BMI COMPLEX DRY/MOISTURE-CONTROLLED PONDS AREA/PHASE IIIB AIR MONITORING SUMMARY REPORT Revision 1

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1.0 INTRODUCTION

Basic Remediation Company (BRC) retained Converse Consultants (Converse) and Tetra Tech EM Inc. (Tetra Tech) to complete a short-term air sampling project to evaluate off-site emissions from dry/moisture-controlled pond excavations in the eastern portions of the Eastside Area of the Basic Environmental Company property located in Clark County, Nevada. This off-site air sampling project is the second of a 3-phased approach to evaluate emissions from material hauling, dry/moisture-controlled pond excavations, and CAMU slit trench excavations.

Tetra Tech set up two temporary air-monitoring stations along the interior perimeter of the Eastside Area near the dry/moisture-controlled pond excavation area and collected air samples on January 6, 9, 13, 16 and 20, 2009. Equipment was set up at each of the two stations to collect ambient air samples over a twenty-four hour (hr) period from approximately 12:00 P.M. to 12:00 P.M. Meteorological data was collected during the sample event and meteorological conditions at the time of sampling are presented in Table 1.

The sampling parameters were based on the BRC *Perimeter Air Monitoring Plan* (PAMP) (October 2008) and *Revised Draft BMI Complex Air Quality Monitoring Project – Phase III – Summary of Sampling Approach and Chemicals of Concern at Eastside and CAMU Areas* (Tetra Tech October 2008) reviewed and approved by the Nevada Division of Environmental Protection (NDEP). Two identical air-sampling stations were constructed and the sampling equipment at each site of the two sites consisted of:

- Three identical polyurethane foam (PUF) hi-volume federal reference method (FRM) samplers designed to collect samples on three PUF cartridges for analysis of organic compounds contained in the U.S. Environmental Protection Agency (EPA) compendium methods TO-4, TO-9 and TO-13

- One portable BGI PQ100 low-volume FRM (PQ100) sampler designed to collect samples on 47mm Teflon filters for analysis of total suspended particulate (TSP) and total metals contained in the U.S. EPA compendium methods IO-3.3 X-Ray Florescence.

- One SKC Model 224-PCXR8 (SKC) low-volume sample pump designed to collect samples on mixed cellulose ester (MCE) filters for analysis of asbestos using National Institute for Occupational Safety and Health (NIOSH) Method 7400 for phase contrast microscopy

- One Honda EB 6500 gasoline-powered generators (or equivalent)

This report summarizes sample collection, analyses methodology, and analytical data collected between January 6, 2009 and January 20, 2009. The sampling approach, methodology, and summary of activities are presented in Section 2.0. The analytical data results are presented in Section 3.0. NDEP comments and BRC response to comments are provided in Appendix A; Field documentation forms are provided in Appendix B; laboratory analytical data reports are provided in Appendix C; calibration and sample volume calculation worksheets are provided in Appendix D; a CD containing an electronic copy of the report, tables, and track changes version of report is provided in Appendix E.

2.0 SAMPLING APPROACH

Based on locations identified taking into account on-going remediation, two temporary air monitoring stations were set up along the perimeter of the Eastside Area in Henderson, Nevada to collect air samples during excavation of the dry/moisture-controlled ponds from the Eastside area. Samples were collected during five 24-hour sample events at each station from January 6, 2009 through January 20, 2009.

2.1 SITE SELECTION AND LOCATIONS

Based on the prevailing wind direction at the BMI Complex, one air monitoring station was placed along the north (BMI-06) and south side (BMI-11) of the Eastside Area. Site BMI-011 was located to represent potential upwind conditions and Site BMI-06 was located to represent potential downwind conditions. The air monitoring station locations are presented in Figure 1.

2.2 SAMPLING EQUIPMENT CALIBRATION AND OPERATION

Tetra Tech assembled and calibrated the PUF, PQ100, and SKC air samplers prior to sample collection and after equipment had been serviced (battery changes). All samplers were calibrated using National Institute of Standards and Testing (NIST) or other authoritative reference certified equipment.

The initial calibrations on the PUF, BGI PQ100, and SKC samplers only required minor adjustments to set correct flow rates, but no major adjustments or equipment failures were observed. All equipment was checked again before sample collection began to ensure the correct flow rate(s) and timer operation.

Tetra Tech performed all calibrations according to EPA reference methods and all equipment was found to be within the calibration acceptance criteria prior to sample collection and equipment was operating within project goals. Equipment calibration worksheets are provided in Appendix D.

All samplers were powered by portable gas-powered generators for each sample event. At the beginning of each sample event, Tetra Tech transported the generators and air sampling equipment to each sample station. Samplers were set up and programmed at each station prior to sampling and subsequently removed after the completion of each sample event. Each station consisted of a sampling platform

enclosed in an approximately 16 foot (ft) by 16 ft by 8 ft high chain link fence secured with a locking gate. Air samplers were secured to the platforms during the sample events.
The sampling approach proposed by BRC and Tetra Tech and approved by NDEP was to collect 24-hr samples twice per week from approximately 12:00 P.M. to 12:00 P.M. over a three week period during nighttime excavating operations.

The first sample event occurred on January 6, 2009 and sampling continued through January 20, 2009. A generator was stolen from site BMI-011 on or about January 12, 2009 and as a result no samples were collected on January 13, 2009. In addition, only one sample was collected during the week of January 20, 2009.

All sample parameters were documented on BMI Complex field documentation forms before and after each sample event. In total, five sample events were completed on the following dates:

- January 6, January 9, January 13, January 16, January 20, 2009

2.3 SAMPLE NOMENCLATURE

All samples collected at the BMI Complex were given a sample ID according to the sample location and sample date as follows:

- BMI-06-010609 (where BMI denotes site location, 06 denotes site #6 and 010609 denotes that sample was collected on January 6, 2009)

2.4 SAMPLE PARAMETERS

Air samples were collected at the established monitoring stations for the analysis of site related chemicals including organochlorine pesticides, Polychlorinated Dibenzo-p-dioxins (PCDDs), Polychlorinated Dibenzo-p-furans (PCDFs), Polychlorinated biphenyls (PCBs), VOCs/SVOCs, TSP, metals, and asbestos fibers. The sampling and analysis procedures are summarized below. For all samples collected at the BMI Complex, field blanks were collected on a frequency of 10 percent (one in 10 samples) for quality control purposes. Upon completion of each sample event, the samples and associated information was recorded on chain-of-custody (COC) sheets and submitted to the respective laboratories for analysis. The COC included the sample identification number, sample location, sample time, beginning and ending flow rate (to calculate sample volume) and the required analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 2.

2.4.2 2.4.1 ORGANIC COMPOUNDS

At each sampling location, three PUF samplers were used to collect PUF samples for the analysis of organochlorine pesticides, PCDDs, PCDFs, PCBs, and VOCs/SVOCs using EPA Compendium Methods TO-4, TO-9, and TO-13. The PUF samplers draw approximately 0.2 cubic meters per minute of ambient air onto a 102 millimeter (mm) diameter quartz glass filter followed by a polyurethane foam plug and XAD resin contained in a glass cartridge. The TO-9 and TO-13 samples were analyzed using gas chromatography and mass spectrometry (GC/MS) and the TO-4 samples were analyzed using GC/Multi-Detector Detection (GC/MD). All PUF (organic) samples were submitted with COC form(s) to Air Toxics Ltd. Laboratory and Frontier Ltd. Laboratory for analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 2.

2.4.3 TOTAL SUSPENDED PARTICULATE MATTER AND METALS

At each sampling location, one PQ100 sampler was used to collect samples for TSP and metals. The PQ100 sampler draws approximately 0.0167 cubic meters per minute (approximately 12 total cubic meters) of ambient air onto the filter media. The TSP and metals samples were collected using 47 mm Teflon filter media and analyzed using USEPA Compendium Method IO-2.1 (gravimetric analysis). The TSP samples underwent additional analysis for metals using USEPA Compendium Method IO-3.3 X-Ray Fluorescence (Protocol number 6). All TSP and metals samples were submitted with COC form(s) to Chester Labnet Laboratory for analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 2.

2.4.4 ASBESTOS

At each sampling location, one SKC low volume sampler was used to collect samples for asbestos analysis using NIOSH Method 7400. The sampling system consisted of a low-flow pump attached to a 25-millimeter MCE filter. The SKC samplers draw approximately 1 liter per minute (lpm) (approximately 720 total liters) of ambient air onto the MCE filter. The samples were analyzed using NIOSH Method 7400 (Phase Contrast Light Microscopy). All asbestos samples were submitted with COC form(s) to AESL Laboratory for analysis. A summary of sample collection, sample handling, and analysis specifications procedures is provided in Table 2.

2.5 SIGNIFICANT SITE-RELATED EVENTS

A generator was stolen from site BMI-11 on or about January 12, 2009 and as a result no samples were collected from site BMI-11 on January 13, 2009. Upon discovery, Tetra Tech personnel immediately notified BRC and Weston Solutions personnel and filed a police report with the Henderson Police Department.

Air Quality Monitoring stations BMI-06 and BMI-11 were dissembled and transported to the CAMU site on January 21, 2009 in preparation for the CAMU Slit Trench air monitoring that began on January 23, 2009.

3.0 ANALYTICAL RESULTS

The air quality sample data collected at the off-site locations represents a wide range of chemical compounds as presented in the PAMP. All sample data was compared to EPA Region 3 risk-based concentrations (RBC) table (April 2006), EPA Region 9 preliminary remediation goals (PRG) table (October 2004), and EPA Region 6 human health medium-specific screening levels (MSSL) table (March 2008) to determine if ambient concentrations exceeded criteria. In most cases the RBC, PRG, and MSSL were either identical or very close in chemical concentration.

The sample results demonstrate that the majority of organic (PUF) compounds were not detected in measurable concentrations in ambient air at the off-site locations. However, a limited number of organic compounds were detected and have been further evaluated. In addition, TSP, some metals, and airborne fibers were detected. A summary of analytical results for each subset of chemical compounds is provided below.

3.1 UPWIND AND DOWN WIND ANALYSIS

Tetra Tech developed an approach for the quantification of upwind versus downwind air quality monitoring data collected during this short-term air sampling project at the BMI Complex Site. The objective of the upwind/downwind evaluation is to evaluate if the dry/moisture-controlled pond excavation operations contributed to the degradation of the existing air quality in the vicinity of the work area. However, it must be noted that this analysis was performed with a limited meteorological dataset of five sample events and thus represents meteorological conditions measured during January 6, 9, 13, 16, and January 20, 2009.

3.1.1 DATA SUMMARY

The upwind/downwind evaluation was conducted using meteorological data and on-site data collected at sites BMI-11 and BMI-06. Meteorological data including wind speed and direction were measured continuously at the on-site meteorological monitoring station operated by Tetra Tech near the Eastside entrance gate.

3.1.2 APPROACH

The general approach for conducting the upwind/downwind evaluation consists of the following steps:

- Determine predominant wind directions
- Assign upwind/downwind stations
- Compare upwind/downwind results
- Determine those air sample results that exceeded either the RBC or PRG screening criteria
- Conduct a statistical analysis

3.1.3 DETERMINE PREDOMINANT WIND DIRECTION

If the wind is variable, assigning a predominant wind direction may be subject to qualitative interpretations.

Tetra Tech defined predominant wind direction based on the following criteria:

- At least 50 percent of wind direction measurements occur in two quadrants (southeast-southwest, or northeast-northwest)

3.1.4 ASSIGN UPWIND/DOWNWIND STATIONS

Meteorological data was recorded for the duration of the eight sample events and the prevailing wind direction was generally from the southwest and southeast**.** A summary of meteorological data during the sample events is presented in Table 1 below.

TABLE 1
METEOROLGICAL DATA RECORD DURING OFF SITE AIR SAMPLING
JANUARY 6 –JANUARY 20, 2009
HENDERSON, NEVADA

Sample Date	Average Wind Degrees	Average Wind Speed (m/s)	Quadrant Wind Blowing From	Respective Upwind Site	Respective Downwind Site
1/5-1/6/09	145.41	1.02	Southeast	BMI-11	BMI-06
1/8-1/9/09	162.85	2.96	Southeast	BMI-11	BMI-06
1/12-1/13/09	189.68	1.05	Southwest	BMI-11	BMI-06
1/15-1/16/09	174.67	1.19	Southeast	BMI-11	BMI-06
1/19-1/20/09z	191.01	0.66	Southwest	BMI-11	BMI-06

3.1.5 COMPARE UPWIND/DOWNWIND RESULTS

To meet project objectives the upwind concentrations of chemical constituents were compared to their corresponding downwind concentrations. The comparison consisted of calculating the percent difference between the upwind and downwind concentrations. This has been completed for all detected chemical compounds.

3.2 TSP AND METALS RESULTS

TSP was detected in all samples and concentrations ranged from 3.58 µg/m^3 to 30.12 µg/m^3. The average concentration was 13.68 µg/m^3. No screening criteria or federal standards currently exist for TSP. An analysis of the percent difference calculation between the upwind site (BMI-11) and downwind site (BMI-06) demonstrated an average percent difference of approximately 63 percent and varied from -46.7 to 280.3. The large fluctuation and discrepancy in TSP concentrations does not demonstrate a good pattern or evidence of significant air quality impacts. A complete summary and statistical analysis of all TSP results are presented in Table 3.

Metals were detected in a majority of the TSP samples and concentrations were reported with an uncertainty of plus/minus 3 standard deviations. The XRF detection method identifies concentrations in extremely low concentration ranges (of less than 0.001 µg/m^3). The results were compared to the RBC, PRG, and MSSL screening criterion (of those available) and four metals exceeded the criterion: Manganese, Cobalt, Arsenic, and Cadmium.

Manganese concentrations ranged from 0. 0018 µg/m^3 to 0.0723 µg/m^3 and the average concentration was 0.0384 µg/m^3. The Manganese PRG and MMSL of 0.051 µg/m^3 (RBC of 0.052 µg/m^3) was exceeded by 3 samples. Two of these of samples were collected at BMI-11 and one sample was collected at BMI-06. Cobalt concentrations ranged from 0.0012 µg/m^3 to 0.0043 µg/m^3 and the average concentration was 0.0023 µg/m^3. The Cobalt PRG and MSSL of 0.001 µg/m^3 was exceeded by six samples. Four of these samples were collected at Site BMI-06 and two samples were collected at Site BMI-11. Arsenic concentrations ranged from 0.0001 µg/m^3 to 0.0018 µg/m^3 and the average concentration was 0.0008 µg/m^3. The Arsenic PRG of 0.0004 µg/m^3, RBC of 0.00041 µg/m^3, and MSSL of 0.00045 µg/m^3 was exceeded by three samples. Two of these samples were collected at Site BMI-06 and one sample was collected at Site BMI-11. Cadmium concentrations ranged from 0.0008µg/m^3 to 0.0065 µg/m^3 and the

average concentration was 0.0030 µg/m^3. The Cadmium RBC of 0.001 µg/m^3 and PRG/MSSL of 0.0011 µg/m^3 were exceeded by three samples. Two of those samples were collected at Site BMI-06 and one sample was collected at Site BMI-11. It must be noted that all Cobalt, Arsenic, and Cadmium concentrations were reported at less than three times the XRF analytical uncertainty and have been flagged. Given the level of the detections and the lack of distinct upwind-downwind patterns or detections of the other metals, it can not be concluded that excavation of the dry/moisture-controlled pond negatively impacted air quality with respect to TSP metals. It should be noted, however, that had the excavation work been the source of air emissions, a distinct pattern of higher downwind concentrations should have been observed, for all metals. A complete summary and statistical analysis of metals results are presented in Table 3.

3.3 ORGANIC COMPOUND RESULTS

Two out of twenty seven Organochlorine pesticides (TO-4) chemical compounds were detected above laboratory detection limits and included alpha-BHC and 4,4'-DDE. Alpha-BHC was detected during all five sample events and 4,4'-DDE was detected in all but one sample event. Alpha-BHC was detected at both the upwind site (BMI-11) and downwind site (BMI-06) on January 9, 16, and January 20, 2009 and Alpha-BHC was detected at the upwind site (BMI-11) on January 9, 16, and January 20, 2009. 4,4'-DDE was detected on the downwind site (BMI-06) on January 13, 16, and January 20, 2009 whereas 4,4'-DDE was detected only once at both the upwind site (BMI-11) and downwind site (BMI-06) on January 9, 2009. An evaluation of this data demonstrates that alpha-BHC is present near the moisture-controlled pond area and the upwind and downwind sites are recording inconsistent concentrations, some of which are above the screening criteria. However, no distinct trend exists and the lack of a data pattern points to the uncertainty of the data. A complete summary and statistical analysis of Organochlorine pesticides (TO4A) chemical compounds results are presented in Table 3.

Twenty four PCDDs/PCDFS (TO-9) chemical compounds were detected above laboratory detection limits, but in extremely low concentrations, ranging from 0.0146 picograms (pg)/m^3 (0.000000015 µg/m^3) to 24.4039 pg/m^3 (0.000024 µg/m^3). The total toxic equivalent value (TEQ) was calculated for each of the upwind and downwind samples and compared to the 2,3,7,8-TCDD screening value of 0.045 pg/m^3. The upwind versus downwind statistical analysis completed for the data appears to show a consistent decrease in concentrations from upwind to downwind. Four out of five sample events at the moisture-controlled pond area had TEQ values that exceeded the 0.045 pg/m^3 screening value at both the upwind

and downwind sites. One partial sample event on 1/13/09 which included sample collection only at the downwind site did not exceed the TEQ. A complete summary and statistical analysis of PCDDs/PCDFS (TO-9) chemical compounds results are presented in Table 3.

Thirteen VOCs/SVOCs (TO-13) chemical compounds were detected above laboratory detection limits. Of the thirteen detected compounds, only one exceeded RBC, PRG, or MSSL screening criteria and included Hexachlorobenzene. Seven Hexachlorobenzene samples exceeded the screening criteria; five from the downwind site and two from the upwind site. The upwind versus downwind statistical analysis completed for Hexachlorobenzene does not show any distinguishable pattern. Overall, the concentrations vary greatly and demonstrate the complex nature of chemical emissions near the monitoring locations. Based on the factors presented above and a comprehensive data review it can be concluded that excavation activities do not appear to negatively impact existing air quality with respect to organic compounds. A complete summary and statistical analysis of all VOCs/SVOCs (TO-13) chemical compounds results are presented in Table 3.

3.4 ASBESTOS RESULTS

The asbestos samples were analyzed using NIOSH Method 7400 PCM. The PCM method gives a number index of airborne fibers. It is primarily used for estimating asbestos concentrations, though PCM does not differentiate between asbestos and other fibers. Asbestos fibers include chrysotile, cummingtonite-grunerite asbestos (amosite), anthophyllite asbestos, tremolite asbestos, crocidolite, and actinolite asbestos and any of these minerals which have been chemically treated or altered. The precise chemical formulation of each species varies with the location from which it was mined. Therefore, the use of PCM is a generally accepted method for screening airborne fibers. The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 0.1 fiber per cubic centimeter (cc) of air as an 8-hour time-weighted average (TWA) and a limit of 1.0 fiber per cc averaged over a sampling period of thirty (30) minutes.

The asbestos samples ranged in concentration from 0.0006 fibers per cc to 0.0020 fibers per cc and the average concentration was 0.0013 fibers per cc. The OSHA TWA limit of 0.1 fibers per cc was not exceeded in any samples and asbestos concentrations at the off site locations were consistent with asbestos concentrations during the perimeter background sampling. A complete summary of all asbestos results are presented in Table 3.

3.5 PATH FORWARD/NEXT STEPS

A conference call meeting was held on March 20, 2009 between NDEP, BRC, and their respective consultants to discuss NDEP comments. The "path forward" was discussed and agreed to by all parties and is summarized below:

- Discontinue air monitoring at the moisture-controlled areas.
- Supplement the existing air quality data with background sampling upwind and downwind of the BMI plant sites.
- Collect vehicle exhaust samples from the CAT and John Deere haul vehicles and a passenger truck to establish an emission profile for on-site vehicles
- Revise data tables to be more easily reviewed and interpreted; additional quality assurance review to ensure accuracy and correct statistical formulas
- Revise current and future summary reports to indicate that wind roses are provides for informational purposes only and will not be used to make upwind/downwind determination

4.0 REFERENCES

Basic Remediation Company 2006. "*Perimeter Air Monitoring Plan for Soil Remediation Activities, BMI Upper and Lower Ponds and Ditches, Clark County, Nevada*." August 2006. Revised 2008.

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U.S. EPA 1999. "*Compendium Method TO-4A Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using High Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)"*

U.S. EPA 1999. *"Compendium Method TO-9A Determination Of Polychlorinated, Polybrominated And Brominated/Chlorinated Dibenzo-p-Dioxins And Dibenzofurans In Ambient Air."* January 1999.

U.S. EPA 1999. "Compendium Method TO-13A Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Ambient Air Using Gas *Chromatography/Mass Spectrometry (GC/MS."* January 1999.

U.S. EPA 1999. *"Compendium Method IO-3.3 Determination of Metals in Ambient Particulate Matter Using X-Ray Fluorescence (XRF) Spectroscopy."* June 1999.

APPENDIX A

NDEP COMMENTS AND BRC RESPONSE TO COMMENTS

APPENDIX B

FIELD DOCUMENTATION FORMS

APPENDIX C

LABORATORY ANALYTICAL RESULTS

APPENDIX D

CALIBRATION AND SAMPLE VOLUME CALCULATION WORKSHEETS

APPENDIX E

CD CONTAINING ELECTRONIC COPY OF REPORT, TABLES, AND TRACK CHANGES VERSION OF REPORT

FIGURE 1

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TABLES 2 AND 3

TABLE 2
SAMPLE COLLECTION SAMPLE HANDLING AND ANALYSIS SPECIFICATIONS FOR MOISTURE-CONTROLLED AREA AIR SAMPLING STATIONS
BMI COMPLEX HENDERSON, NEVADA

Analytical Parameter	Equipment Manufacturer/ Model	Sample Media	Sample Frequency/ Sample Events	Sample Handling Temperature/ hold time	Laboratory/ Analytical Method
Organochlorine Pesticides (TO-4A)	Tisch Environmental/ TE-1000	Polyurethane foam cartridge/102 mm quartz fiber filter	24hr. cont. sample/every 3 days/10 events	<4°C/7 days	Air Toxics Ltd./Method TO-4A
PCDDs/PCDFs (TO-9A)	Tisch Environmental/ TE-1000	Polyurethane foam cartridge/102 mm quartz fiber filter	24hr. cont. sample/every 3 days/10 events	<4°C/7 days	Frontier Ltd./Method TO-9A
VOCs/SVOCs (TO-13A)	Tisch Environmental/ TE-1000	Polyurethane foam cartridge/102 mm quartz fiber filter	24hr. cont. sample/every 3 days/10 events	<4°C/7 days	Air Toxics Ltd./Method TO-13A
TSP/Metals	BGI, Inc./PQ100	47mm Teflon fiber filter	24hr. cont. sample/every 3 days/10 events	None/30 days	Chester Labnet/ Method IO-2.1; Method IO-3.3
Asbestos	SKC, Inc. 224-PCXR8	25mm mixed cellulose ester filter	24hr. cont. sample/every 3 days/10 events	None/N/A	AES Laboratory/ NIOSH 7400

Notes:

< = less than
°C = degree Celsius
cont. = continuous
hr = hour
PM_{10} = particulate matter less than 10-microns
N/A = not applicable
$\mu g/m^3$ = microgram per cubic meter