8350	× —
Certified personnel not present	8050	<u> </u>	Leachate	entering a water	8360	
during operating hours	***		cours	6	8370	
Unapproved salvaging of waste	8060		Inadequa	te gas migration contro	al Coro	
Evidence of open burning	8070	-	systen	n	8380	•
Inadequate fire protection	8080		Inadequat	e maintenance of gas	0000	
Unsatisfactory litter control	8090		migrat	ion control system	8390	I
il Inadequate employee facilities	8110		Potential t	or explosions or		
No communication devices	8120		uncont	rolled fires	8420	
Inadequate operating equipment	8130 8140			confined to a		
Unavailability of backup equipment	8150		manag	eable area	8430	\times 1
Unavailability of cover material	8160	<u> </u>	improper s	preading of waste	8440	
Inadequate maintenance of			Improper o	compacting of waste	8450	
runon/runoff system(s)	8170		Unsatisfac	tory initial cover	8460	
Inadequate erosion control	8180		Unsatisfac	tory intermediate		
Inadequate dust control	8190		Cover		8470	
Unauthorized waste accepted	8210		Chsatisfac	tory final cover	8480	
Unapproved special waste accepted	8220		Uncoticina	pooling of water	8490	
rires improperly handled	8230	-	COVEL	ory stabilization of		
Medical waste improperly handled	8240			Darament Carlos	8518	
Dead animals improperly handled	8250		Incaticfact	waste into water ory records or reports	8520	
Washout of solid waste	8270		Groundwate	or monitoring system	6530	
No permanent benchmark	8280		imprope	rly maintained		İ
inadequate random inspection program	— <u>—</u>		Operation d	oes not correspond	8540	
Mishandling of special waste	8290		with eng	neering plans	8570	1
Buffer zone standard violated	8300		Operation d	oes not correspond	9210	
inadequate maintenance of track	6310		with perr	nit condition(s)	6580	
Inadequate maintenance of leachate management system	_	i	Permit, plan	s, operating manual	0000	
management system	8320		not availa	aple	8590	. 1
·	-		No operating		8610	
COMMENTS: A Clima I	?				0010	
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alig ang a big hole abu	& it and	MAP 1	Dumpan	a louchade a	1 1	In land
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	····	TITLE	PKIA	Tornental E		20
ME OF DAY)	IDITIONS	~	Add	, ,	MAIN	
	20///		10	COMPLIANCE DATE	Take	23 2019
Ölstribytion: Facili		igld Office	Canani	Central Office - XC	1-04	00 -00 /
	•	914 011100	Collaik	CAMUSI OTHER - XI.	/	/



MATT DILLIART

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NAME OF SITE			ATION NUMBER	DA	1 28 20%
Louden Corney Candfill		51/	53-0203 PURPOSE () Complete	Follow-up	
OF HOW D West of Lon	don		() Complete	() Other	
OWNER DEERATOR	3 / 6	11.	TYPE OF FACILITY		CLASS II
Owner: Coulon G. S. W. Commi	ISIUM BERAKU - AM	lek/	1	CLASS III ()	CLASS IV
	√ V1 V	2 /		V1	V2
Inadequate vector control	8010	Leacha	ite improperly managed	8330	1
Access not limited to operating hours	8020		uate leachate collection		
Inadequate artificial or natural barrier	8030	sys		8340	
Inadequate information signs	8040		ite observed at the site	8350	
Unsatisfactory access road(s)/parking		Leacha	ite entering runoff	8360	
area(s)	8050	Leacha	ite entering a water		ì
Certified personnel not present			irse	8370	
during operating hours	8060		uate gas migration control		ļ
Unapproved salvaging of waste	8070	sysi		6380	
Evidence of open burning	8080		uate maintenance of gas		
Inadequate fire protection	8090		ration control system	8390	- — i
Unsatisfactory litter control	8110		al for explosions or	0.420	
Inadequate employee facilities	8120		ontrolled fires	8420	
No communication devices	8130		not confined to a	8430	
Inadequate operating equipment Unavailability of backup equipment	8140 <u> </u>		nageable area er spreading of waste	8440	-
Unavailability of cover material	8160		er compacting of waste	8450	
Inadequate maintenance of	5100		factory initial cover	8460	
runon/runoff system(s)	8170		factory intermediate]
Inadequate erosion control	6160	COVE	•	8470	1
Inadequate dust control	8190 — —	- Unsatis	factory final cover	8480	
Unauthorized waste accepted	6210		ive pooling of water	8490	
Unapproved special waste accepted	B220		factory stabilization of		
Tires improperly handled	8230	COVE		8510	<u> </u>
Medical waste improperly handled	B240	Dumpir	ng of waste into water	8520	
Dead animals improperly handled	B250		factory records or reports	8530	
Washout of solid waste	8270		lwater monitoring system		
No permanent benchmark	8280		roperly maintained	8540	
Inadequate random inspection			ion does not correspond		
program	8290		engineering plans	B570	
Mishandling of special waste	8300		on does not correspond	0500	
Buffer zone standard violated	8310		permit condition(s)	8580	
Inadequate maintenance of leachate	0000		plans, operating manual available	8590	
management system	8320		rating scales	8610	-
		No ope	rating scales	5010	
comments: They have co	pa and -	Re clan	a fact a doce	a. 4 To	1 nold
	carea up 7	stop	e tailure area.	- Mari Ju	ausk
on top and graded The	ARA WETK	some sois	cover. Lot en	sugh care	r ever
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PERSON INTERVIEWED		INSPECTED		yor.	· -
(Signature)		(Signature) /	KAR BIRNA	<u></u>	
TITLE .		TITLE 7	winn non tal	EnA.	noor
	0 1/	- 1-	V0		
TIME OF DAY 2:15-3:00 WEATHER CO	DIJ TONS	clouder	COMPLIANCE DATE	. /	
Distribution: Fac	ility Whith Earl	d Office Wana	ry Central Office - XC	•	



AME OF SITE		DAL PACILI	TY EVALUATIO	NI .	
- number of	1 10			14	
LOCATION (physical)	andh 11	REGISTR	ATION NUMBER		
	1	I SA!	C 2 - A@		DATE
OWNER/OPERATOR WEST of	Condo		PURPOSE OC	13_	A 44.1.1-26 21
Owner: Land on Co. S. Al. Commit	. 1		I SUL OSE SCO	mplete () F	ollow-up
T WILL CO. IN THE ST. T.	sion Operation: Sunlak!	Tuchia	- " [/ [mplaint () o	ther
I IDadenusta	V1 V2	Justines	TYPE OF FACILITY	NO CLASS 1	
Access not limited to	8010	f		() CLASS III	() CLASS II
Access not limited to operating hours Inadequate artificial or natural barrier Inadequate information signs	8020	Leachata	im.		() CLASS IV
Inadequate intermedial parrier	8030 —	Inadenus	improperly mana	ged 8330	V1 V2
Unsatisfactory access re-	8040 — —	syster		ion	
Unsatisfactory access road(s)/parking		Leachate	Obos-	8340	. 1
Certified personnel	8050	Leachate	observed at the si	te 8350	
during operating hours				8360	
	8060	COURSE	entering runoff entering a water	5555	
Evidence of open burning	8070 —	Inadequati	, , , , , , , , , , , , , , , , , , , ,	8370	1
	8080	system	e gas migration co	ntrol	
	8090	Inadequate	. Promite d	8380	.
Inadequate employee facilities No communication	8110 —	migratio	: maintenance of g	as	
No communication devices	8120 —	Potential to	in control system	8390	[
Inadequate operating equipment Unavailability of books	8130 —	i i i i i i i i i i i i i i i i i i i	I EXDIOSIONO	-	
Unavailability of hackure	8140	Waste not a	elled fires	8420	- 1
Unavailability of backup equipment Unavailability of cover material Inadequate maintenant	8150	Waste not o	onlined to a	0120	
Inadequate maintant (Material	8160	managea	inie alea	8430	
runon/runoff system(s)		Improper so	reading of waste	8440	
Inadequate erosion control	8170	Unsatisfactor	npacting of waste	8450	
Inadequate dust control	8180 —	Unsatisfactor	y initial cover	8460	
	8190	Cover	y intermediate	2700	S
Jnapproved special waste accepted ires improperly handled	8210	Insatisfactory	e et i	8470	1
ires improperly handled				8480	
	8230	Insatisfactor	of water	8490	
ead animals improperly handled /ashout of solid waste	3240	cover	ning of water stabilization of		1
/ashout of solid waste	3250 — D	Umping of um	1_ •	8510	- 1
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. "" oquate fandom ina" 8	280 — GI	Oundwater -	records or reports conitoring system	8530	
program		improperly -	ormoring system		
shandling of special waste	290 Op	improperly n	naintained not correspond	8540	1
	300 —	with enginee	not correspond		
7-90 IUBINIADAA	10 — Opi	eration does	ung plans	8570	1
management system		with permit comit name	ring plans not correspond		
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MENTS:		ot available	erating manual		
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DAY/A :) C- // () CATE ATURE	TITLE	- 4 / F	4 (30 yr		
WEATHER CONDITION	is C	AU110.	ronful .	77.	
Distribution: Facility - Wh	Junn Viz X/10	COMP	IANOE -	majores,	
Rev 7000 X	ite Field Office - Canary	JOJVIPI	JANCE DATE	darkla. M	
Rev. 7-98) 9 Hime. Try to	do La La		Office - XC	VIII /	Vacq
Wilson A.	a lor of	cont.	7.0	/-	



LOCATION (physical)	5//	REGISTR/	TION NUMBER		DATE
	10.10		53-0203		September11
OMATERIA	ouron.		PURPOSE Comple () Comple	. / 1 ^ - "	ow≺up.
Swifer: Coulon Cu C. W. Commuss	In Arounter Co Sal)	T 14 C	Tybe or every		
	VI VI	Justin Given		CLASS 1	() CLASS II
Inadequate vector control	V V1 V2	-		Y CONDO III	() CLASS IV
Access hat limited to an and the	8010 8020	Leachate	improperly managed	sinos	V1 V2
	8030	— I madedus	10 10achate collection	8330	
	B040	— j system	ID		
Unsatisfactory access road(s)/parking area(s)		_ Leachate	observed at the site	8340 8350	
	8050	Leacuste	enterina rusoff	8360	
Certified personnel not present during operating hours		Leachate	entering a water	5000	
Unapproved saving nours	8060	i cours	8	8370	
I WINDOW OF ON DOMA MILENIA	8070	_ madequal	te gas migration contro	ol .	
I III QUEQUATE TITO PROTOCOLO	8080		£	8380	
Chistastactory litter and the	8090	and parties	e maintenance of ges		
I MOSPOURSTE PINDISMON Constitut	8110	- 1 2279100	UII COntrol evetor	8390	i
	8120	(Breent	or explosions or folled fires	_	
MOUBURIA ANDRAGO	8130	Waste not	confined to a	8420	1
- ' ' ' WINGDOUGLY OF NOADOW A	8140	manage	saple area	_	
	8150	Improper si	preading of waste	8430	
i magadagir Mgintanana at	8160	I withrobat Co	OMDActing of waste	8440	
! 'UIUINIOT evetom/o\	8170	L OusattalaCi	OEV initial cover	8450	
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Unauthorized waste accepted	8190	I COABL		8470	
Unapproved special	8210	Unsatisfacto	ry final cover	8480	
Unapproved special waste accepted Tires improperly handled	8220	CACGSSIVE DA	Colina of water	8490	!
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T = WILLIAMS II NOTABASIN K V. /	8240	COVE		8510	. 1
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1 5.08.611		Operation de	maintained	8540	
Mishandling of special waste	8290	with engin	es not correspond		
I PMIDI ZDDB STANASIA GALLA I	8300	Operation due	eering plans	8570	1
moveduate maintenance of leashests	8310	With permit	es not correspond condition(s)	-	
management system	6700	Permit plans	operating manual	3580	
	8320	not availab	ie .		-
COMMENTS: /) J	<u>·</u>	No operating s	I	590	
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for todays waste Co	adequately con	eved pip	rything is co	10 /	
and the same	ne mich un			Great Oc	cent
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I THE ROLL OF MI	check done	1.		week.	che.
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need to watch De	The time	leachate	is about to	Break	1
17648	and tix			BI ENTE	aug.
PERSON INTERVIEWED	-		ecessary		
L(Signature) / J. Jeff - Jenny -	INSPE	CTED BY	2-/		
TITLE	(Signa	ture)	ich IZ-		
There are a series	TITLE		en som		
TIME OF DAY 2'01-2-30 PHATEATHER CONDI		Trull	on mental.	Fig 1.	200
1	TIONS CHOUNTY 70	20 100	MPI IANGE -	trache	27
Distribution: Facility	White Field Office -		MPLIANCE DATE	/	1
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· core really			- 100		



	NAME OF SITE								
	1 de la	(Cm X 1	10.11		REGISTR	ATION NUMBER		Lower	
	LOCATION	- county Co	~0571		5//	53-0702		1	2016
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	OWNER/OPER	THOR COLL		1	1/6				
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				Ø1 V2	17	134000	LLASS III		
-	Inadequate ve	rtor control	8 0 ±0					V1 V2	2
	Access not lin	ted to operating hours			Leachat	e improperly managed	8330	_	
	Inagequate an	licial or natural harrier			_ เบลสอดีก	ate leachate collection			`
	Insceduate inf	imation sions					8340		-
	Unsatisfactory	BCCess road(s)/parking	0040		Leachat	e observed at the site	8350		·
	į area(s)	•	POEO		Leachati	e entering runoff	8360		'
	Certified perso	inel not present	9000		. Leachate	a entering a water			٠ ١
	during oper	iting hours	onen				8370		1
	Unapproved se	Vacing of waste		<u> </u>	Inadequa	ate gas migration contro	l i		1
	Evidence of on	3D primipu			syste	m			- 1
	Inadequate fire	nsotestion			inadequa	ate maintenance of das	****		J
	Unsetisfactory	Hat anneal			Migra	tion control system	8390		1
i	Inadequate em	MEN COMICI			Potential	for explosions or	COOD		1
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1	inodenuote eser	system(s)	8170		Unsatisfa	CTOTY Intermediate	040U		Į.
ı	madequate eros	on control	8180		cover	") uterillediate	0.470		
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l	Tires impression	Diel waste accepted	8220		Unsatisfac	topy stabilization -4	8490		
ı	mes improperly:	handled	6230		COVET	vorà sranius allau of	0545		ĺ
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l	neso atimais it.	properly handled			Unsatisfac	Again IUID MSIGL			<u> </u>
Į	AABSUORT OF SOIL	waste	8270 ~		Granduct	tory records of reports	8530		I
•	No parmanent k	nchmark			Groundwa.	ter monitoring system	_		ľ
1	nadequate ranci	in inspection	-		Oponation	eny maintained	8540		ĺ
1	program	•	8290		Operation	does not correspond			
ſ	vishandling of sp	ecial waste			Operation	gineering plans	8570		1
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J	nadequate mair:	anance of leachate			with per	mit condition(s)	8580		
	management	iystem	8320		Fermit, plai	na, operating manual			
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-11	Pulle.	-/i/5 ANY EATHER CO	SNOITIONS -		11/11/	COMPLIANCE DATE			
		Distribution Faci	lity - White		many	l			
			r (9 − ¥¥11)(6 *	rield Office	- Canary	Central Office - XC,	-	10	/
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		All Files Comments	- wallen	MACK E	years A	TIVE TO STORY	1 * '	,	
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E Comb Cand	7/		REGISTRA	TION NUMBER 53-0203		DATE	-520
M (physical)	Cardon			PURPOSE Complete	()F	llow-up	
ROPERATOR	under-			() Complaint	<u>()</u> 9		
ACHA SILA CALLA	ción Maria	1 Carlos	(A.I.	TYPE OF FACILITY	CLASS 1		ASS IÏ
My Coudin Coc & Wi Commi		· Santan	Jash L	aires (CLASS III		ASS IV
	<i>U</i> V1	V2	·	•		V1	V2
nadequate vector control	8010		Leachat	e improperly managed	8330		
Access not limited to operating hours	8020	. ——		ate leachate collection			
Inadequate artificial or natural barrier	8030		syst		8340		
Inadequate information signs	8040	· ——		e observed at the site	8350		
Unsatisfactory access road(s)/parking	3040		í	e entering runoff			
area(s)	8050				8360		
Certified personnel not present	0000			e entering a water	2072		
during operating hours	2000		cou		8370	. 	
Unoncoved set mains of wants	8060			ate gas migration control			
Unapproved salvaging of waste	8070		syste		8380		
Evidence of open burning	8080			ate maintenance of gas			
Inadequate fire protection	8090			ation control system	8390		i
Unsatisfactory litter control	8110			l for explosions or		,	
Inadequate employee facilities	8120			ntrolled fires	8420		
No communication devices	8130		ŀ	ot confined to a			
Inadequate operating equipment	8140	•	1	ageable area	8430		
Unavailability of backup equipment	8150			r spreading of waste	8440		
Unavailability of cover material	8160			r compacting of waste		-	
inadequate maintenance of	100				8450		— J
runon/runoff system(s)	0476			actory initial cover	8460		}
Inadequete erosion control	8170		1	actory intermediate			ı
Inadequate dust control	8180		cover		8470		
madequate dust control	8190			actory final cover	8480		
Unauthorized waste accepted	8210			e pooling of water	8490		
Unapproved special waste accepted	8220		Unsatisfi	actory stabilization of			ŀ
Tires improperly handled	8230		cover	•	8510		
Medical waste in properly handled	8240		Dumping	of waste into water	8520		
Dead animals improperly handled	- 8 250			actory records or reports	8530		
Washout of solid waste	8270		Groundy	vater monitoring system			
No permanent benchmark	8280			perly maintained	8540		ļ
Inadequate random inspection				n does not correspond	9070		
program	8290			ongineering plans	8570		į.
Mishandling of special waste	8300				6570		
Buffer zone standard violated				n does not correspond	0000		1
	8310			permit condition(s)	8580		
Inadequate maintenance of leachate	0000		, -	lans, operating manual			1
management system	8320			/eilable	8590		1
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COMMENTS: 77	1 / /						
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drea st is the no	MIZ WIL		<i>5.</i> -	1 1/2	-11-1		
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PERSON INTERVIEWED		TAIG	SPECTED B	V 1 - 19 - 19 -		-	
(Signature) Ount / O			gnature)	1191/h. 150.	m-	_,	[
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TIME OF DAY A LATTER OF	Augustiania A		111				
TIME OF DAY (), 'TC / JUNEATHER O	CADITIONS (1/4)	ny/∞	60"	COMPLIANCE DATE	NOVER	ter 19	20
Distribution: Fai	cility - White	Meld Office	e - Canary	Central Office - XC		<u> </u>	



NAME OF SITE			
London - Perox	andfill	REGISTRATION NUMBER	Toors.
(physical)	75100111	SNL 53-0203	BATE
OF they 72 west	of Condon	PURPOSE Complete () Follow-up
OWNER/OPERATOR		() Complaint) Other
Owner: Constanty Ch. Con	aniscion Promotors Som	116 J TYPE OF EACH DOLL	
	V1 V2	TELASS OCLASS	() 40/00/11
Inadequate vector control	PO45		
1 75055 not limited to an accept	8010 8020 —	Leachate improperly managed 833	•~
	8030	Inadequate leachate collection	.0
		- l system	/
VIDERISIBLEON SCOOLS TOPEN IN THE PLANTAGE OF	a 0040	Leachate observed at the site 835	
	8050	Leachare entering runoff	
Certified personnel not present		Leachate entering a water	' — <u> </u>
during operating hours	8060	course	
Unapproved salvaging of waste	8070	Inadequate gas migration control	'
Evidence of open burning Inadequate fire protection	8080	Oyaton	
Unsatisfactory litter control	9090	Inadequate maintenance of gas	
Inadequate emplemental	8110	I TIME GROUP CONTROL STATES	
Inadequate employee facilities No communication devices	8120	Totalitial Tot explosions or	
Inadequate operating equipment	8130	uncontrolled fires	· i
	8140	Waste not confined to a	
	8150	Managable area	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	8160	Improper spreading at	\angle
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	8250	Parabolica VI WESTA Into Mostan	
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Mishandling of special waste	8290	Operation goes not correspond	ij
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management system			İ
	8320	Permit, plans, operating manual not available	
COMMENTS: /	· · · · · · · · · · · · · · · · · · ·	No operating scales 8590	·
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BERROLL	The orally	operational portion	Che Correit
PERSON INTERVIEWED -		again Popular	V75
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TIME OF DAY 1/2	TITLE	The Book	
TIME OF DAY //3/2) POWEATHER CON		ENVIONMENTA/ Fide	200
30 PANEATHER CON	UTIONS PLANT OF THE	2 10/1	neer
Distribution: Facility	-White Field Cold	OS COMPLIANCE DATE POPOLA	28 2824
V-0761 (Rev. 7-98)	-White Field Office - C	anary Central Office - XC	CLB 2009 🖪
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NAME OF SITE	REGISTRATION NUMBER DATE	_
MATLOCK BOND LOW DON COUNTY	SNL 53-0303 1-15-18	<u> </u>
LOCATION (-bariowi)	PURPOSE () Complete () Follow-up () Complaint () Other	•
DFF Hay TON LOUDEN COUNTY	* * * * * * * * * * * * * * * * * * *	
OWNER/OPERATOR / SANTEIC - DOMA DIC	TYPE OF FACILITY () CLASS II () CLASS II () CLASS III () CLASS II	
COSATY / SANTEIC - DOME DIC	() CLASS (ii () CLASS (
V1 V2		
Inadequate vector control 8010	Leachate improperly managed 8330	-
Access not limited to operating hours 8020	Inadequate leachate collection	
Inadequate artificial or natural barrier 8030	system 8340	
Inadequate information signs 8040	Leachate observed at the site 8350	
Unsatisfactory access road(s)/parking	Leachate entering runoff 8360	•
area(s) 8050	Leachate entering a water 8370	
Certified personnel not present		•
during operating hours 8060	Inadequate gas migration control system 8380	
Unapproved salvaging of weste 8070		
Evidence of open burning 8080	Inadequate maintenance of gas	
inadequate fire protection 8090	migration control system 8390	•
Unsatisfactory litter control 8110	Potential for explosions or uncontrolled fires 8420	
Inadequate employee facilities 8120	uncontrolled fires 8420	,
No communication devices 8130 Inadequate operating equipment 8140	manageable area 8430	
Inadequate operating equipment 8140 Unavailability of backup equipment 8150	Improper spreading of waste. 8440	
Unavailability of cover material 8160	Improper compacting of waste 8450	
Inadequate maintenance of	Unsatisfactory initial cover 8460	
runon/runoff system(s) 8170	Unsatisfactory intermediate	
inadequate erosion control 8180	cover 8470	
Inadequate dust control 8190	Unsatisfactory final cover 8480	1
Unauthorized waste accepted 8210	Excessive pooling of water 8490	
Unapproved special waste accepted 8220	Unsatisfactory stabilization of	
Tires improperly handled 8230	cover 8510	
Medical waste improperly handled 8240	Dumping of weste into water 8520	1
Dead animals improperly handled 8250	Unsatisfactory records or reports 8530	
Washout of solid waste 8270	Groundwater monitoring system	
No permanent benchmark 8280	Improperty maintained 8540	
Inadequate random inspection	Operation does not correspond	
program 8290	with engineering plans 8570	
Mishandling of special waste 8300	Operation does not correspond	
Buffer zone standard violated 8310	with permit condition(s) 8580	
Inadequate maintenance of leachete	Permit, plans, operating manual	
management system 8320	not available 8590	
	No operating scales 8610	
COMMENTS:		⊣
COMMENTS: TOTALL C. TITCE TITOL	no Un Tab like of	_
Problem 1	FIVAT Lexik & THIK	
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SLOW ACOPONE needs 1000	instruct of tish kind for	4
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PERSON INTERVIEWED	NSPECTED BYY	寸
	Signature)	
	TITLE E-7->< ?	\neg
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TIME OF DAY / COME WEATHER CONDITIONS 500	COMPLIANCE DATE W/M	1
	ffice - Canary Central Office - XC	ب
Programmetour Lacines - saura - Litaria O		

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NAME OF SITE	7.1	ARECISTA	ATION NUMBER	·		
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-7-11 (M) (M) (M)		101 710	DI IDROCE V		12/22/12	<u>></u> -
Hry72 (ndu	- Not I-40		PURPOSE Complete		llow-yp	\neg
OWNER/OPERATOR	The state of the s					
LOUTON CONTY	Santik		TYPE OF FACILITY	QCLASS 1	() CLASS II	\Box
7	V1 V2	- 1	L.,) CLASS III	() CLASS N	≠.
Inadequate vector control	On4n				V1 V2	
Access not limited to operating hours	9020	_ Leachat	e improperly managed	8330		- 1
inadequate anticial or natural harrier	8030	- luaqedn	ate leachate collection			
I inadequate information signs	P040	_ syste		8340		
Unsatisfactory access road(s)/parking		Leachati	e observed at the site	8350	→	-
(4(64(8)	8050	Leachate	entering runoff	8360		- }
Certified personnel not present	3000		entering a water		200	دار
during operating hours	8060	coun		8370	7500	Ŋσ
Unapproved salvaging of waste	8070	Iusqedn≊	ate gas migration contra	ol	TO RE	1
Evidence of open burning	8080	. syster		8380	•	1
Inadequate fire protection		Inadequa	ite maintenance of gas			
Unsatisfactory litter control	8090	migra	tion control system	8390		
inadequate employee facilities	8110	Potential	for explosions or			1
. No communication devices	8120		trolled fires	8420		1
Inadequate operating equipment	8130	Waste no	t confined to a			
Unavailability of backup equipment	8140	ហានពងខ្ម	Jeable area	8430		1
Unavailability of cover material	8150	Improper	spreading of waste	8440		
Inadequate maintenance of	8160	Improper	compacting of waste	8450		İ
runon/runoff system(s)	0470	Unsatisfac	tory initial cover	8460		ļ
Inadequate erosion control	8170	Unsatisfac	tory intermediate			l
inadequate dust control	8180	cover		8470	İ	
Unauthorized waste accepted	8190	Unsatisfac	tory final cover	8480		ĺ
Unapproved special waste accepted	8210	Excessive	pooling of water	8490		
Tires improperly handled	8220	Unsatisfac	tory stabilization of	· • • • • •		
Medical waste improperly handled	8230	cover		8510	ì	
Dead animals improperly handled	8240	Dumping of	f waste into water	8520		
Washout of solid waste	8250	Unsatisfact	tory records or reports	8530		
Vo permanent benchmark	8270	Groundwat	er monitoring system	_		
nadequate random inspection	6280	Imprope	aly maintained	8540	}	
program	o et a -a	Operation of	loes not correspond		 	
fishandling of special waste	8290	with eng	ineering plans	8570		
uffer zone standard violated	8300	Operation of	loes not correspond			
hadaquate maintenance of leachate	8310	with peri	mit condition(s)	8580	1	
management system	. •	Permit, plan	is, operating manual		 [
	8320	not avail	able	8590		
	. :	No operation		8610		
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E OF DAY 12 Don WEATHER CO	INDITIONS 4/AD_					
VIII	. 10 F OUX		COMPLIANCE DATE	17:17-Le	HER	
Distribution: Facil	lity - White Field Office	- Canary	Central Office - XC		-1,1	•
Total In The State of the State	Vy Rain ellon + 5		Total Olling - VC	حرا ۱۱:نما	FINT	

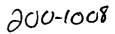


NAME OF SITE DON MATLOCKE	Sed (1.	9351	REGISTRA	ATION NUMBER - COC	23,	3-9-19
LOCATION (physical)				PURPOSE () Complete () Complaint	() Oth	8r
OWNERIOPERATOR/	KIC			TYPE OF FACILITY 740	LASS 1	() CLASS II () CLASS IV
	. V1	V2				V1 V2
Inadequate vector control	8010		Leachat	te improperly managed	8330	
Access not limited to operating hours	8020		Inadequ	rate leachate collection		
Inadequate artificial or natural barrier	B030		syste		8340	<u>√</u> —
Inadequate information signs	8040			te observed at the site	8350	<u> </u>
Unsatisfactory access road(s)/parking				te entering runoff	8360	
area(s)	8050			te entering à water	0978	
Certified personnel not present			COU	=	8370	
during operating hours	8060	<u> </u>		late gas migration control	nana.	·
Unapproved salvaging of waste	8070		syste		B380	
Evidence of open burning	8080	<u> </u>		rate maintenance of gas	9200	
Inadequate fire protection	8090			ration control system	8390	
Unsatisfactory litter control	8110			al for explosions or	8420	
Inadequate employee facilities	8120			ontrolled fires	0420	
No communication devices	B130		r	not confined to a	8430	
Inadequate operating equipment	8140			ageable area	8440	
Unavailability of backup equipment	B150			er spreading of waste er compacting of waste	8450	
Unavailability of cover material	8160			factory initial cover	8460	
Inadequate maintenance of	8170			factory intermediate	0400	
runon/runoff system(s)	8180		COVE		8470	j
Inadequate erosion control Inadequate dust control	8190		1	factory final cover	8480	
Unauthorized waste accepted	8210			ve pooling of water	8490	
Unapproved special waste accepted	8220			factory stabilization of		
Tires improperly handled	8230		cove	•	8510	1
Medical waste improperly handled	8240			g of waste into water	8520	
Dead animals improperly handled	8250			factory records or reports	8530	
Washout of solid waste	8270			water monitoring system		
No permanent benchmark	8280		1	operly maintained	8540	1
Inadequate random inspection	5200	 .		on does not correspond		
program	8290			engineering plans	8570	
Mishandling of special waste	6300			on does not correspond		
Buffer zone standard violated	B310			permit condition(s)	8580	
Inadequate maintenance of leachate				plans, operating manual		
management system	8320	. •		vailable	8590	
···				rating scales	8610	
COMMENTS: VOX350	xered	1-	1/ -	- Some au	045	Cirl
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PERSON INTERVIEWED	_		ISPECTED	BY	אגומים	V
(Signature)			Signature)	(.(0,1		
TITLE			ITLE T	E7-3_	>	
TIME OF DAY IMEATHER CO	ONDITIONS (7	ludi 5	5%	COMPLIANCE DATE	140	1475
Distribution Fac	ility - White	Elekt Off	ice - Cana	ry Central Office - XC	,	

					·
AME OF SITE		0	REGISTE	ATION NUMBER	
LOUDON COUNTY M	ATLAINE	ench	I SI	110N NUMBER 12 53-20-20-3	DATE
LOCATION (physical)		200	1		<u> 13-25-10</u>
The V 73 K)					Follow-up
OWNER/OPERATOR	a - mt. 1.				Other
LOUD COUNTY	SPMICK			TYPE OF FACILITY () CLASS 1	
lead	V1	V2		() CLASS I	() CLASS IV V1 V2
Inadequate vector control	8010		Leachat	e improperly managed 8330	- 1
Access not limited to operating hours	8020	*********	Inadequ	e improperly managed 8330 ate leachate collection	<u> </u>
Inadequate artificial or natural barrier	8030		syste		1 -6 4- 8-
Inadequate information signs	8040			em 8340 e observed at the site 8350	
Unsatisfactory access road(s)/parking area(s)			Leachate	e entering runoff 8360	· ——
Certified personnel not present	8050		Leachate	entering a water	/
during operating hours			cours		j
Unapproved salvaging of waste	8060		Inadequa	ate gas migration control	
Evidence of open burning	8070	····	syste	m 8380	
Inadequate fire protection	8080		Iпаdequa	ite maintenance of gas	
Unsatisfactory litter control	8090		migra	tion control system 8390	
Inadequate employee facilities	8110		Potential	for explosions or	
No communication devices	8120		uncon	trolled fires 8420	. 1
Inadequate operating equipment	8130			t confined to a	
Unavailability of backup equipment	8140 8150		mánag	geable area 8430	}
Unavailability of cover material	8160		Improper	spreading of waste 8440	
Inadequate maintenance of			Improper	compacting of waste 8450	
runon/runoff system(s)	8170		Unsatisfa	ctory initial cover 8460	
Inadequate erosion control	8180			ctory intermediate	
Inadequate dust control	8190		cover	8470	
Unauthorized waste accepted	8210		Unsatisfac	ctory final cover 8480	
Unapproved special waste accepted	8220		Excessive	pooling of water 8490	
rires improperly handled	8230		Unsatistad	ctory stabilization of	
Medical waste improperly handled	8240		Cover	8510	
Dead animals improperly handled	8250		Lineations	of waste into water 8520	
vvasnout of solid waste	8270		Groundwa	tory records or reports 8530	
No permanent benchmark	8280		improp	ter monitoring system erly maintained 8540	
nadequate random inspection			Operation	erly maintained 8540 does not correspond	
program dishonding of	8290		with en		1
Mishandling of special waste	8300		Operation	gineering plans 8570 does not correspond	
Buffer zone standard violated	8310		With per		
nadequate maintenance of leachate			Permit nia	mit condition(s) 8580 ns, operating manual	
management system	8320	·	not avai	9 1 1	1
·			No operatir		
OMMENTS: 1/ 025-		- 		90010	
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RSON INTERVIEWED		None	TOTEL TO		_C/OSA/
gnature)		(Signa	ECTED BY	01.6 th. st	
TLE MANAGER/Site		TITLE		well to the same	
War and Williams		11116		1/1257	<i>,</i>
ME OF DAY WEATHER COL	NOITIONS LINA	= 0-	t	COMPLIANCE DATE	1.0
	<u> </u>	- KG.		COMPLIANCE DATE	4
Distribution: Facili	ty - vvnite Field	d Office -	Canary	Central Office - XC	

CN-0761 (Rev. 7-98)

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NAME OF SITE			REGISTRA	TION NUMBER		DATE
LOUDON COUT	MAT	LOCKY	and	JWL 53-6)203	4-16-10
LOCATION (physical)		,		PURPOSE Complete	() Fall	low-up
Thu Ta Not To	75	Lack	ــــــــــــــــــــــــــــــــــــــ	() Complaint		
OWNER/OPERATOR ,	'	J.J.	G.	TYPE OF FACILITY	CLASS 1	() CLASS II
DANTEK	CUL			_()	CLASS III	() CLASS IV V1 V2
	•	V1 4V2	İ			V1 V2
Inadequate vector control	8010			te improperly managed	8330	
Access not limited to operating hours	8020		•	late leachate collection	0040	
Inadequate artificial or natural barrier	8030		syst		8340	
Inadequate information signs	8040		- 1	te observed at the site	8350 8360	
Unsatisfactory access road(s)/parking				te entering runoff	DOQU	
area(s)	8050		<u> </u>	te entering a water	8370	
Certified personnel not present	0000		COL	rse late gas migration contro		
during operating hours	8060				8380	
Unapproved salvaging of waste	8070		syste	ate maintenance of gas	0300	
Evidence of open burning	6080			ration control system	8390	
Inadequate fire protection	8090			al for explosions or	0000	
Unsatisfactory litter control	8110			ontrolled fires	8420	
Inadequate employee facilities	8120			not confined to a	-TLV	
No communication devices	8130 8140			ageable area	8430	
Inadequate operating equipment	the second secon			er spreading of waste	8440	
Unavaliability of backup equipment	8150			er compacting of waste	845D	
Unavailability of cover material	8160			factory initial cover	8460	
Inadequate maintenance of	8170			factory intermediate	4 .55	
runpr/runoff system(s)	8180		COVE	-	8470	
Inadequate erosion control	8190		- 1	factory final cover	8480	
Inadequate dust control				ve pooling of water	8490	
Unauthorized waste accepted	8210 8220			factory stabilization of	5,52	
Unapproved special waste accepted	8230		COVE	-	8510	
Tires improperly handled	8240			ag of waste into water	8520	
Medical waste improperly handled	8250			factory records or reports		
Dead animals improperly handled				water monitoring system		
Washout of solid waste	8270			roperly maintained	8540	
No permanent benchmark	8280			on does not correspond	30,5	
Inadequate random inspection	8290			engineering plans	8570	
program				on does not correspond	22.0	
Mishandling of special waste	8300			permit condition(s)	8580	
Buffer zone standard violated	8310			plans, operating manual		
Inadequate meintenance of leachete	8320	-		available	8590	
management system	6320		- 1	rating scales	8610	
		<u> </u>	/to ope	ratifig odator		
COMMENTS:	at =	to a	179 /	101/201 1011	Kork	·
NE SCHOOL STATE	<u> </u>			+1121-1-	.) .).	
hole open - 1	4 C U	11.70 -+	fox	#TUC/53/00	<u> الريخ : لرام</u>	<u>_4</u>
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Anlea Nota	die	<u> </u>	45 1	+ 6205 10	<u>) (⊃C</u>	: :///
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					e- 55.	Jed /
NOVIOLATION:						
PERSON INTERVIEWED	<u> </u>		INSPECTED	BY)	11	
(Signature)			(Signature)	160 G	(<u>)</u>	
TITLE		-	TITLE	F +53	-	
TIME OF DAY / 12 Dm WEATHER	GONDITION	\$ 800F	CleAR	COMPLIANCE DAT	EM	A
Distribution: F	acility - Wh	ite Field	Office - Cana	ry Central Office - 2	KC .	



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NAME OF SITE		A REGISTRAT	TION NUMBER		15455
LOUDON COUNTY MA	TLOCK BENC	SN	<u>L 53-02</u>	10 Z.	DATE 5-10-10
To over the (bridgical)		_ 	PURPOSE X Complete	()Fol	
MI HLY TON OF I-T	5 LUDON	TW	() Complaint	() Ott	
OWNER/OPERATOR DUDON COUNTY CANTA	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		TYPE OF FACILITY -64		() CLASS II
LOUDON COUNTY, SANTA	K how Hre	40N		CLASS III	() CLASS IV
Inadominto in the second	V1 V;	2			V1 V2
Inadequate vector control	8010	Leachate	improperly managed	8330	
Access not limited to operating hours	8020	Inadequa	te leachate collection		
Inadequate artificial or natural barrier Inadequate information signs	6030	system	n	8340	,
Unsatisfactory access road(s)/parking	8040		observed at the site	8350	→ -
area(s)	5050	Leachate	entering runoff	8360	
Certified personnel not present	8050		entering a water		
during operating hours	9060	cours		8370	
Unapproved salvaging of waste	8060		e gas migration control		/
Evidence of open burning	8070 8080	system		8380	<u> </u>
Inadequate fire protection	8090	Inadequat	e maintenance of gas		
Unsatisfactory litter control	8110	migrati	on control system	8390	
Inadequate employee facilities	8120		or explosions or	.	
No communication devices	8130		rolled fires	8420	
Inadequate operating equipment	8140		confined to a	A . A .	!
[B150 — —		eable area	8430	
Unavailability of cover material	8160	improper s	preading of waste compacting of waste	8440	— ·— I
Inadequate maintenance of		_ incoher t	tory initial cover	8450	
runon/runoff system(s)	8170	Unesticfoc	tory intermediate	8450	
Inadequate erosion control	8180	cover	tory intermediate	8470	
inadequate dust control	8190		tory final cover	8480	
Unauthorized waste accepted	8210		pooling of water	8490	
Unapproved special waste accepted	8220		tory stabilization of	U-7-3-D	~~~~
Tires improperly handled	8230	cover	,,, oran include, or	8510	
Medical waste improperly handled	B240	_	f waste into water	8520	
Dead animals improperly handled	8250		cory records or reports	8530	
Washout of solid waste	3270	Groundwat	er monitoring system		
No permanent benchmark	3280	imprope	rly maintained	8540	
Inadequate random inspection		Operation of	loes not correspond		— (`
	3290	with eng	ineering plans	8570	1
	3300	_ Operation of	loes not correspond		
Buffer zone standard violated inadequate maintenance of leachate	3310	_ with per	mit condition(s)	8580	
	1405		ns, operating manual		
menegenenralem	3320	_ not avai	=	8590	
		No operation	g scales	8610	
COMMENTS: beach, to Li	Hile 11-	16 1 -	- (
	file abo	ue La-	I repair	<u>, 49</u>	٧
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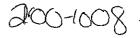


TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DIVISION OF SOLID WASTE MANAGEMENT SOLID WASTE DISPOSAL FACILITY EVALUATION

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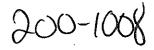
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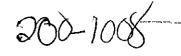


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Inadequate information signs	8040				e observed at the site	8350	<u> </u>
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area(s)	8050			1	e entering a water		
Certified personnel not present				cou		8370	
during operating hours	8060				ate gas migration control		
Unapproved salvaging of waste	8070			syste		8380	
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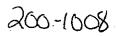
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during operating hours	8060	system	•	8380	
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Evidence of open burning	8080	migration cont	rol system	8390	
Inadequate fire protection	8110	Potential for explo	osions or	8420	
Lineatisfactory litter control	8120	uncontrolled fi	res	D4ZU	
Inadequate employee facilities	B130	Waste not confin	ed to a	8430	_ [
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inadequate operating equipment	8150	Improper spreadi	ing of waste	8450	
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Inadequate dust control	8210	Unsatisfactory s	tabilization of		
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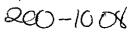




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management system	8320	Permit, plans, operating manual
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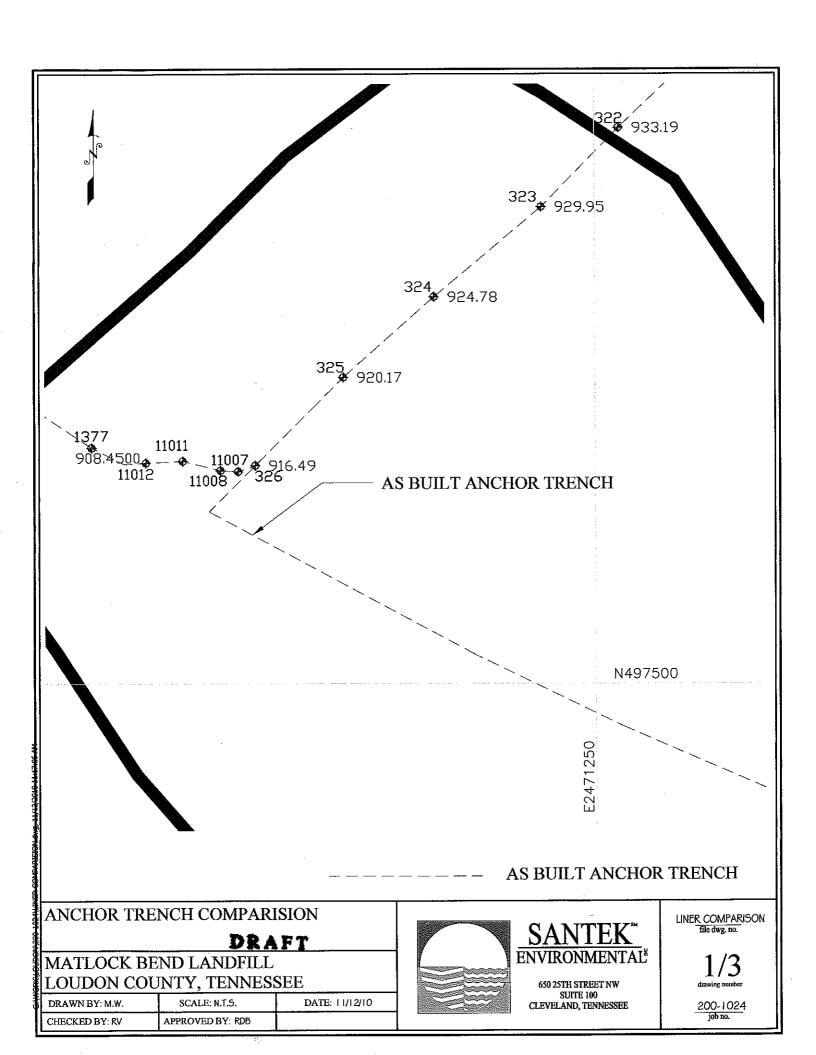
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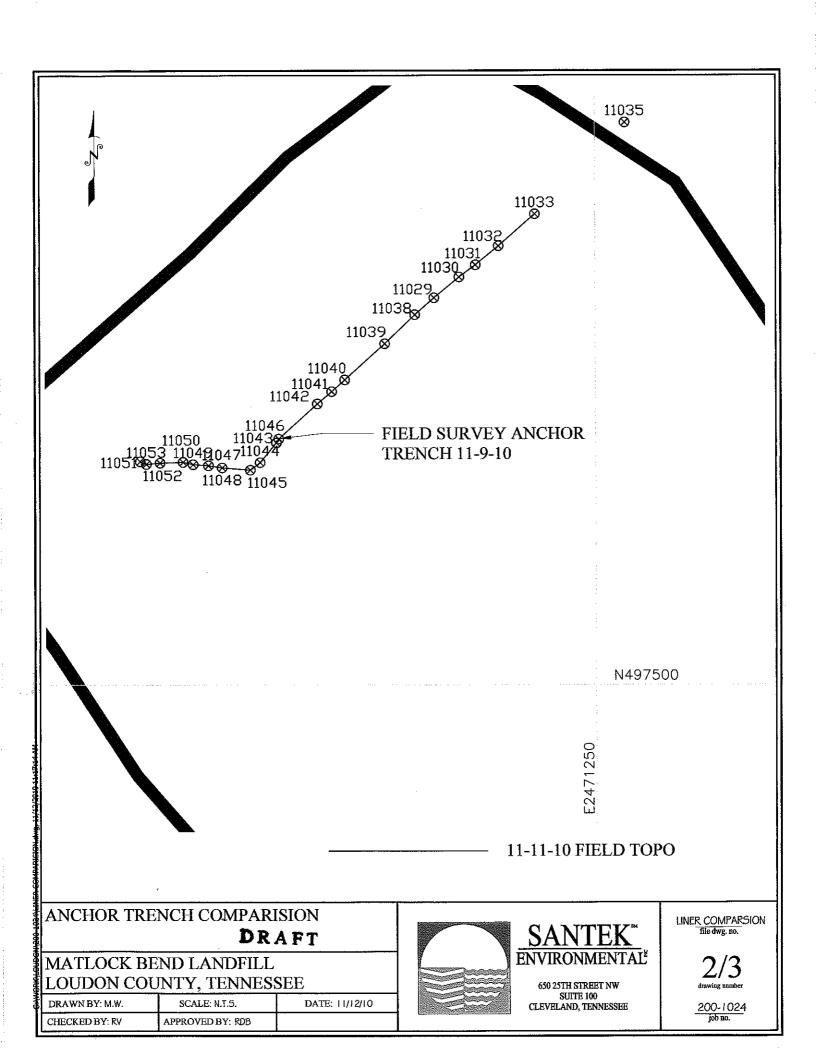


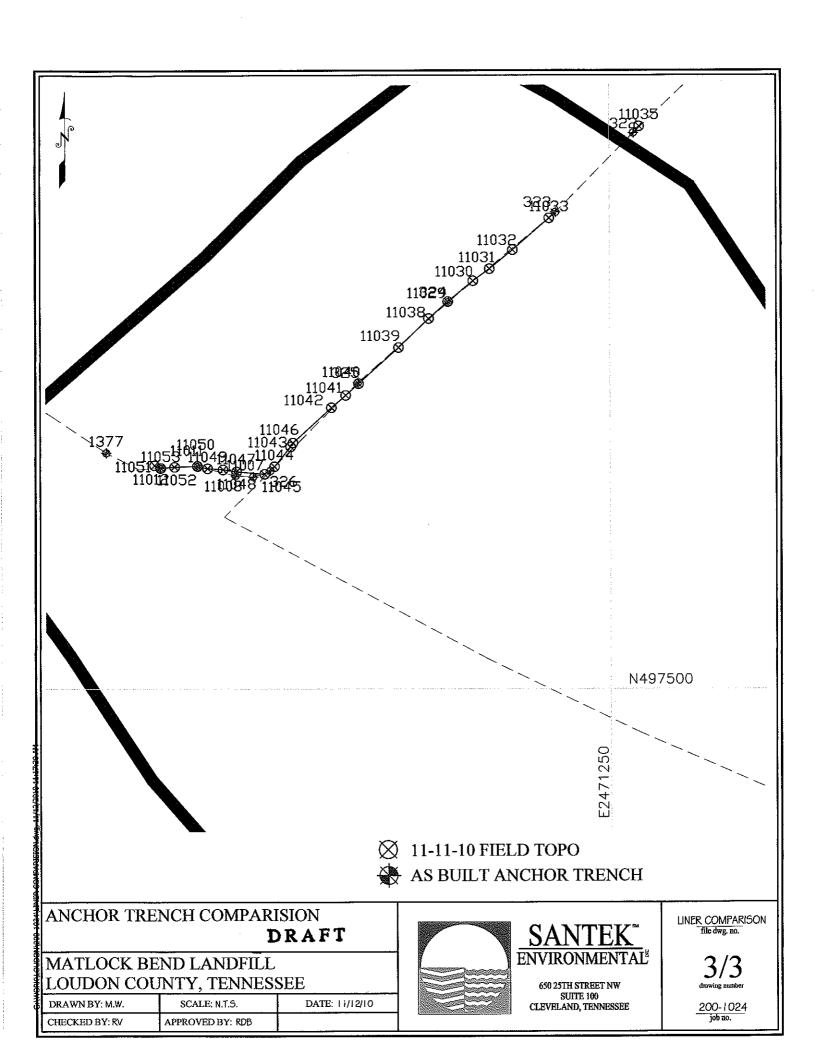
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Appendix C Anchor Trench Survey Results







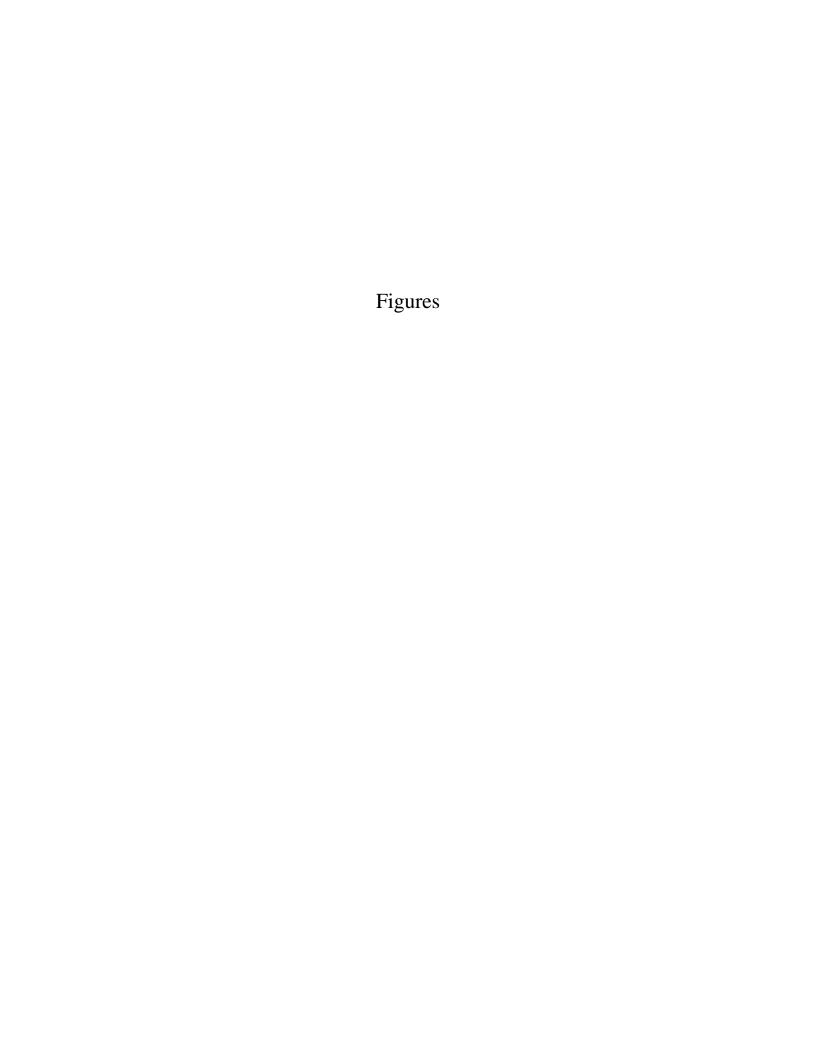
Appendix D

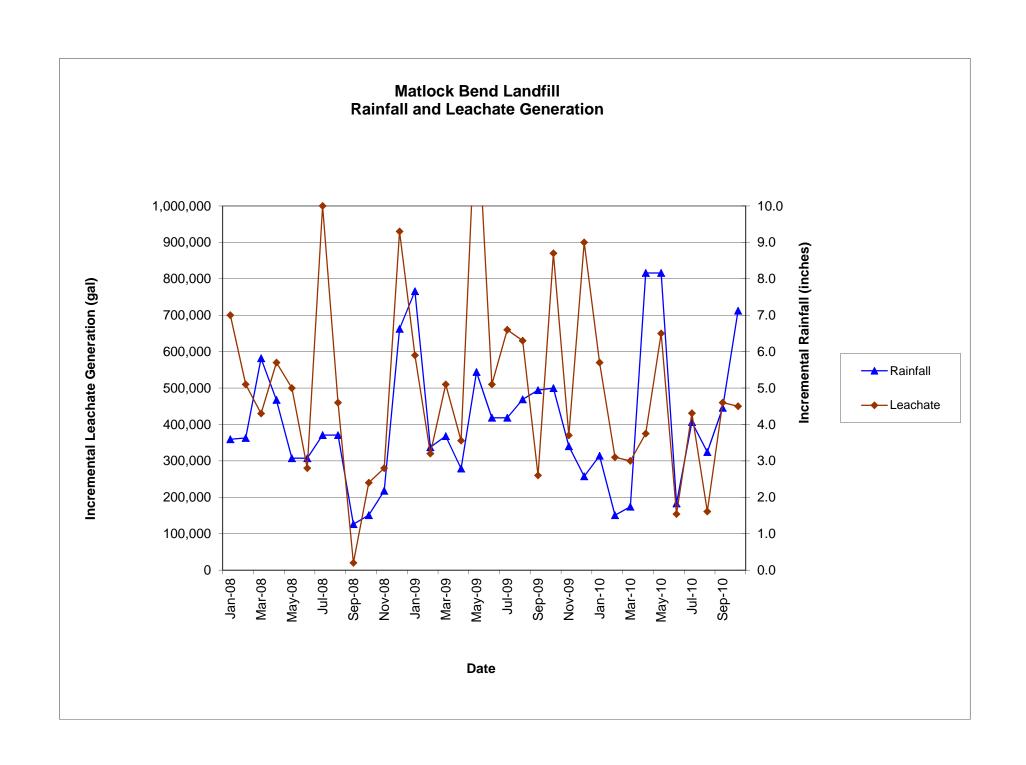
Leachate Generation and Precipitation Records

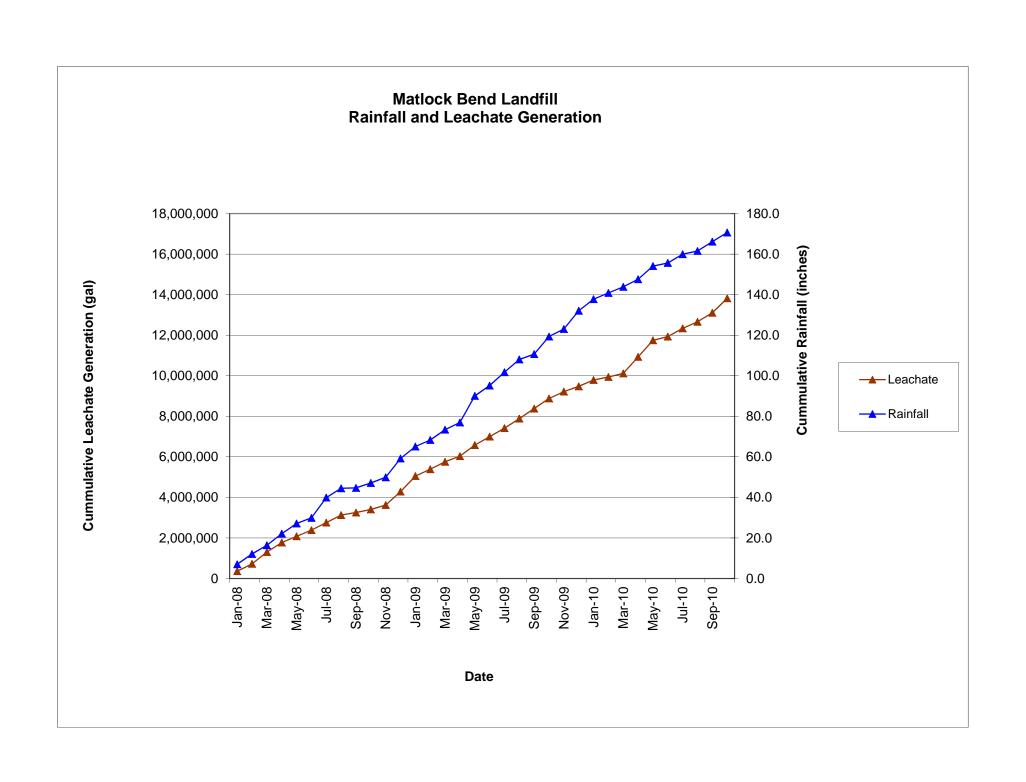


Matlock Bend Landfill Leachate and Rainfall Summary

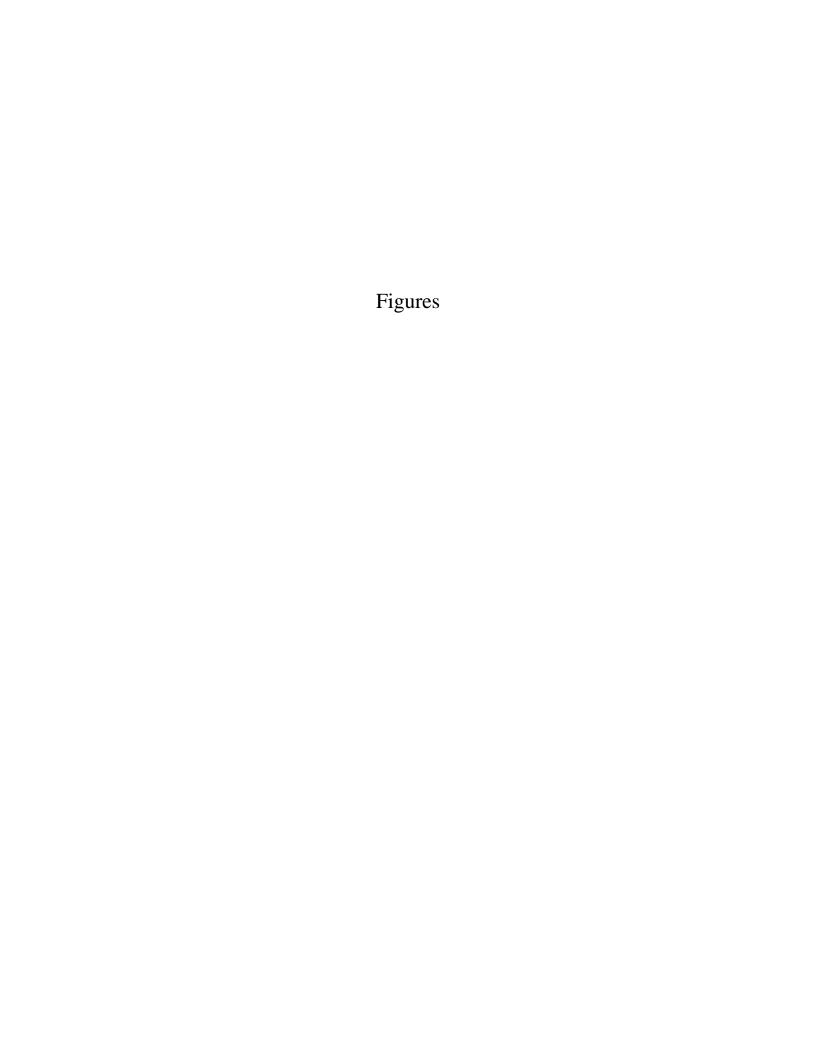
Date	Rainfall	Accum	Leachate	Accum
Date	(gal)	(gal)	(gal)	(gal)
Jan-08	7.0	7.0	359,404	359,404
Feb-08	5.1	12.1	362,885	722,289
Mar-08	4.3	16.4	581,829	1,304,118
Apr-08	5.7	22.1	467,310	1,771,428
May-08	5.0	27.1	307,266	2,078,694
Jun-08	2.8	29.9	307,266	2,385,960
Jul-08	10.0	39.9	370,812	2,756,772
Aug-08	4.6	44.5	370,812	3,127,584
Sep-08	0.2	44.7	126,151	3,253,735
Oct-08	2.4	47.1	150,881	3,404,616
Nov-08	2.8	49.9	217,804	3,622,420
Dec-08	9.3	59.2	662,487	4,284,907
Jan-09	5.9	65.1	765,834	5,050,741
Feb-09	3.2	68.3	337,425	5,388,166
Mar-09	5.1	73.4	367,983	5,756,149
Apr-09	3.6	77.0	278,909	6,035,058
May-09	13.1	90.1	543,988	6,579,046
Jun-09	5.1	95.2	418,400	6,997,446
Jul-09	6.6	101.8	418,400	7,415,846
Aug-09	6.3	108.1	468,862	7,884,708
Sep-09	2.6	110.7	494,208	8,378,916
Oct-09	8.7	119.4	499,696	8,878,612
Nov-09	3.7	123.1	340,281	9,218,893
Dec-09	9.0	132.1	257,558	9,476,451
Jan-10	5.7	137.8	313,996	9,790,447
Feb-10	3.1	140.9	150,798	9,941,245
Mar-10	3.0	143.9	174,165	10,115,410
Apr-10	3.8	147.6	816,001	10,931,411
May-10	6.5	154.1	816,001	11,747,412
Jun-10	1.5	155.6	183,224	11,930,636
Jul-10	4.3	160.0	406,479	12,337,115
Aug-10	1.6	161.6	324,250	12,661,365
Sep-10	4.6	166.2	445,695	13,107,060
Oct-10	4.5	170.7	712,429	13,819,489

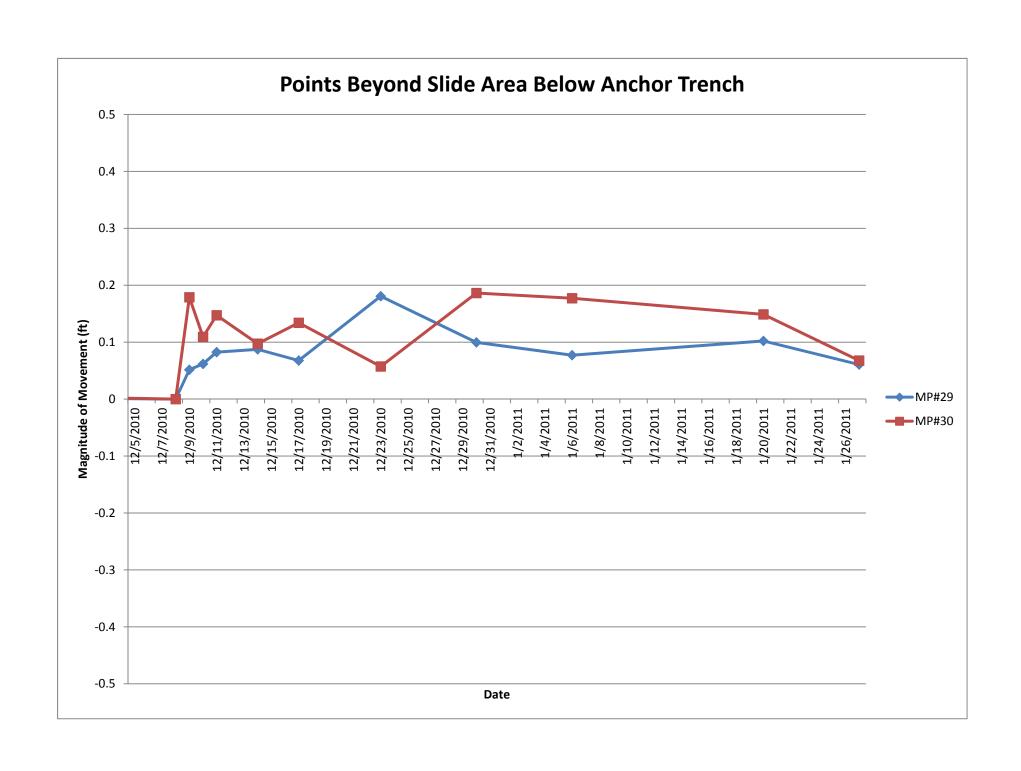


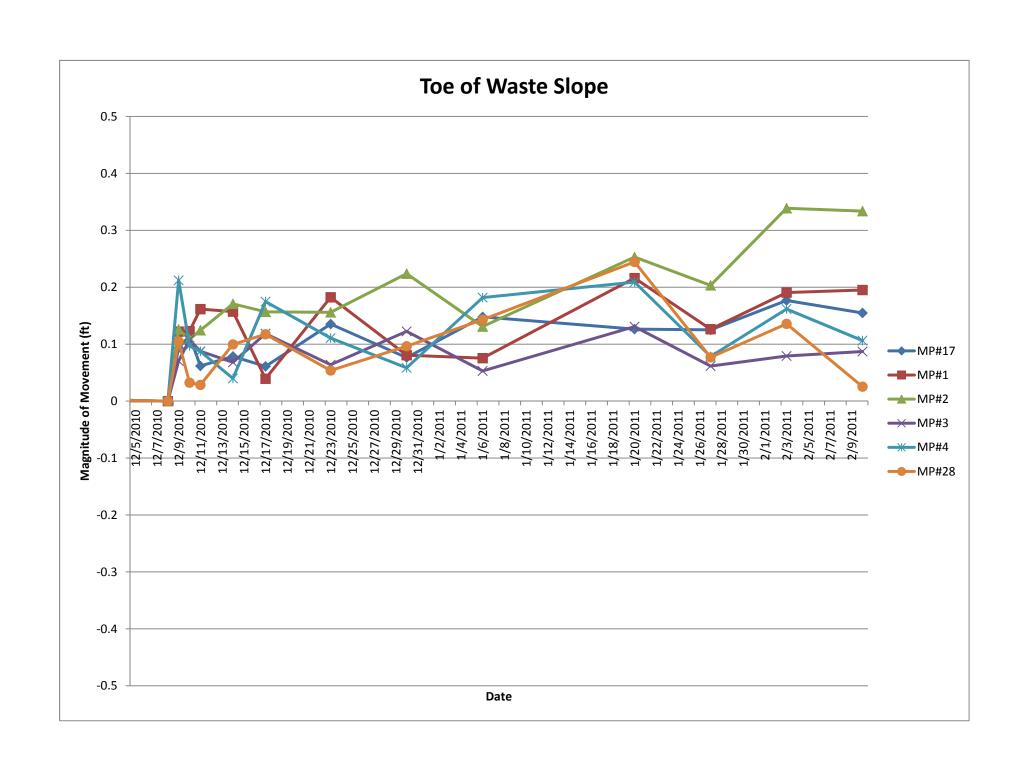


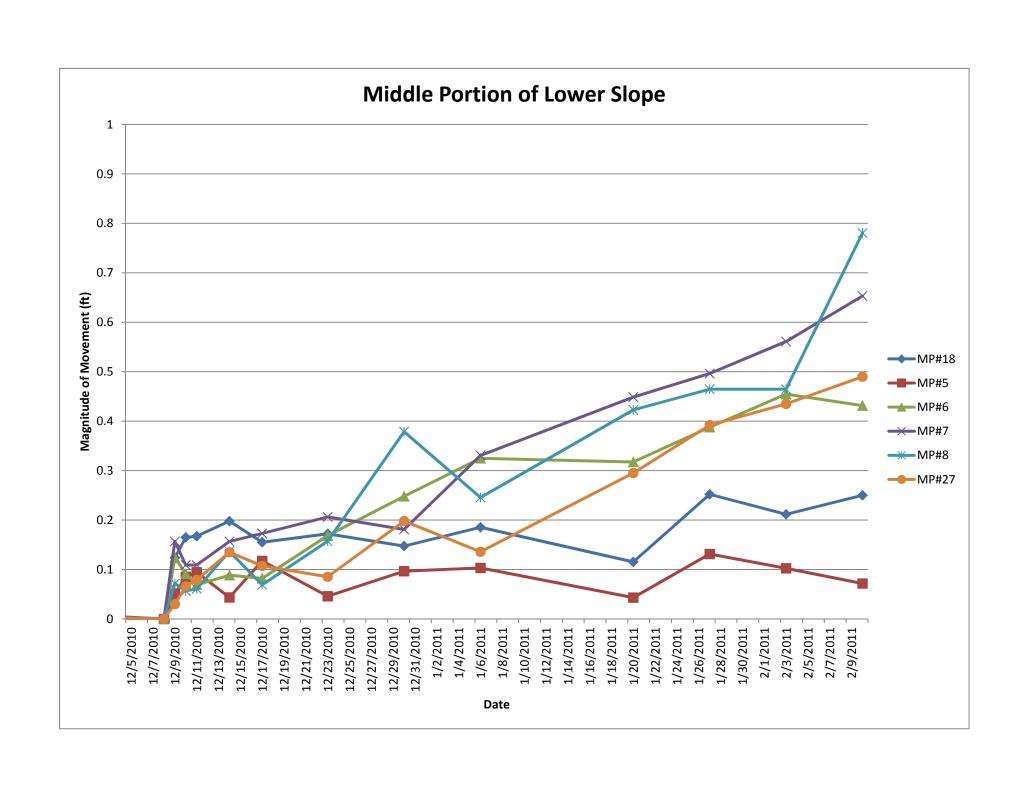


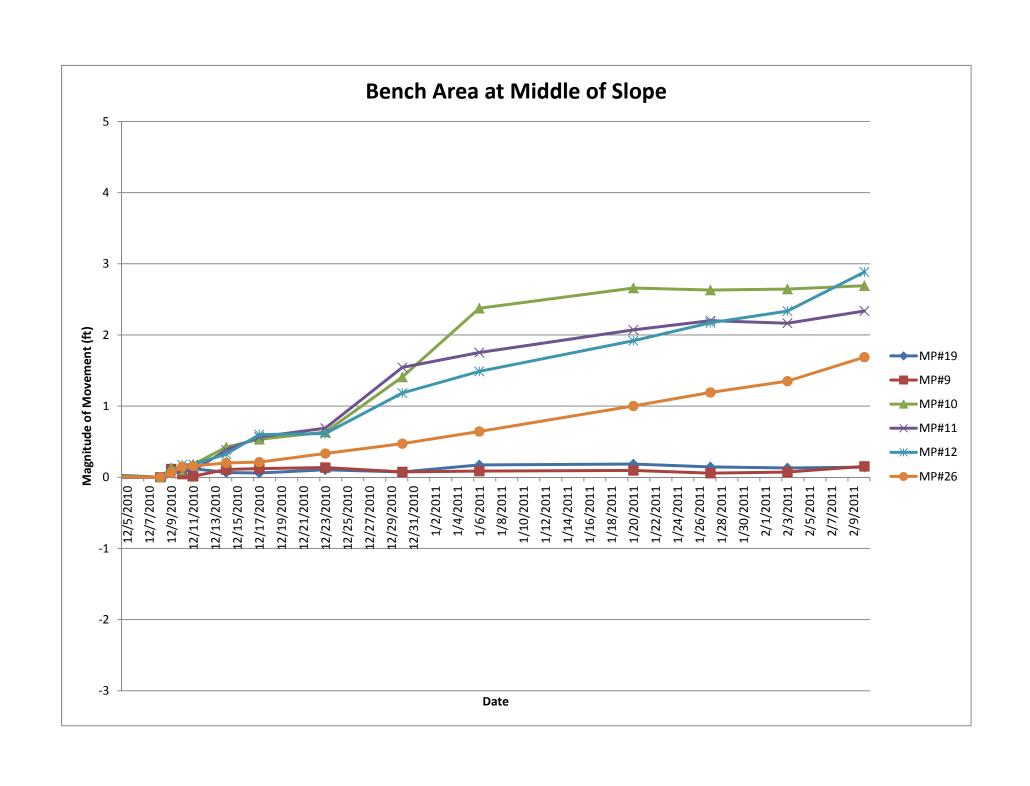
Appendix E Slope Monitoring Point Records

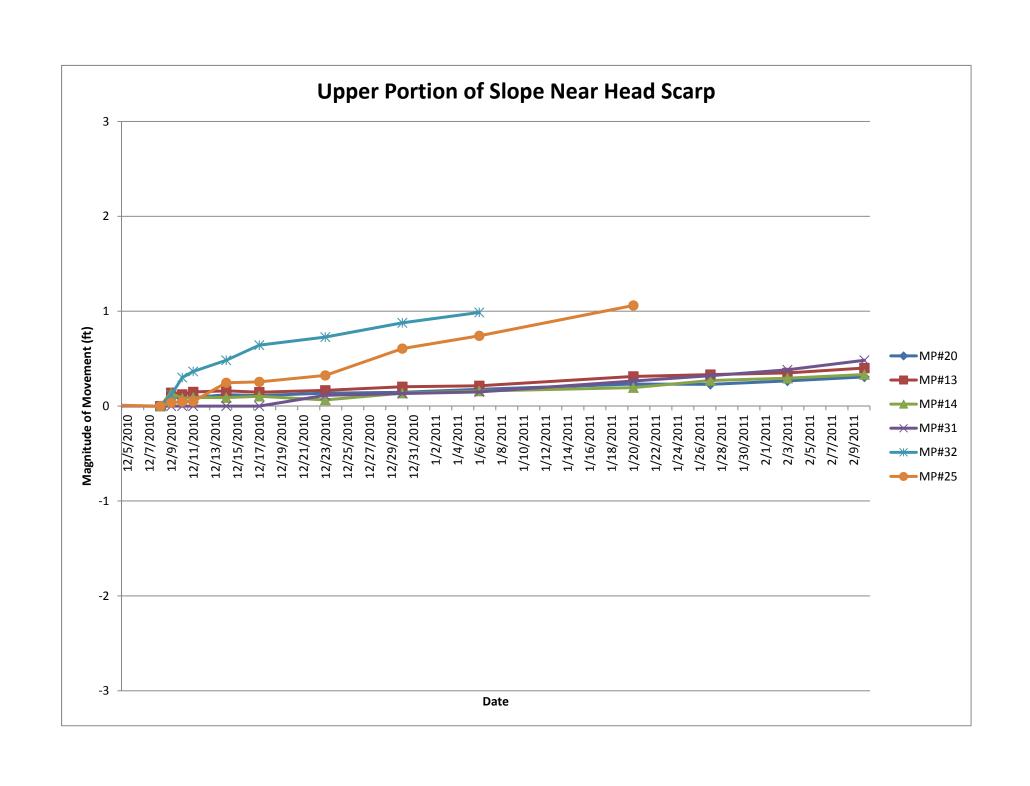


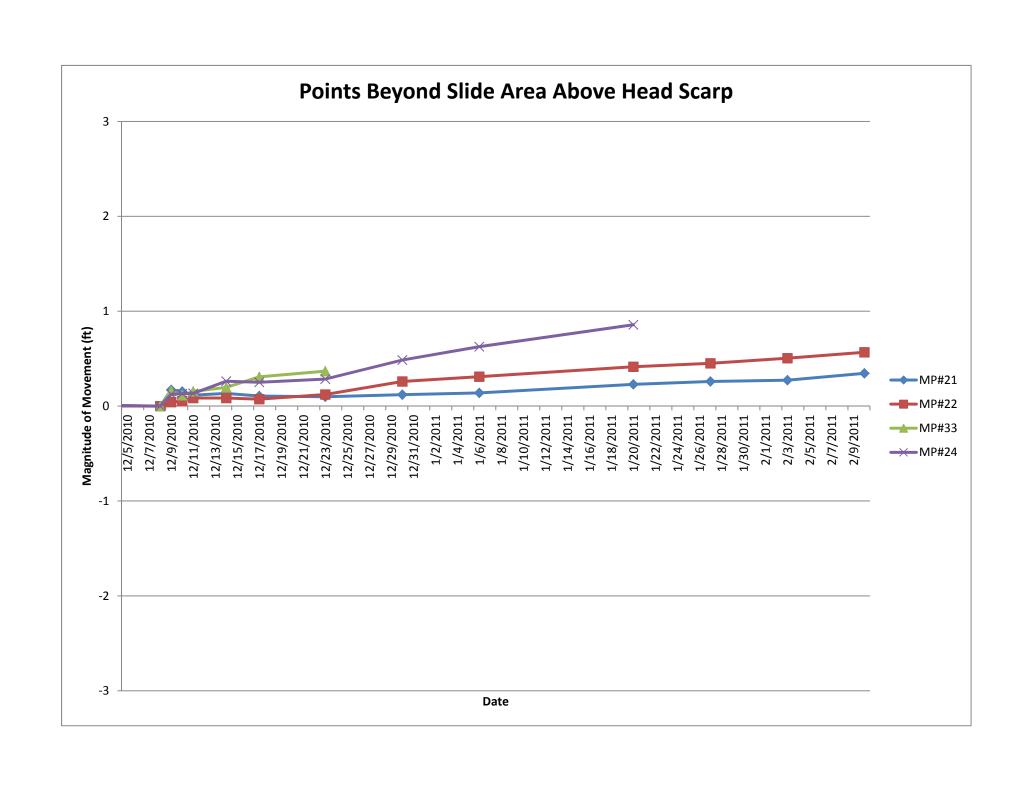












Appendix F Slope Stability Calculation Results



COMPUTATION COVER SHEET

Client: LCSWDC Project: Loudon County, TN Proposal No.: GG4773 Task No. 01 Title of Computations Slope Stability Analyses Computations by: Signature Rodolfo Sancio Title Senior Engineer Assumptions and Procedures Checked by: Operations Title Printed Name Dimitrios Lekkakis Title Staff Engineer Computations Computations Computations Signature Project Engineer Computations Checked by: Originator Title Staff Engineer Computations Signature Printed Name Rodolfo Sancio Title Staff Engineer Computations Date Feb. 15, 2011 Date Feb. 16, 2011 Date Feb. 16, 2011 Date Feb. 16, 2011 Date Feb. 16, 2011 Approved by: Originator Printed Name Rodolfo Sancio Title Senior Engineer Approved by: Originator Title Principal Approval notes: Revisions (number and initial all revisions)				Matlock Bend Landfill Waste Failure	Project/	
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BACKGROUND

A waste slope failure (failure) occurred at the Matlock Bend Landfill (MBL or Landfill) in Loudon County, TN (site) on 3 November 2010. The MBL is permitted as a Class I landfill by the Tennessee Department of Environment and Conservation (TDEC) to the Loudon County Solid Waste Disposal Commission (LCSWDC). The MBL is operated by Santek Environmental (Santek) of Cleveland, TN under contract to LCSWDC. Geosyntec Consultants (Geosyntec) was retained by LCSWDC to assess the root cause of the failure and to make short-and long-term recommendations regarding stabilization of failure area

The failure affected portions of Module B, G, and H of the Landfill. As shown on the photos on Figure 1 and Figure 2 that were taken on 3 November 2010, the failure mass (mass) developed a crescent-shaped head scarp and exhibited a relatively flat (i.e., five percent slope) and hummocky topography between the scarp and the toe.

Santek noted the presence of free water within the slide mass after the failure. Additionally, the consistency of portions of the slide mass was too soft to even allow foot traffic over portions of the waste given the high liquids content of the waste.



Figure 1. View of the Failure Area Near the Toe on 3 November 2010

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Figure 3 shows the toe of the slope on 3 November 2010, where "blocks" of waste can be observed. As shown by these three photographs, the waste mass appeared to "flow" down the slope. This observation, coupled with the relatively flat slopes in the failure area, is indicative of translational sliding over a weak plane and not a deep-seated rotational movement.

The material within the failure area consisted of municipal solid waste (MSW) and sludges that had been placed over an approximate two-year time period since Module G was constructed, lined, and placed into service. A portion of the mass slid beyond the limits of the lined Module G and onto unlined ground. Santek immediately constructed a compacted soil berm exhibiting approximately 2 horizontal to 1 vertical (2H:1V) sideslopes to contain the toe of the waste. After the containment berm was constructed, Santek excavated waste from the unlined areas and relocated the excavated waste to a recently lined portion of Module G adjacent to the failure area. When the conditions allowed equipment over the intervening days following the failure, Santek regraded the waste within the failure area (including the head scarp) to achieve a gentle and relatively uniform slope within the failure area. Soil cover was placed over the regraded waste surface.



Figure 2. View of the Failure Area from the Toe on 3 November 2010



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Figure 3. View of the Failed Material at the Toe on 3 November 2010

PURPOSE

The purpose of this calculation package is to present the results of slope stability analyses that were conducted to gain insight into the possible failure mechanisms and the root cause of the 3 November 2010 waste slope failure at the MBL. This calculation package also includes the back analysis results that were conducted to develop strength parameters for use to support recommendations for stabilization of Module G and for future waste placement.

SLOPE GEOMETRY

Figure 4 presents a cross-section through the failure area that shows the approximate geometry of the ground surface of the landfill in October 2010 (i.e., about one month prior to the failure). This cross-section also shows the liner grade and the elevation of the waste in 2009. Figure 5 shows an approximate cross-section through the failure

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area on 3 November 2010. This surface was developed by combining topographic survey data with visual estimates, as the failure area was too irregular and wet to accommodate a field survey. Figure 6 shows the same cross-section after Santek had regraded the failure area. Figure 6 includes the containment berm that was constructed at the toe of the failure area immediately after the slide.



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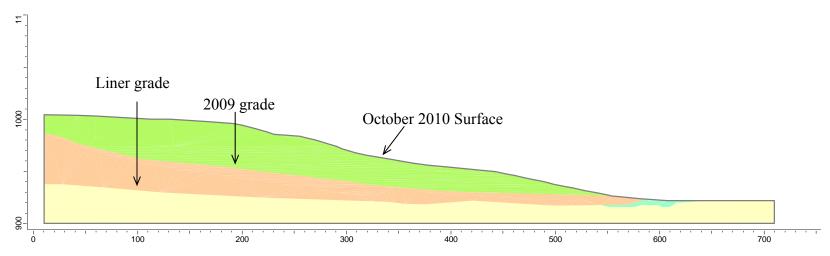


Figure 4. Cross-section Through Centerline of Failure Area Prior to Failure (October 2010)



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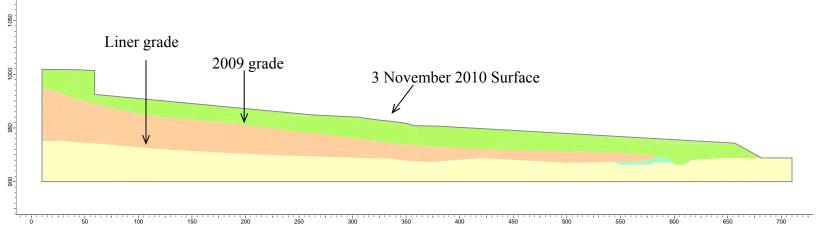


Figure 5. Approximate Cross-section through Centerline of Failure Area after the Failure (November 2010)



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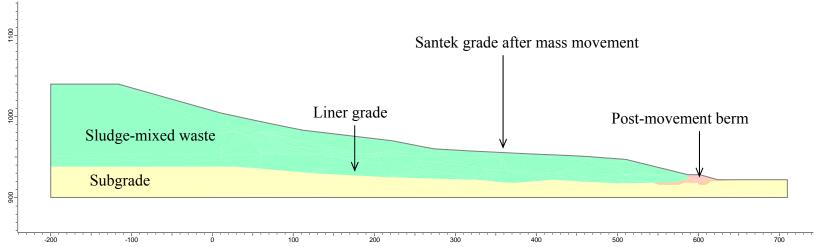


Figure 6. Cross-section through Centerline of Failure Area after Regrading (November 2010)



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SLOPE STABILITY CALCULATIONS

Methodology

Limit equilibrium slope stability analyses were conducted by Geosyntec to calculate the factor of safety *(FS)* using the method of slices according to the procedure developed by Spencer [1]. The calculations were carried out using the computer program SLIDE v. 5.044 (Rocscience).

Material Parameters and Slope Geometry

For these calculations, Geosyntec utilized back analyses coupled with experience from previous waste testing and analysis projects to estimate the unit weight and shear strength parameters of the waste. With regards to analysis geometry, Geosyntec considered the following four analysis scenarios: (i) waste geometry immediately before failure; and (ii) waste geometry after post-failure regrading; (iii) waste geometry after stabilization; and (iv) waste geometry after development in accordance with pending Major Modification.

<u>Back Analysis – Waste Geometry Immediately</u> before Failure¹

For this analysis Geosyntec assumed: (i) the geometry immediately prior to the mass movement (Figure 4) exhibited FS = 1; (ii) an elevated liquids level with a piezometric head was present in the slope (see Figure 9); and (iii) the sludge-mixed waste material exhibited characteristics of a frictional material. Analyses were conducted to calculate the friction angle of the sludge-mixed waste at the time of failure assuming that sliding occurred along a shallow circular or translational surface. The analyses were thus conducted to calculate the factor of safety considering the geometry in Figure 4.

Verification Analysis – Waste Geometry upon Regrading

For this analysis Geosyntec assumed: (i) the geometry after regrading was only marginally stable; (ii) the friction angle of the sludge-mixed waste was the value

¹ A large number of additional analyses were conducted to evaluate the elevation of potential translational sliding surfaces as well as friction angles that incorporate the effect of excess pore water pressures that developed in the failed mass prior to sliding. These analysis are not included in this document but provided insight and guidance on potential mechanisms and material strength parameters.



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resulting from the back analyses; (iii) a piezometric surface was elevated in the regraded waste due to poor drainage into the leachate collection system (see Figure 11); and (iv) the sliding mechanism could be either circular or translational but should be at the same approximate location as calculated from the back analyses. The analyses were thus conducted to calculate the factor of safety considering the geometry in Figure 6.

Stabilized Grades Analysis - Final Stabilization Geometry

The results of the back analysis verification analyses described above (i.e., location of the critical failure surface and the frictional strength of the weakened waste) were used to calculate the FS of the Landfill upon regrading to the proposed final stabilized The stabilization strategy explicitly (and importantly) considers that adequate drainage provisions are included to permanently lower the elevated liquid levels in the waste. Upon discussion with Santek, a candidate final geometry considers construction of a berm from select solid waste (i.e., MSW that is free of sludge) at the toe of Module G. As shown on Figure 7, the berm will have 3H:1V side slopes and will be constructed to approximately Elevation 945 ft. The elevation of the waste within Module G will then be raised progressively to approximately Elevation 1055 ft in 30-ft thick lifts, incorporating 4H:1V sideslopes and 10-ft wide benches at each 30-ft vertical interval (except that last lift which will be 25-ft high). The first lift would reach Elevation 970 ft. Subsequent staged waste placement considers lifts to Elevation 1000, 1030 and 1055 ft. As shown on Figure 7, a 10-ft wide bench is used for each lift. The analyses were thus conducted to calculate the factor of safety considering the geometry in Figure 7.

The material parameters used in the analyses of the final configuration are summarized in Table 1 and include properties from the back analysis results and values based on Geosyntec experience with MSW testing. The minimum acceptable factor of safety for this interim grading condition is assumed to be FS>1.3.

Analysis of Potential Final Grades – Pending Major Mod Grades

As a final analysis condition, Geosyntec recognizes that Santek has submitted to TDEC a Major Permit Modification application (Major Mod) that is currently in suspended review by TDEC. Analyses were performed to consider whether this proposed grading plan would be adversely impacted by the failure. The analyses were thus conducted to calculate the factor of safety considering the geometry in Figure 8.

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The material parameters used in the analyses of the final configuration were the same as those summarized in Table 1 and include properties from the back analysis results and values based on Geosyntec experience with MSW testing. The minimum acceptable factor of safety for this final grading condition is assumed to be $FS \ge 1.5$.

Table 1 Material Parameters used for Calculation of the FS of the Final Stabilization Geometry

Material	Unit Weight	Shear Strength Parameters			
Material	(pcf)	c (psf)	φ (°)		
Sludge-mixed waste					
above the failure	90	0	20		
surface					
Future Waste	90	$\tau = 500 \text{ psf for } 0 < \sigma_n < 770 \text{ psf,}$			
rutule waste	90	$\varphi = 33^{\circ}$ for $\sigma_n > 770$ psf			
Waste Berm	90	$\tau = 500 \text{ psf for } 0 < \sigma_n < 770 \text{ psf},$			
waste beiiii	90	$\varphi = 33^{\circ}$ for $\sigma_n > 770$ psf			



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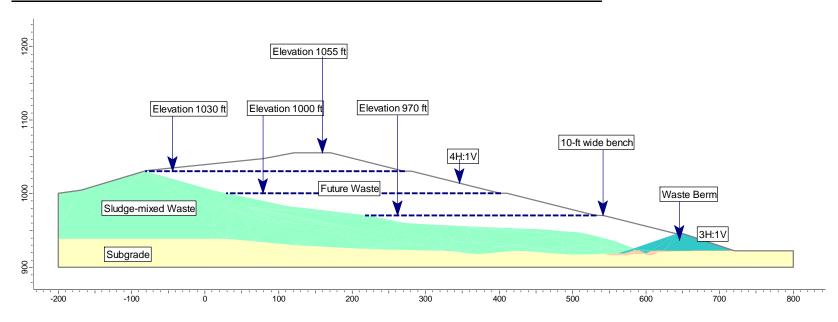


Figure 7. Assumed Geometry for the Stabilized Landfill Condition



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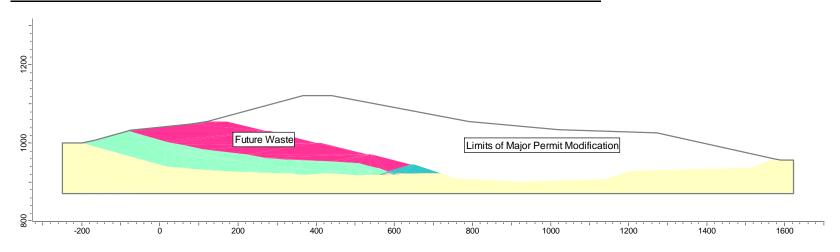


Figure 8. Assumed Geometry for the Major Modification Permit (Major Mod)



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Calculation Results

<u>Back Analysis – Waste Geometry prior to Failure</u>

The results of the slope stability analyses in which the October 2010 geometry was used assuming that FS = 1.0 (i.e., Back Analysis) are summarized in Table 2. The translational surface at Elevation 948 ft and circular sliding surface is shown in Figure 9 and Figure 10, respectively.

The results of the analysis indicate similarly located critical failure surfaces and that the friction angle of the sludge-mixed waste ranges between approximately 19 and 20 degrees for the condition analyzed.

Table 2 Summary of Scenarios Analyzed - Back Analyis

Sliding Mechanism	φ (°) of sludge- mixed waste
Translational (Figure 9)	19.1
Circular (Figure 10)	20.1 (c = 20 psf)

Verification Analysis – Waste Geometry after Regrading

Figure 11 and Figure 12 present the circular and translational sliding surfaces with lowest calculated factor of safety values for the post-failure regraded geometry. The analyses were conducted using a friction angle for the sludge-mixed waste of 20 degrees and no cohesion intercept. However, the results were noted to be significantly sensitive to the elevation of the piezometric surface and cohesion intercept was noticed.

The calculated FS is 1.16 for the circular mechanism and 1.25 for a horizontal translational surface at Elevation 952 ft. These results essentially verify physical observations in the field and the surface monitoring results of the post-failure regraded slopes. Specifically, the waste appeared to be marginally stable when it exhibited a high liquids level. It is interesting to note that the toe of the slope in the failure area was excavated to an approximate 2H:1V slope and was noted to be relatively stable. However, this slope was also noted to explicitly not have excessive free liquids in the waste. Therefore, Geosyntec believes that these calculation results are consistent with the field performance and observations.



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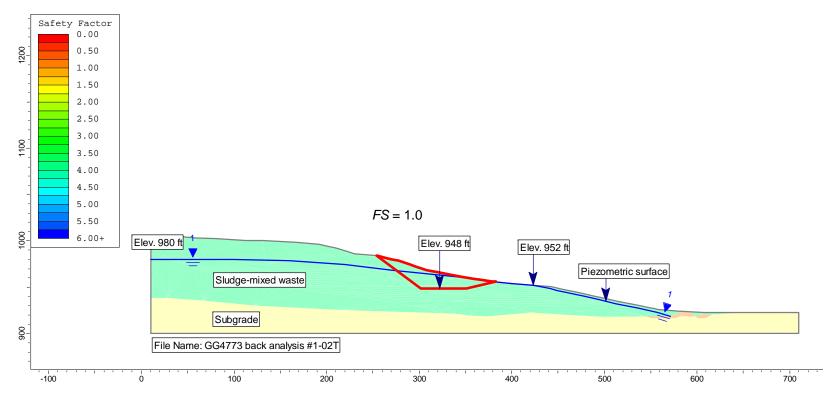


Figure 9. Translational Sliding Surface with FS = 1.0 and Assumed Piezometric Surface. $\varphi = 19.1$ degrees.



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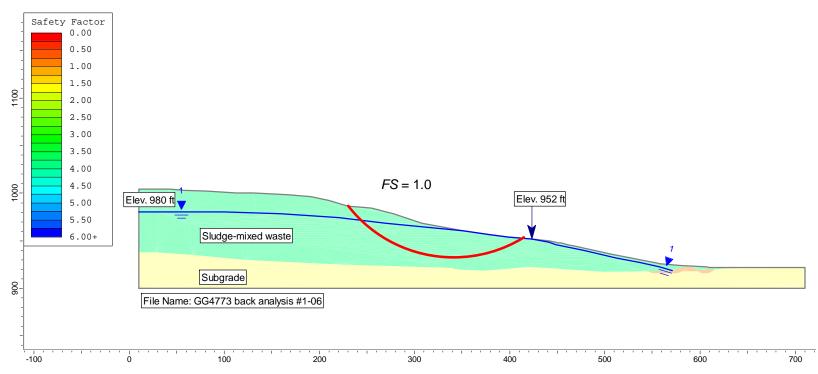


Figure 10. Circular Sliding Surface with FS = 1.0 and Assumed Piezometric Surface. $\varphi = 20.1$ degrees, c = 20 psf.



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Figure 11. Circular Sliding Surface with Lowest FS for November 2010 Geometry and Assumed Piezometric Surface (after regrading)



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Figure 12. Translational Sliding Surface with Lowest FS for Translation along a Horizontal Plane at Elevation 952 ft and Assumed Failure Surface



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Stabilized Grades Analysis - Final Stabilization Geometry

For the proposed waste stabilization, additional waste is proposed to be placed against the toe buttress adjacent the lower reaches of Module G. Waste that was involved in the failure was assumed to exhibit a weakened frictional strength of 20 degrees as calculated from the back analyses. Waste placed as part of the stabilization strategy is assumed to exhibit the frictional strength of "conventional" MSW. Analyses were performed to calculate the FS for each proposed stage of waste placement used to develop the final stabilization geometry. As listed on Table 3 and shown on Figure 13 to Figure 16, staged construction of waste placement in Module G to the proposed interim grades meets the minimum factor of safety requirement of 1.3 as long as liquids are allowed controlled. Therefore, these results confirm that the proposed stabilization grades will results in an increase in the calculated stability of Module G and that waste does not have to excavated from the module to achieve a stable geometry, assuming that liquid levels are controlled and significantly reduced.

Table 3 Summary of Scenarios Analyzed for the Final Configuration

Geometry	FS (Spencer)
Phase 1: Elevation 970 ft	2.53
Phase 2: Elevation 1000 ft	2.53
Phase 3: Elevation 1030 ft	2.30
Phase 4: Elevation 1055 ft	1.69

<u>Analysis of Potential Final Grades – Pending Major Mod Grades</u>

Calculation results for the potential final grades at the site are presented in Figure 17 and Figure 18. These results indicate that if the grades are established in accordance with the grades identified in the Major Mod, an increase in calculated stability is achieved relative to the FS achieved upon implementation of the interim stabilization grades. Once again, this conclusion is predicated on the long-term control of liquid levels at the site. These results are completely anticipated given the frictional character of the waste and the final geometry. Significant additional vertical stress and buttressing are provided through the development of these grades. Therefore, the



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proposed Major Mod grading plan will not have any adverse impacts on the stability of Module G. In fact, calculation results indicate that approval and implementation of the Major Mod final grades enhances stability of Module G.



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Figure 13. Circular Surface with Lowest FS for Final Configuration to Elevation 970 ft



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Figure 14. Circular Surface with Lowest FS for Final Configuration to Elevation 1000 ft

-200



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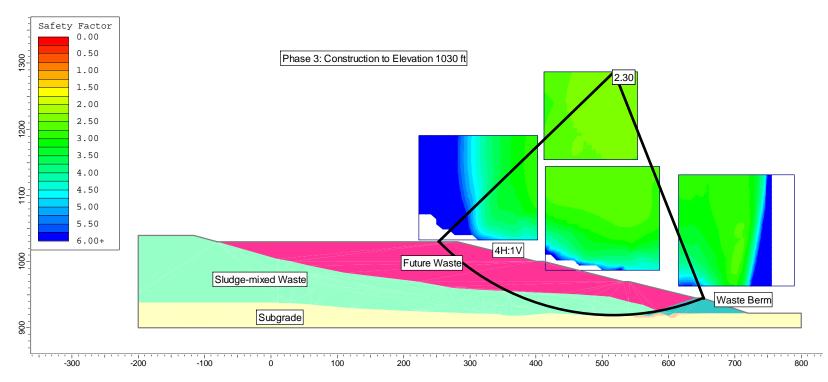


Figure 15. Circular Surface with Lowest FS for Final Configuration to Elevation 1030 ft



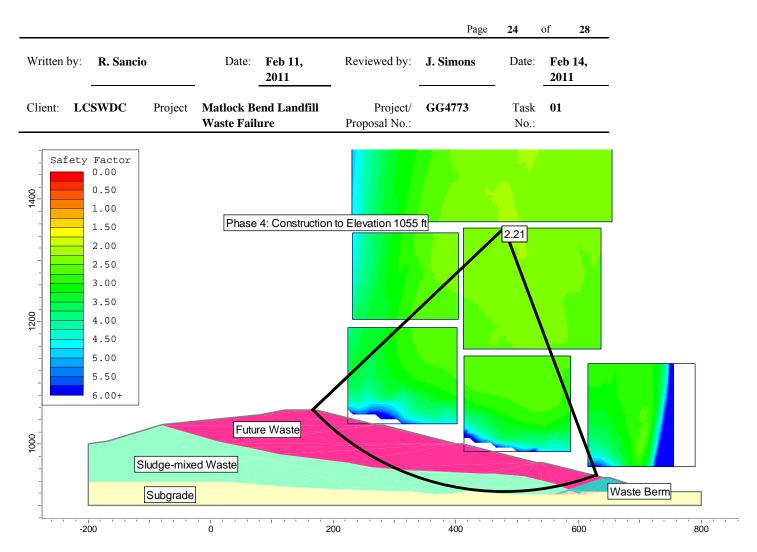


Figure 16. Circular Surface with Lowest FS for Final Configuration to Elevation 1055 ft



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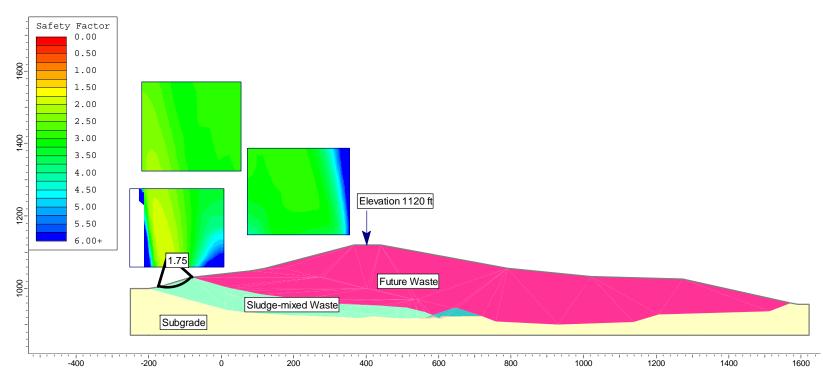


Figure 17. Circular Surface with Lowest FS for Major Mod Geometry



itten by	y: R. Sancio)	Date:	Feb 11, 2011	Reviewed by:	J. Simons	Date:	Feb 14, 2011	
ent:	LCSWDC	Project	Matlock Bo Waste Fail	end Landfill ure	Project/ Proposal No.:	GG4773	Task No.:	01	
Safet	ty Factor								
	0.00								
	0.50								
	1.00								
	1.50								
	2.00								
	2.50								
	3.50								
	4.00								
	4.50								
	5.00								
	5.50								
	6.00+				\wedge				
	Subgrad	de	Sludge-mix	red Waste	Future Waste				

Figure 18 Contours of FS for Major Mod Geometry (FS > 3)



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SUMMARY AND RECOMMENDATIONS

Slope stability analyses were conducted by Geosyntec assuming FS = 1.0 for the October 2010 (i.e., pre-failure) geometry. A back calculated friction angle of 20 degrees identified to achieve this condition. Based on these analyses and evidence of elevated liquid levels in the waste, Geosyntec believes that the waste slope failure at the MBL occurred due to high liquid levels combined with the presence of relatively low-strength sludge-mixed waste. These conditions combined to create a condition in which the placed waste in the upper reaches of Module G was not able to resist the stresses applied by ongoing waste placement in Module G. The failure is likely to have initiated over a portion of the mass and propagated retrogressively upslope towards the future head scarp.

The results of the analyses indicate that the sludge-rich waste within the failure area is likely best characterized as having a friction angle of 20 degrees to meet the limit equilibrium conditions likely to have been prevalent when the mass movement was triggered. The analyses also show that the waste can be placed safely within Module G as part of the overall stabilization strategy to the interim elevation of 1055 ft as long as: (i) new waste placed in Module G is thoroughly mixed to achieve the strength typical of MSW; and (ii) aggressive drainage techniques are implemented to reduce the liquids level in the Landfill. Furthermore, future long-term waste grades identified in the proposed Major Mod can be established without any adverse impacts to the stability of Module G. In fact, these proposed grades actually enhance the stability of the waste in Module G due to the increased vertical stress and the buttressing effect of these proposed final grades.

Geosyntec believes that a Sludge Management Plan needs to be developed to help assure an appropriate amount of blending, mixing, and compaction to achieve these strengths. Liquid levels in the waste can be controlled by: (i) installing vertical drainage paths through vertical gas wells; or (ii) constructing infiltration trenches through the sludge-mixed waste. These options are intended to develop/maintain hydraulic continuity between the waste in Module G and the leachate collection system. Furthermore, Geosyntec recommends that procedures be developed to assure that liquid levels are controlled through the use of piezometers. Similarly, procedures



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should also be developed to verify that the rate of new waste placement is slow enough such that generated excess pore water pressures in the waste are low.

As a result of these slope stability calculation results and sensitivity studies, Geosyntec recommends the following actions.

- Liquid levels within the waste in Module G should be controlled by implementing aggressive measures to facilitate drainage of leachate to the leachate collection system.
- Liquid level control measures in Module G should be implemented prior to placing additional fill in the failure area in Module G.
- A monitoring program should be developed to include measuring liquid levels in Module G. This may include the installation of piezometers and/or observation wells
- A Sludge Management Plan should be developed to minimize the potential for subsequent waste slope instability by providing limits to amount of sludge that can be placed and to define specific blending and compaction activities.

REFERENCES

[1] Spencer, E. (1967), A method of analysis of the stability of embankments assuming parallel inter-slice forces. Geotechnique, Vol. 17, No. 1, pp. 11-26.

Appendix G

Proposed Sludge Management Procedures for the Matlock Bend Landfill

(Santek, 2011)



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Proposed Sludge Management Procedures

For The

Matlock Bend Landfill

Identification

Santek Environmental (Santek) manages the Loudon County Landfill (Landfill) on behalf of the Loudon County Solid Waste Disposal Commission. Based on the an assessment of the waste streams accepted at the Landfill, Santek has indentified six (6) waste streams at the Landfill that warrant special consideration. Two of these wastes are identified because the Landfill accepts significant volumes of the material; one waste exhibits significant beneficial effects; while three of these wastes have specific handling needs. A brief summary of these wastes and their acceptance at the Landfill are summarized as follows:

Significant Volume

- Kimberly Clark "Ash" material: This material is being identified in this plan because of the volume delivered to the Landfill. This material does not present any special handling considerations. The material is relatively easy to handle and in some instances can be used as a mixing agent in the Landfill to facilitate stabilization of other wastes. The Manifest / Profile # for this material effective 3/1/11 will be L0311-1.
- PSC Metals "Auto Fluff" material: The material is identified in this plan because of the volume delivered to the Landfill. The material is very easy to handle and in some instances can be used effectively as a mixing agent in the Landfill to facilitate stabilization of other wastes. The Manifest / Profile # for this material is L0610-1.

Beneficial Waste

 Tate & Lyle "Bottom Ash" material: This material is identified in this plan as a material that is not currently accepted in large volume, nor does this material present any handling problems. Like the Ash and Auto Fluff

Landfill Solutions Under Local Governments Authority. materials previously described, in some instances this waste can be used effectively as a mixing agent in the Landfill to facilitate stabilization of other wastes. The Manifest / Profile # for this material effective 3/1/11 will be **L0311-3**.

Special Handling Considerations

- Kimberly Clark "Paper Waste" material: This material is identified in this plan as a material that has specific handling requirements and in some instances needs additional stabilization. The Manifest / Profile # for this material effective 3/1/11 will be **L0311-2**.
- Tate & Lyle "WT13 Sludge" material: This material is identified in this plan as a material that has specific handling requirements and needs additional stabilization. The Manifest / Profile # for this material effective 3/1/11 will be <u>L0311-4</u>.
- Tate & Lyle "Drum Dry" material. This material is identified in this plan as a material that has specific handling requirements and needs additional stabilization. The Manifest / Profile # for this material effective 3-1-11 will be <u>L0311-5</u>.

These are the sludges that have historically been disposed at the Landfill. With the addition of Manifest / Profile #'s Santek will be better able to track specific material for disposal into the Landfill. This will allow for very specific determination of amount of sludge that is disposed at the Landfill. If new sludge waste streams are identified, Santek will assess the impact of the sludge on landfill operations and then place the new sludge into one of these three categories and manage accordingly.

Material Handling Protocol

Santek is currently stabilizing the sludge material coming into the Landfill by mixing with municipal solid waste (MSW). Given the findings in the Assessment Report that the slope failure was at least partially caused by the sludge, Santek recognizes that there is a need to modify the current material handling procedures. Therefore, Santek proposes to develop and implement a new material handling protocol for the sludge that will be disposed in the Landfill.

Based on the discussion above, Santek recognizes that the Paper Waste, WT 13 Sludge, and Drum Dry require special attention upon receipt at the Landfill. Furthermore, based on experience, Santek recognizes that the mixing procedures (i.e., relative amounts of sludge and stabilizing admixtures, degree of mixing, etc.) may differ for each of these materials. In consideration of this, Santek proposes the following:

- Upon approval of this strategy by TDEC, Santek will commence a field trial mixing program that is specific to each of the three identified sludges that require stabilization.
- For each of the sludges, known weights of sludge and "stabilizing admixture" will be mixed using available on-site equipment. The stabilizing materials that will be

considered include MSW, Soil, Ash, Bottom Ash, and/or Auto-Fluff. Various amounts of sludge and admixture will be blended, mixed, placed, and compacted during these trials. The trials will be monitored by Santek and Geosyntec (the independent consultant retained by the LCSWDC).

- The outcome of each trial on each sludge will be reported and photo-documented. The goal is to establish a limiting amount of sludge and admixture, as well as specific mixing procedures that will result in a mixture that can be placed effectively in the Landfill without segregation, pumping, etc. Santek recognizes that the limiting amounts will likely be sludge and admixture dependent. However, at these limiting amounts, it is likely that the "texture" and "character" of the mixed materials will be similar.
- At the completion of the field trial program, Santek will review the results in collaboration with Geosyntec and the LCSWDC to establish specific limits and procedures. Santek will then request that TDEC perform a site visit to visually observe the proposed blending, mixing, and placement procedures. Upon concurrence of the procedures proposed by Santek will establish a formal Sludge Mixing Protocol for each of the aforementioned materials that will provide a stabilized material in the Landfill. Santek anticipates the process of field testing through TDEC concurrence and document submittal will take up to sixty (60) days after TDEC's approval of this strategy.

Upon approval of the Sludge Mixing Protocol (Protocol), Santek will treat this document as part of the Operation Plan for the Landfill. If new sludges are identified that require special handling or is new admixtures and/or blending strategies are identified, Santek will develop sludge- and admixture-specific procedures that will result in a blended and stabilized mixture of similar texture and character to the mixtures identified in the Protocol. These new procedures will be documented and appended to the Protocol. TDEC will be informed of the modification to the Protocol.

Santek believes that by performing the field trials and establishing a visible criterion for the blending, mixing, and placement, the problems that may have contributed to the slope failure will be avoided in the future. Consistent with the current Permit requirements Santek will continue to track all of the special waste and sludge materials coming into the Landfill.