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Submitted via Electronic Mail

Ms. Jackie Drummond
North Carolina Department of Environment and Natural Resources
Division of Waste Management - Solid Waste Section
Section Chief
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

March 19, 2010

Dear Ms. Drummond:

Water Quality Assessment Plan Submittal
Charlotte Motor Speedway, Landfill V, Permit 13-04

On behalf of the Charlotte Motor Speedway, Landfill V, Herst & Associates, Inc. is submitting a response to a letter dated January 28, 2010 from Mr. Paul Crissman of the North Carolina Department of Environment and Natural Resources (NCDENR) addressed to Mr. Mike Gurley of the Charlotte Motor Speedway Landfill V.

The January 28, 2010 transmittal requested the site submit a Water Quality Assessment Plan (WQAP) within 60 days of receipt of the letter. A copy of the NCDENR letter was received on January 28, 2010 via electronic mail correspondence from Ms. Jaclynne Drummond of NCDENR. The following NCDENR comment requested the WQAP.

NCDENR Comment: *BFI Waste Systems of North America, Inc., a wholly owned subsidiary of Republic Services Inc. shall acquire the services of a North Carolina Professional Geologist with experience in assessment and remediation and submit for approval by the Solid Waste Section, a phased Water Quality Assessment Plan. The North Carolina Professional Geologist shall consult with Ms. Jaclynne Drummond prior to preparing the Water Quality Assessment Plan. The Solid Waste Section will review the submitted Water Quality Assessment Plan and then approve, or request additional information prior to implementation. The Water Quality Assessment Plan shall then be implemented as approved. Within 60 days of receipt of this letter, please submit the Water Quality Assessment Plan to Ms. Jaclynne Drummond.*

Based on the January 28, 2010 receipt date, the 60 day deadline would be March 29, 2010. Herst & Associates, Inc. has licensed North Carolina Professional Geologists on staff that have extensive experience in assessment and remediation. The requirements for, or the contents of a WQAP are not referenced in the NC Solid Waste Regulations, therefore the facility met with Ms. Drummond on March 9, 2010 to discuss proposed items to include in the requested WQAP. During the meeting, NCDENR agreed that the activities to be proposed in the upcoming WQAP were acceptable. The attached WQAP is being submitted for NCDENR review and approval.

Should you have any questions or concerns, please contact Mr. Mike Gurley at (704) 262-6019 or either of the undersigned at (636) 939-9111.

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Sincerely,

HERST & ASSOCIATES, INC.

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cc: *Mike Gurley, Republic Services, Inc.*

Water Quality Assessment Plan

Charlotte Motor Speedway, Landfill V
Concord, North Carolina
Permit No. 13-04

March 2010

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1.0 INTRODUCTION

On behalf of the Charlotte Motor Speedway, Landfill V, Herst & Associates, Inc. is submitting a Water Quality Assessment Plan in response to a letter dated January 28, 2010 from Mr. Paul Crissman of the North Carolina Department of Environment and Natural Resources (NCDENR) addressed to Mr. Mike Gurley of the Charlotte Motor Speedway Landfill V.

NCDENR Comment: *BFI Waste Systems of North America, Inc., a wholly owned subsidiary of Republic Services Inc. shall acquire the services of a North Carolina Professional Geologist with experience in assessment and remediation and submit for approval by the Solid Waste Section, a phased Water Quality Assessment Plan. The North Carolina Professional Geologist shall consult with Ms. Jaclynne Drummond prior to preparing the Water Quality Assessment Plan. The Solid Waste Section will review the submitted Water Quality Assessment Plan and then approve, or request additional information prior to implementation. The Water Quality Assessment Plan shall then be implemented as approved. Within 60 days of receipt of this letter, please submit the Water Quality Assessment Plan to Ms. Jaclynne Drummond.*

A copy of the NCDENR letter was received on January 28, 2010 via electronic mail correspondence from Ms. Jaclynne Drummond of NCDENR. Therefore, the 60 day deadline would be March 29, 2010. Pursuant to NCDENR's request, this Water Quality Assessment Plan was compiled and submitted by Professional Geologists licensed by the State of North Carolina: Mr. Ward Herst and Mr. Steve Jett. Mr. Herst is a Licensed Geologist in 35 States, including North Carolina. Mr. Jett is a Licensed Geologist in 16 States, including North Carolina.

The requirements for, or the contents of a Water Quality Assessment Plan (WQAP) are not referenced in NC Solid Waste Regulations or Guidance Documents, therefore the facility requested a meeting with NCDENR prior to the March 29, 2010 deadline, in order to discuss potential items to include in the requested WQAP. A meeting was held at the NCDENR office in Raleigh, North Carolina on March 9, 2010. Site representatives discussed with NCDENR the planned items to be included in the WQAP. The following WQAP outlines the completed and proposed activities to address the constituents detected above the North Carolina 15A NCAC 2L Water Quality Standards at the site.

2.0 BACKGROUND

The landfill began Assessment Monitoring pursuant to 15A NCAC 13B .1634 following confirmation of Appendix I volatile organic compounds (VOCs) confirmed detected during the October 2004 groundwater sampling event. Appendix II groundwater monitoring has been conducted on an annual basis since April 2005.

Per Assessment Monitoring regulation 15A NCAC 13B .1634(f), "*If the concentrations of any Appendix II constituents are above background values, but all concentrations are below the approved ground-water protection standards, using the approved statistical procedures, the owner or operator shall continue assessment monitoring.*" Since initiation of Assessment Monitoring subsequent to the Second Semi-Annual 2004 event, and as stated in each semi-annual groundwater statistical analysis report submittal, the concentrations of Appendix II organic constituents have been above background values, however the concentrations have been statistically below the groundwater protection standards (GPSs). Therefore, the site has continued in Assessment Monitoring, with no further action, as required by 15A NCAC 13B .1634(f). Regulation 15A NCAC 13B .1634(g) does not apply to the facility since the facility has not statistically exceeded a GPS to date.

The facility submitted the Groundwater Statistical Analysis Report for the Second Semi-Annual 2009 Event to NCDENR on February 15, 2010. As discussed in the Report, again the GPSs continue to exhibit no statistical exceedances. In addition, the VOC detections are stable to trending downward, likely attributable to the expansion and improved efficiency of the landfill gas collection and control system over recent years. Recent site upgrades should further enhance the removal of landfill gas and continued improvement in groundwater quality.

The NC 2L Standards were recently updated and became effective on January 1, 2010. **Comparison of the Second Semi-Annual 2009 event (December 2009) data to the new NC 2L Standards indicates that no VOC detections exceeded a value-to-value comparison to the NC 2L Standards.**

The First Semi-Annual 2010 sampling event (May 2010) will be the next annual Appendix II sampling event at the site for assessment wells MW-18A, MW-19, MW-19A, MW-20B, and MW-25. The remaining wells will be sampled for the Appendix I detection monitoring list.

In order to address NCDENR's January 28, 2010 letter, the site has compiled the following WQAP to address past VOC detections above value-to-value comparisons to the NC 2L Standards.

3.0 COMPLETED ACTIONS AND EXISTING DATA REVIEW

Since initiation of Assessment Monitoring in 2005, the following items have been completed to assess the groundwater quality conditions at the facility.

3.1 Geochemical Investigation of Groundwater and Leachate (Nature of Source)

The July 6, 2007 Groundwater Monitoring Summary submitted to NCDENR recommended the site sample the leachate and groundwater wells for anions/cations during the Second Semi-Annual 2007 event. The anion/cation data allowed the compilation of piper diagrams and stiff diagrams to compare the geochemistry of the leachate and groundwater to further identify the source of the impacts to the groundwater. On February 7, 2008, Herst & Associates, Inc. submitted the Groundwater Statistical Analysis Report for the Second Semi-Annual 2007 event. The Groundwater Statistical Analysis Report provided the following summary of the geochemical evaluation.

The major-ion composition of groundwater from each of the Second Semi-Annual 2007 (December 2007) groundwater samples and the leachate was evaluated using Piper (trilinear) diagrams and Stiff diagrams. A Piper diagram shows the relative contribution of major cations and anions, on a charge-equivalent basis, to the total ion content of the water. Percentage scales along the sides of the diagram indicate the relative concentration, in milliequivalents per liter, of each major ion. Cations are shown in the left triangle and anions are shown in the right triangle. The central diamond integrates the data. On the basis of major-ion data plotted on the Piper diagrams, water from the groundwater wells sampled during December 2007 can be placed into one grouping (calcium-magnesium-bicarbonate type) and December 2007 sample from the leachate monitoring point can be identified in a separate group (sodium-bicarbonate type), each with vastly different chemical compositions. The different correlations of the groups indicate two items: (1) that upgradient and downgradient wells fall into the same group, and (2) that quality is not similar between the groundwater data and leachate data. Both items indicate that mixing of leachate and groundwater is apparently not occurring.

Stiff diagrams were plotted for each of the December 2007 groundwater samples and the leachate sample as a method of graphically comparing the concentration of selected anions and cations for several individual samples. The shape formed by the Stiff diagrams indicated that these samples have different composition. The plot of the December 2007 groundwater samples was much narrower in relationship to the wider, more prominent leachate sample, indicating different chemical compositions.

To verify that groundwater quality conditions have not changed at each well over time, Piper and Stiff Diagrams were generated using all available cation/anion data, which consisted of a November 1993 event, a February 2007 event, and the December 2007 event. The historical Piper and Stiff Diagrams indicated that the major ion composition at each well (upgradient and downgradient) has not changed significantly since at least 1993 (14 years), indicating no impact from the landfill leachate had occurred.

The groundwater impacts detected at the site appeared to be attributable to landfill gas and not due to mixing of groundwater with leachate. No inorganics or VOCs were statistically exceeding the GPSs in the groundwater monitoring wells that surround the landfill.

3.2 Water Quality Comparison of Leachate to Groundwater (Nature of Source)

Available site leachate quality data from 2004 through 2009 (5 years) was reviewed and the range of confirmed detections were summarized on the attached Table 1. The groundwater results from the most recent event (December 2009) for the Assessment Wells (MW-18A, MW-19, MW-19A, MW-20B, and MW-25) were also summarized on Table 1 to compare to the leachate concentrations.

Inorganics

A majority of the inorganics detected in leachate were reported as non-detect (below the Solid Waste Section Limits) in the groundwater samples. Only barium, cobalt, and zinc were detected above their respective Solid Waste Section Limits (SWSLs) in groundwater samples, each of which are naturally occurring compounds in the soil at the site as detailed in previously submitted Alternate Source Demonstrations.

VOCs

Of the twelve VOCs confirmed detected in the leachate samples, only two were confirmed detected above a SWSL in the groundwater samples: benzene and cis-1,2-dichloroethene. 1,4-Dichlorobenzene was confirmed detected above the SWSL in groundwater samples, but not in leachate samples. The leachate VOC detections with the highest concentrations (acetone, 2-butanone, toluene, xylenes) were not confirmed detected above the SWSL in the Assessment well groundwater samples.

Summary

The inorganic and VOC constituents detected at elevated levels in leachate do not correlate well with the parameters and concentrations detected in the groundwater samples from the Assessment monitoring wells. The trace VOC detections in groundwater Assessment wells correlate more with VOCs typically detected at elevated levels in landfill gas (i.e. chlorinated ethanes and ethenes). The groundwater impacts detected at the site appear to be attributable to landfill gas and not due to mixing of groundwater with leachate.

3.3 Rocky River Groundwater Discharge Evaluation

The following information was presented in the Design Hydrogeologic Report (Phase 3) dated May 2009 by David Garrett and Associates. The Rocky River borders the west and south sides of the study area, and an unnamed tributary borders the east side – outcrops were observed near the river, outside the Phase 3 footprint. The larger streams provide on-site groundwater discharge features and serve as groundwater divides between the facility boundary and across the river. The on-site streams converge near the southeast corner of the facility boundary. The cross sections provided in the Design Hydrogeologic Report illustrate a division of the ground water flow along the central ridge, leading to the larger streams – the predominant groundwater flow direction is toward the south, with southeast and southwest components directed toward the unnamed tributary and the Rocky River, respectively. The Rocky River and its unnamed tributaries appear to be groundwater discharge features within and adjacent to the site boundary.

3.4 Proximity and Withdrawal Rate of Groundwater Users

The following information was presented in the Design Hydrogeologic Report (Phase 3) dated May 2009 by David Garrett and Associates. An area water well survey was completed during the "site suitability" stage of the permitting process. Since then, public utilities have been extended into the vicinity and area reliance on groundwater use has decreased. No groundwater users exist downgradient of the current landfill or the proposed expansions, i.e., no residences or wells exist between the landfill and the groundwater discharge features. The site is hydraulically isolated from its surroundings by numerous groundwater divides, i.e., the Rocky River and creeks, which are localized groundwater discharge features of the uppermost aquifer. Municipal water is available throughout the vicinity.

Based on the relative distances to the nearest privately owned structures (over 500 feet, located across regional groundwater divides) and the present of on-site groundwater discharge features, it is unlikely that a potential release of solid waste constituents from the proposed landfill expansion will pose a risk to public health, safety or welfare.

3.5 Landfill Gas Collection and Control System (Source Control)

According to the site, the perimeter methane monitoring probes do not have detections of methane (Fourth Quarter 2009 event).

The following sections were provided by SCS. The Gas Collection and Control System (GCCS) has been operational at the Landfill since 1996. As areas of the Landfill reached 5 years old or 2 years old and at final grade, the GCCS was expanded in general accordance with the NSPS GCCS Design Plan. The GCCS was designed and constructed in general accordance with the NSPS provisions and the NSPS GCCS Design Plan.

The GCCS includes over 150 vertical extraction wells, five horizontal collectors (HC), and nine leachate cleanouts. The facility includes the following major control system components:

- A 4,000 scfm enclosed flare with 2 25-hp Lamson blowers rated at 1,500 scfm each,
- A 2-stage gas compressor that feeds a Taurus 60-T7300 Solar turbine, and
- A 6,000 scfm enclosed flare, with 2 50-hp Lamson blowers rated at 3,000 scfm each,

The turbine is part of a landfill gas-to-energy (LFGTE) facility at the site. The LFGTE facility was constructed in 1999 with start-up testing performed in December 1999. The LFGTE facility began generating electricity in early 2000 with power being sold to the City of Concord.

2007 Expansion

Construction on the GCCS Expansion began in January 2007, and ended in February 2007. The objectives of the upgrades during the expansion included the following:

- Re-drill four nonperforming wells – EW-35B, EW-66C, EW-72B, EXP-25A.
- Replace damaged lateral piping - vicinity of EW-31 and EW-22.
- Install new lateral piping for new wells – EW-35B, EW-66C, EW-72B, EXP-25A.
- Install new airline for sumps – CS-1, CS-2, CS-3, CS-4.
- Install new sump pumps – CS-1, CS-2, CS-3, CS-4.
- Perform boot repairs on four wells - EW-8, EW-15, EW-16, EW-17.

2008 Expansion

Expansion of the GCCS began in February 2008 and ended in May 2008. The primary objectives of the expansion project were to replace non-performing wells, increase the available vacuum to the GCCS by installing new header pipes, and replace the condensate sump/knockout pot at Flare 2. Replacing the condensate sump/knockout pot will improve the operation of the flare and allow the flare to be operated at a higher vacuum.

During construction it was observed the leachate cleanout located on the south west side of the landfill (near MW-18A) was showing signs of landfill gas pressures within the cleanout. Because of this, the cleanout was connected to the GCCS so a vacuum could be applied and landfill gas collected. In general the 2008 expansion of the GCCS included the following:

- Re-drill 21 nonperforming wells – EW-07, EW-10, EW-16, EW-19, EW-20, EW-22, EW-24, EW-31, EW-32A, EW-33A, EW-35B, EW-37, EW-38, EW-40, EW-46, EW-47, EW-121, EXP-04, EXP-05, EXP-13, and EXP-14.
- Two new LFG wells – EW-199 and EW-200.
- 6” lateral piping for new and re-drilled wells.
- 16” and 12” header piping.
- 2” airline for sump CS-03.
- 2" condensate sump and pump for Flare 2.
- Connected a leachate cleanout to the GCCS.

2009 Expansion

Expansion of the GCCS occurred in 2009. The primary objectives of the expansion project were to expand the system into Cell 2G, replace non-performing wells, and increase the available vacuum to the GCCS by installing new header pipes. In addition, a new 24-inch diameter header pipe was installed from the big flare into Cell 2G.

In general the 2009 expansion of the GCCS included the following:

- Re-drill four nonperforming wells – EW-05A, EW-44A, EW-114A, and EW-115A.
- Install 11 new LFG wells – EW-120, EW-122, EW-123, EW-124, EW-159, EW-160, EW-183, EW-184, EW-185, EW-201, and EW-202.
- Tie leachate cleanouts into GCCS (near MW-18A, MW-19, and MW-19A).

- 6” lateral piping for new and re-drilled wells.
- 24”, 18”, 16” and 12” header piping.
- Connected a leachate cleanouts to the GCCS.

According to SCS Engineers, because of the improvements stated above, the efficiency of the GCCS has improved. 2009 upgrades to the GCCS should further enhance the removal of landfill gas and continued improvement in groundwater quality.

4.0 PROPOSED ACTIONS

The following actions are proposed in order to further assess the groundwater quality conditions at the site:

4.1 Sewer Line Examination

According to the site, a sewer line is installed along the toe of the western portion of the landfill, below ground surface, and between the landfill and the perimeter access road. The groundwater monitoring wells are located adjacent to the perimeter access road. Sewer lines can act as a conduit and potentially contain landfill methane gas (and VOCs) that may migrate into the adjacent groundwater monitoring well headspace. Therefore, it is proposed that an examination be conducted of the sewer line construction. The available design drawings will be reviewed and a field reconnaissance will be conducted to determine if evidence of methane migration is present near the sewer line vicinity.

4.2 Headspace Methane Monitoring in Groundwater Wells

Landfill gas may migrate to the headspace of the groundwater monitoring wells, come into contact with the surface of the water level in the well and be phase transferred into the groundwater. VOCs in gas molecules can be transferred to aqueous phase at these interaction zones. Review of the monitoring well construction diagrams for the wells with VOC detections (MW-18A, MW-19, MW-19A, MW-20B, and MW-25) indicates that the groundwater elevation intersects the screened interval of wells MW-18A and MW-19, which could also allow landfill gas to enter the monitoring well through the unsaturated portion of the screen interval. Therefore, it is proposed that the headspace of wells MW-18A, MW-19, MW-19A, MW-20B, and MW-25 be monitored for methane prior to sampling each well during the May 2010 semi-annual groundwater sampling event. Headspace methane monitoring will be performed by removing the well cap and inserting tubing into the well to a depth just above the water table. The tubing will be connected to a portable methane gas monitoring meter for a period of 5-minutes, with the highest methane measurement being recorded on the field sampling logs. It is recommended that a sensitive methane meter be utilized during the monitoring that can also measure carbon dioxide and oxygen volume.

4.3 Geochemical Evaluation of Groundwater and Leachate

Similar to the geochemical evaluation that was performed during the Second Semi-Annual 2007 event, it is proposed that the leachate and groundwater wells MW-18A, MW-19, MW-19A, MW-20B, and MW-25 be sampled for anions/cations during the First Semi-Annual 2010 event (May 2010). The anion/cation data would allow the compilation of Piper diagrams and Stiff diagrams to compare the geochemistry of the leachate and groundwater. The additional parameters included alkalinity, bicarbonate, calcium, carbonate, chloride, magnesium, potassium, and

sodium. The additional parameters will allow the facility to evaluate possible leachate impacts in these wells.

4.4 Install Wells Downgradient of Wells of Concern

As stated above, the site has made considerable upgrades to the GCCS over the last 3 years, which has apparently increased the efficiency of the GCCS, which should further enhance the success the site has had in removing landfill gas. This has been evident by the stable to downward trends of the VOC detections. Comparison of the groundwater analytical data from the Second Semi-Annual 2009 event (December 2009), indicate that no VOCs exceed a value-to-value comparison to the USEPA MCLs, NC GPSs, and recently updated (January 2010) NC 2L Standards.

Installation and monitoring of wells downgradient of the wells of concern would allow the delineation of the horizontal and vertical extent of VOCs. The wells with confirmed VOC detections over one of the last two semi-annual events are considered the wells of concern, and are comprised of MW-18A, MW-19, MW-19A, MW-20B, and MW-25.

MW-25

As shown on the attached potentiometric surface map (see Figure 1), monitoring wells MW-10 and MW-10A are located directly downgradient of MW-25. Historical groundwater monitoring at wells MW-10/MW-10A indicate no VOCs have been confirmed detected. Therefore, no additional downgradient wells would be necessary to delineate the extent of detections downgradient of MW-25.

MW-20B

Well MW-20B is located between the landfill and a 40 foot vertical drop down to the Rocky River (1:7 slope). Due to the inaccessibility of a drill rig to install an additional well downgradient of MW-20B, an additional well is not proposed in this location at this time. Also, since initiation of assessment monitoring in 2005, the trace VOC detections at well MW-20B have not exceeded a value-to-value comparison to a NC 2L Standard. Therefore, there is no requirement to install a well downgradient of MW-20B at this time.

MW-19 and MW-19A Nest

Wells MW-19 and MW-19A are located in a nest approximately 20 feet west of the landfill and approximately 10 feet east of the landfill access road. The landfill access road receives a high volume of daily traffic from trucks entering/leaving the landfill. Exhaust fumes from the vehicular traffic could be another potential source of the VOCs at MW-19/19A.

Review of well installation reports compiled by S&ME, Inc. reveals that MW-19 and MW-19A were installed in September 1998. The boring and well installation log for MW-19 indicates the following subsurface materials were encountered:

- Surface to 6 feet below ground surface (fbgs): micaceous fine sandy Silt (with manganese);
- 6 to 12.5 fbgs: micaceous clayey fine sandy Silt (with manganese);
- 12.5 to 13.5 fbgs: micaceous fine sandy clayey Silt;
- 13.5 to 18.5 fbgs: micaceous fine sandy clayey Silt (with manganese); and
- 18.5 to 53 fbgs: partially weathered rock (PWR), when sampled becomes silty medium to coarse Sand.

Well MW-19 has a screened interval from 25 to 40 fbgs, which intersects the partially weathered rock (PWR) zone.

The boring and well installation log for MW-19A indicates the following subsurface materials were encountered:

- Surface to 6 fbgs: micaceous fine sandy Silt (with manganese);
- 6 to 12.5 fbgs: micaceous clayey fine sandy Silt (with manganese);
- 12.5 to 13.5 fbgs: micaceous fine sandy clayey Silt;
- 13.5 to 18.5 fbgs: micaceous fine sandy clayey Silt (with manganese);
- 18.5 to 63 fbgs: PWR, when sampled becomes silty medium to coarse Sand; and
- 63 to 71 fbgs: Bedrock.

Deeper zone well MW-19A has a screened interval from 61 to 71 fbgs, which intersects the bottom 2 feet of the PWR and the top 8 feet of the bedrock zone.

It is recommended to install a nest of two wells downgradient of existing nest MW-19/MW-19A. One of the new wells (MW-19R) will be installed with a fully saturated screened interval near the base of the PWR zone, and one well (MW-19AR) will be installed with a fully saturated screened interval in the bedrock zone. The new well nest (MW-19R/MW-19AR) will be located on the west berm of the sedimentation pond, approximately 165 feet to the southwest of MW-19/MW-19A and 185 feet southwest of the solid waste limits, which would still be within the 250 feet relevant point of compliance distance from the waste boundary (see attached Figure 1). If the current permit application is approved by NCDENR, then the site intends to install the additional monitoring wells as part of the expansion process. This expansion field work is currently expected to occur during the Fall 2010. Therefore, it is proposed that during the same drilling mobilization event in Fall 2010, wells MW-19R and 19AR be installed.

MW-18A

Well MW-18A is located approximately 40 feet southwest of the waste boundary and approximately 100 feet northwest of the enclosed flare. Also, a landfill gas header pipe is installed below the ground surface between the landfill and the flare, immediately adjacent to MW-18A. Therefore, the presence of landfill gas would not be unexpected. Well MW-18A is also adjacent to the landfill access road, which receives a high volume of daily traffic from trucks entering/leaving the landfill. Exhaust fumes from the vehicular traffic could be another potential source of the VOCs at MW-18A.

Review of well installation reports compiled by S&ME, Inc. reveals that in September 1998 a shallow well (MW-18) was initially installed at a depth of 20 fbgs. Subsurface materials encountered at MW-18 included:

- Surface to 7 fbgs: clayey fine sandy Silt;
- 7 to 8.5 fbgs: fine sandy clayey Silt;
- 8.5 to 18.5 fbgs: fine sandy Silt with clay lenses; and
- 17 to 20 fbgs (auger refusal): silty fine Sand.

For MW-18, the screened interval was placed from 5 to 20 fbgs, to intersect the fine sandy Silt with clay lenses zone and the silty fine Sand zone. However subsequent water levels determined insufficient water volume was present in MW-18 to collect a sample, therefore well MW-18 was not included as part of the site's groundwater monitoring program. In November 1998, a deeper well (MW-18A) was installed to replace MW-18. The boring and well installation log for MW-

18A indicates drilling to a total depth of approximately 26 fbgs. Subsurface materials encountered included:

- Surface to 7 fbgs: clayey fine sandy Silt;
- 7 to 8.5 fbgs: fine sandy clayey Silt;
- 8.5 to 17 fbgs: fine sandy Silt with clay lenses; and
- 17 to 26 fbgs: Bedrock.

The screened interval for MW-18A was placed from 11 to 26 fbgs, which would intersect both the fine sandy Silt with clay lenses zone and the Bedrock zone.

Due to the shallow bedrock in the vicinity of MW-18A, it is recommended to install only one well downgradient of MW-18A. The new well (MW-18AR) will be installed with a fully saturated screened interval intersecting the shallow bedrock zone. This should allow the horizontal and vertical extent of VOC presence to be defined. New well MW-18AR will be located approximately 160 feet to the southwest of MW-18A and 200 feet southwest of the solid waste limits; which would be within the 250 feet relevant point of compliance distance from the waste boundary (see attached Figure 1). If the current permit application is approved by NCDENR, then the site intends to install this additional well as part of the expansion process. This expansion field work is currently expected to occur during the Fall 2010. Therefore, it is proposed that during the same drilling mobilization event in Fall 2010, well MW-18AR be installed.

The three new wells are proposed to be sampled for the Appendix I list of constituents during the Second Semi-Annual 2010 groundwater sampling event (November 2010).

5.0 EXPECTED TIMELINE

The following expected timeline is proposed in order to conduct the above activities:

<u>May 2010 (Concurrent with the First Semi-Annual 2010 event)</u>

- Monitor headspace in groundwater monitoring wells MW-18A, MW-19, MW-19A, MW-20B, and MW-25 for methane.
- Analyze leachate and groundwater samples from MW-18A, MW-19, MW-19A, MW-20B, and MW-25 for leachate indicator parameters for a geochemical evaluation.
- Conduct sewer line examination.

<u>July/August 2010</u>

- Submit Status Summary Report upon receipt/review of May 2010 event data.

<u>November 2010 (Concurrent with the Second Semi-Annual 2010 event)</u>

- Install new wells MW-18AR, MW-19R, and MW-19AR, located more downgradient from the waste. Sample new wells for the Appendix I list of constituents.

<u>January/February 2011</u>

- Submit Status Summary Report upon receipt/review of November 2010 event data.

6.0 SUMMARY

This WQAP provides a summary of actions completed to date and proposed actions in order to address the source and extent of the VOC detections in groundwater monitoring wells at the site. The first phase of the field work is proposed to occur during May 2010 (in conjunction with the First Semi-Annual 2010 event) and will consist of **(1)** a sewer line examination, **(2)** headspace methane monitoring in groundwater monitoring wells of concern, and **(3)** a geochemical evaluation of groundwater and leachate. The results of the first phase activities will be submitted upon receipt and review of the respective data.

Installation and monitoring of wells downgradient of the wells of concern would allow the delineation of the horizontal and vertical extent of VOCs. The second phase of the field work is proposed to occur during November 2010 (in conjunction with the Second Semi-Annual 2010 event) and will consist of **(4)** installing new wells MW-18AR, MW-19R, and MW-19AR, and **(5)** sampling the new wells for the Appendix I list of constituents. The results of the second phase activities will be submitted upon receipt and review of the respective data.

TABLES

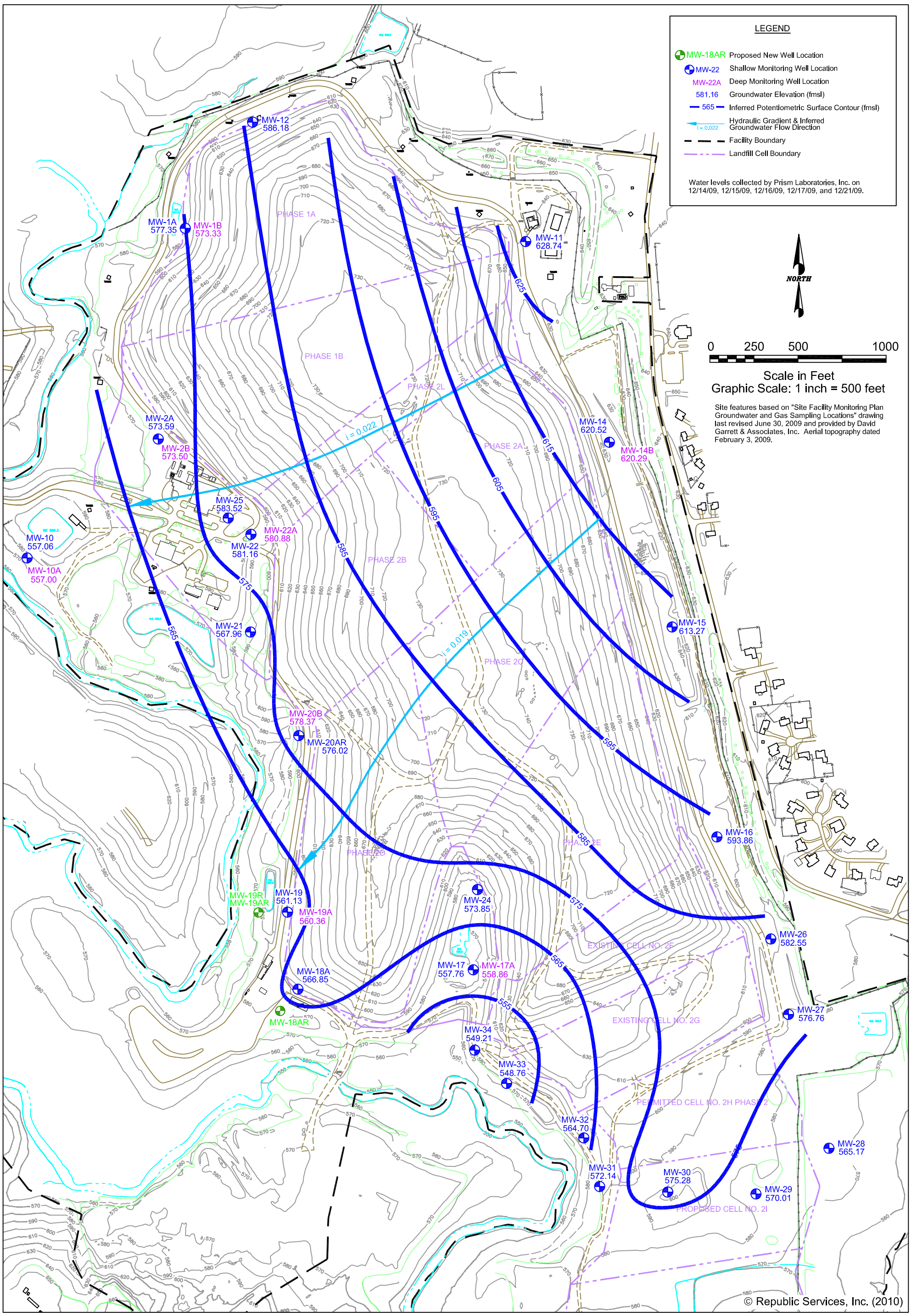
Table 1: Leachate Concentrations Compared to Groundwater Concentrations

Constituent Inorganic	Range of Detections in Leachate		Units	December 2009 Concentrations in Groundwater Assessment Wells
	Low	High		
Antimony	9	19.6	ug/L	<SWSL
Arsenic	5.6	50.2	ug/L	<SWSL
Barium	503	1600	ug/L	92.4 - 938
Chromium	4.3	11	ug/L	<SWSL
Cobalt	8.67	66	ug/L	0.68 - 15.7
Copper	3.8	7.94	ug/L	<SWSL
Lead	0.05	6.1	ug/L	<SWSL
Nickel	25	79	ug/L	<SWSL
Selenium	7.7	46.6	ug/L	<10 - 11.4
Vanadium	2	6.6	ug/L	<SWSL
Zinc	3.7	66	ug/L	<10 - 736

Constituent VOC	Range of Detections in Leachate		Units	December 2009 Concentrations in Groundwater Assessment Wells
	Low	High		
Acetone	4.68	2300	ug/L	<SWSL
Benzene	0.2	18	ug/L	<1 - 1.0
2-Butanone (MEK)	110	2200	ug/L	<SWSL
1,1-Dichloroethane	2.3	7.8	ug/L	<SWSL
cis-1,2-Dicholoroethene	2.3	12	ug/L	<5 - 9.9
Ethylbenzene	0.4	90	ug/L	<SWSL
2-Hexanone	1.8	25	ug/L	<SWSL
4-Methyl-2-pentanone (MIBK)	6.8	31	ug/L	<SWSL
Toluene	0.19	320	ug/L	<SWSL
Vinyl Chloride	2.3	16	ug/L	<SWSL
m,p-Xylene	25	120	ug/L	<SWSL
o-Xylene	13	46	ug/L	<SWSL

Note1: Leachate data was reviewed from 10/04 through 12/09 (5 years).
Note2: Assessment wells are MW-18A, MW-19, MW-19A, MW-20B, and MW-25.
Note3: 1,4-Dichlorobenzene detected in groundwater (1.1 to 1.7 ug/L), however not detected in Leachate Samples.
Note4: SWSL denotes the NCDENR Solid Waste Section Limits.

FIGURES



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Charlotte Motor Speedway Landfill V
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Figure 1
Second Semi-Annual 2009
Potentiometric Surface & Proposed Well Location Map