MODULE IX – SWMU 58 CORRECTIVE MEASURES PROGRAM

IX.A. REQUIRED PROGRAM

IX.A.1. The Permittee shall maintain a Corrective Measures Program (CMP) for Solid Waste Management Unit (SWMU) 58 in accordance with Utah Admin. Code R315-264-101 and this Permit. The elements comprising SWMU 58 are outlined in Condition X.C. In accordance with the purpose of the CMP, the Permittee shall treat groundwater contaminants in the SWMU 58 plume and treat residual soil contamination within the vadose zone beneath source areas located in SWMUs that have previously undergone corrective measures and are in post-closure care, as outlined in Condition X.D.3. The CMP shall comply with the requirements of R315-264-101, and this Permit.

IX.A.2. The overall management strategies for the SWMU 58 CMP are specified in the Corrective Measures Implementation Plan (CMIP) for Soils (2010), Addendum 1 to the CMIP for Soils (2012), and the CMIP for Groundwater (2014), hereafter referred to as the CMIPs (2010, 2012, 2014). The Permittee shall conduct corrective measures in accordance with the CMIPs (2010, 2012, 2014) and the following four primary elements to ensure the protection of human health and the environment:

IX.A.2.a. Implementation of the Updated Groundwater Management Area (GWMA) Plan (2022) and Institutional Controls to prevent current and future human and ecological exposure to contaminated groundwater.

IX.A.2.b. Source area corrective measures that will reduce the potential for downgradient migration of contaminants and prevent further degradation of groundwater. These corrective measures include soil vapor extraction and air sparging to remove high concentrations of volatile contaminants from groundwater and the vadose zone.

IX.A.2.c. Monitored natural attenuation (MNA) of low contaminant concentrations in the diffuse portion of the plume, through both physical and biological processes; and

IX.A.2.d. Implementation of the contingency plans presented in the Updated GWMA Plan (2022), the Corrective Measures Study (CMS) Report (2012), and the CMIP for Groundwater (2014).

IX.A.2.e. As necessary, the Permittee shall prepare and implement additional plans, or updates to the existing plans, per the requirements of Condition VII.C.2, to address unforeseen changes, such as contamination migrating faster than expected to potential receptor wells.

IX.B. SELECTED CORRECTIVE MEASURES FOR SWMU 58

IX.B.1. The Permittee shall conduct the corrective measures for the SWMU 58 groundwater plume as specified in the approved CMIPs (2010, 2012, 2014), which are divided into two parts: Corrective measures for the source area portion of the plume, and corrective measures for the diffuse portion of the plume.

IX.B.1.a. All decision documents will follow the public participation process in accordance with Utah Admin. Code R315-124.

IX.C. CORRECTIVE MEASURES

IX.C.1. The Permittee shall maintain institutional controls that prohibit further development of contaminated groundwater within the TEAD-N GWMA, including the on-Depot portions of the plume, the BRAC Property, and off-Depot portions of the plume, as outlined in the Updated GWMA Plan (2022) and in accordance with the requirements of Condition VIII.C.5

IX.C.2. The Permittee shall implement soil vapor extraction at each of the source areas in accordance with the requirements of the CMIP for Soils (2010) and Addendum 1 to the CMIP for Soils (2012) to reduce contaminant concentrations in the vadose zone until there is no longer any Trichloroethene (TCE), Perchloroethylene (PCE), or Carbon tetrachloride (CTC) migration to groundwater.

IX.C.2.a. Additionally, the Permittee shall continue to operate soil vapor extraction at the C-Avenue Outfall in accordance with the requirements of the CMIP for Soils (2010) and Addendum 1 to the CMIP for Soils (2012) until the risks to future industrial indoor workers associated with vapor intrusion from soil gas meet Utah Admin. Code R315-101 standards and approval for discontinuing treatment is approved by the Director of the Division of Waste Management and Radiation Control (Director).

IX.C.3. The Permittee shall implement air sparging at each of the source areas in conjunction with the soil vapor extraction systems, to reduce contaminant concentrations in groundwater, in accordance with the requirements of the CMIP for Groundwater (2014). Reducing the mass of VOCs in the groundwater source areas will reduce the migration of VOCs from the source areas to the diffuse portion of the groundwater plume.

IX.C.4. Requirements for system installation work plans, construction reports, and operation and maintenance (O&M) plans for the soil vapor extraction and air sparging systems are outlined in the CMIPs (2010, 2012, 2014).

IX.C.5. Soil vapor extraction and air sparging system installation work plans, construction reports, and O&M plans shall be maintained in the Operating Record per the requirements of Condition VII.C.5.

IX.D. DIFFUSE AREA CORRECTIVE MEASURES

IX.D.1. Institutional Controls that prohibit further development (i.e., withdrawal) of impacted groundwater within the GWMA, including the on-Depot portions of the plume, the BRAC Property, and off-Depot portions of the plume, are outlined in the Updated GWMA Plan (2022), and shall be maintained in accordance with the requirements of Module VIII.

IX.D.2. Every five years, the Permittee shall evaluate and reassess the effectiveness of natural attenuation of TCE as a corrective measure for the diffuse plume. The Permittee shall incorporate key findings of the effectiveness of monitored natural attenuation evaluations into the groundwater model.

IX.D.3. In the event that monitored natural attenuation or source area remediation is ineffective at maintaining plume stability, and the diffuse plume migrates further downgradient, approaching or moving beyond the GWMA boundary, the Permittee shall evaluate the impacts to human health and the environment and implement the contingency actions requirements in Condition IX.E.

IX.D.3.a. These contingencies, if needed, may be implemented either individually or in combination, depending on the current corrective measures program.

IX.E. CONTINGENCY ACTIONS

IX.E.1. The Permittee shall perform contingency actions if TCE is reported and confirmed at concentrations equal to or exceeding 1 µg/L and 5 µg/L in groundwater collected from a sentinel well, per Condition X., or if a receptor well is impacted.

IX.E.1.a. The first time the concentration of TCE in a sentinel well equals or exceeds 1 µg/L, the Permittee shall notify the Director in writing within 7 days and the Permittee shall continue to monitor the impacted well.

IX.E.1.b. Should the concentration of TCE in a sentinel well exceed 5 µg/L, the following steps will be taken:

IX.E.1.b.i. The Permittee shall notify the Director in writing within 7 days that each specified well exceeded 5 µg/L TCE. Within 14 days of receiving the original analytical results, the Permittee shall collect a confirmation sample from each well;

IX.E.1.b.ii. Within 30 days of receiving the original analytical results documenting an exceedance, the Permittee shall perform a receptor survey; and

IX.E.1.b.iii. In accordance with the Condition X.E., the Permittee shall install new downgradient sentinel well(s).

IX.E.2. Contingency A – Based on the results of the receptor survey, the Permittee may be required to immediately supply water to at-risk receptors. If a downgradient receptor is impacted, the Permittee shall implement the appropriate water supply option as specified in Sections 4.6 and 4.7 of the GWMA Plan (2022).

IX.E.3. Contingency B – The Permittee shall implement air sparging at each groundwater monitoring well where the TCE exceedance occurred, and the Permittee shall develop a groundwater sampling plan as specified in Section 4.3.2 of the CMIP for Groundwater (2014). An evaluation shall also be completed to determine if additional steps need to be taken to protect downgradient receptors.

IX.E.4. Contingency C – Should TCE concentrations exceed 5 µg/L in one or more of the sentinel wells, and Contingency B is deemed ineffective at addressing the risk, the Permittee shall evaluate active remediation technologies and shall choose the technology or a combination of technologies, based on what is most feasible and effective for the location where remediation of the TCE exceedance is needed. Upon approval of a remedial technology by the Director, the Permittee shall conduct the approved remediation method over a broad area of the plume boundary where downgradient receptor(s) are at risk.

IX.E.4.a. The Permittee shall prepare and submit for written Director approval a workplan to address the risk to downgradient receptors from the TCE exceedance, in accordance with the requirements in Section 4.3.3 of the CMIP for Groundwater (2014). In preparing the workplan, the Permittee shall coordinate with stakeholders.

IX.E.5. Contingency D – Should natural attenuation and/or source remediation prove ineffective at controlling the TCE plume, even if downgradient receptors are not at risk, the Permittee shall directly remediate TCE "hot spots" within the plume (i.e., non-source areas with TCE concentrations greater than 50 µg/L).

IX.F. CORRECTIVE MEASURES COMPLETION CRITERIA

IX.F.1. The Permittee shall prepare a Corrective Measures Completion Report when the Permittee believes that the approved corrective measures completion criteria or the groundwater protection standards or approved alternate concentration limits in accordance with Condition IX.J. have been achieved. The purpose of the Corrective Measures Completion Report is to fully document how the Corrective Measures completion criteria have been met and to justify why the Corrective Measures or groundwater monitoring may cease, or both.

IX.F.1.a. When TCE concentrations and other contaminants pose a minimal threat to human health and the environment, the Permittee may petition the Director to cease corrective measures and approve clean closure status of SWMU 58. Upon written approval from the Director, the Permittee shall update the Permit in accordance with Condition VII.I.2.a.

IX.F.1.b. The Permittee may petition the Director to cease source area corrective measures when the Permittee can demonstrate corrective measure ineffectiveness. If remaining TCE concentrations or other contaminants in the source area pose a threat to human health or the environment, the Permittee shall submit a Site Management Plan and implement monitored natural attenuation in the source areas and continue monitoring per the requirements of the SWMU 58 groundwater monitoring plan, in accordance with the requirements of Condition X.C.

IX.G. OPERATION OF SOIL VAPOR EXTRACTION AND AIR SPARGING REMEDIATION SYSTEMS

IX.G.1. The Permittee shall maintain and operate the source area soil vapor extraction and air sparging remediation systems as specified in CMIPs (2010, 2012, 2014), Operations, Maintenance and Monitoring (OM&M) Work Plans for each system (2014), and this Permit.

IX.G.2. The Permittee shall maintain a remote alarm system, or equivalent, for each of the remediation systems. This alarm system shall be capable of remediation system shutdown in the event of a malfunction that could impair the performance of the remediation system or threaten human health or the environment.

IX.G.3. The Permittee shall operate the source area remediation systems in a manner that will prevent spills, releases, or other adverse effects to human health and the environment.

IX.G.4. The Permittee shall train all personnel operating the remediation systems as outlined in Condition II.U.

IX.G.5. The Permittee shall operate the source area soil vapor extraction and air sparging remediation systems eight months per year (April through November), weather permitting, as specified in the CMIPs (2010, 2012, 2014), followed by a period of rebound monitoring as described below.

IX.G.5.a. The Permittee shall monitor the rebound in contaminant concentrations in soil vapor and groundwater in accordance with Condition IX.H during nonoperational months (December through March).

IX.G.5.b. The Permittee shall notify the Director in writing 10 days in advance of soil vapor extraction/air sparging remediation system startup and shall provide a schedule of upcoming soil vapor extraction/air sparging operations.

IX.G.6. The Permittee shall maintain a current Operation, Maintenance and Monitoring (OM&M) Manual for each remediation system, which specifies routine and non-routine system checks and maintenance, field work, management, and recordkeeping activities to maximize system runtime.

IX.G.6.a. Soil vapor extraction OM&M activities shall include optimization of the soil vapor extraction systems to support air sparging operations and to maximize mass removal and/or zone of influence (ZOI), per the CMIPs (2010, 2012, 2014).

IX.H. PERFORMANCE EVALUATION OF CORRECTIVE MEASURES

IX.H.1. The Permittee shall conduct source area sampling to support the assessment of corrective measures performance, including:

IX.H.1.a. Soil gas samples from soil vapor extraction wells, vapor monitoring wells, and vertical soil gas wells as specified in Table 4.1 (Building 679) and Table 4.2 (C Avenue Outfall) of the CMIP for Soils (2010), and Table 5.1 (Building 615, Building 620, and Landfill) of Addendum 1 to the CMIP for Soils (2012).

IX.H.1.b. Soil vapor extraction effluent sampling to confirm compliance with Department of Air Quality (DAQ) *de minimus* exemption per Utah Admin. Code R307-410-15 and R307-410-16.

IX.H.1.c. Groundwater samples from source area monitoring wells associated with each air sparging system, as specified in Table 3.2 of the BRAC Property Soil Vapor Extraction and Air Sparging OM&M Work Plan (2014) and Table 4.4 of the Former Sanitary Landfill Air Sparge Work Plan (2014).

IX.H.2. The Permittee shall submit to the Director annually, on or before September 15th of each year, Performance Evaluation Reports for each of the source area soil vapor extraction and air sparging remediation systems. Each report shall include, at a minimum:

IX.H.2.a. Soil vapor extraction and air sparging system operating data and laboratory analytical results of soil gas, system effluent, and groundwater samples

collected per Condition IX.H.1 and the Groundwater Management Area (GWMA) Plan;

IX.H.2.b. A summary of system maintenance and optimization, including any new soil vapor extraction and air sparging wells installed;

IX.H.2.c. The zone of influence (ZOI) of each of the systems, as well as contaminant removal rates and concentration reduction rates; and

IX.H.2.d. An evaluation of the advancement of each source area towards the Corrective Action Objectives (CAOs) outlined in Condition IX.I., using, at a minimum, the following analyses:

IX.H.2.d.i. Trend analyses of contaminant concentrations in groundwater;

IX.H.2.d.ii. Analysis of rebound contaminant concentrations in soil gas and groundwater; and

IX.H.2.d.iii. Analysis of projected mass removal rates or concentration reduction rates with continued remediation system operation during the next annual period.

IX.H.2.e. Recommendations for optimization of future system operations.

IX.I. PERFORMANCE EVALUATION OF SWMU 58 CORRECTIVE MEASURES PROGRAM

IX.I.1. The Permittee shall conduct the following required field activities to support performance evaluation of the SWMU 58 Corrective Measures Program (CMP):

IX.I.1.a. Groundwater level measurements per Condition X.C.2.b.;

IX.I.1.b. Collection of groundwater samples from monitoring wells located throughout SWMU 58, per Condition X.C.3; and

IX.I.1.c. Collection of groundwater samples from sentinel wells located beyond the toe of the plume, per Condition X.C.3.a.iii.

IX.I.2. The Permittee shall submit to the Director, on or before April 15th of each year, an Annual Groundwater Monitoring Report which shall include, at a minimum:

IX.I.2.a. A summary of the results of groundwater level measurements and groundwater sampling;

IX.I.2.b. An assessment of groundwater flow rate and direction in the impacted aquifers based on groundwater surface level measurements. An updated

potentiometric map shall be created for the shallow, bedrock, and deep aquifers;

IX.I.2.c. Groundwater contaminant trend analyses;

IX.I.2.d. Groundwater contaminant plume maps;

IX.I.2.e. The results of the annual monitoring well inspections conducted per the requirements of Condition X.E.1.

IX.I.3. The Permittee shall submit to the Director, on or before October 15th every five years, an update to the TEAD-N Groundwater Flow and Contaminant Transport Model which shall include, at a minimum, the results of the model recalibration and a summary analysis of the results.

IX.J. DURATION OF SWMU 58 CORRECTIVE ACTION PROGRAM

IX.J.1. The Permittee shall continue the groundwater corrective measures program for SWMU 58 until such time as the Groundwater Protection Standard (GWPS) or Alternate Concentration Limits established in accordance with Utah Admin. Code R315-264-94(b) are not exceeded, as specified in Condition X.B through X.C. and Utah Admin. Code R315-264-100(f), and R315-264-92. If the Permittee believes the GWPS, alternate limits or approved Corrective Measures Criteria, in accordance with Condition IX.F., have been attained, the Permittee shall prepare a Corrective Measures Completion Report and submit it to the Director for written approval. An appropriate statistical corrective action test, centering on confidence intervals, shall be applied to groundwater monitoring results in accordance with the USEPA Unified Guidance (2009 or current), or the ITRC Groundwater Statistics and Monitoring Compliance Technical Guidance (2013 or current), minimizing the false positive error rates to the extent possible.

IX.K. INSTALLATION RESTORATION WASTE MANAGEMENT

IX.K.1. In areas within the groundwater contaminant plume, the Permittee may generate groundwater or process water contaminated with hazardous constituents from the following processes: 1) development of newly constructed monitoring wells and piezometers; 2) sampling of monitoring wells; and 3) condensate generated from soil vapor extraction systems.

IX.K.2. Groundwater and process water contaminated with the hazardous constituents listed in Table X-1 shall be characterized and, if deemed hazardous, disposed of off-site at an approved hazardous waste treatment facility.

IX.L. REPORTING AND RECORDKEEPING

IX.L.1. The Permittee shall submit to the Director an annual Performance Evaluation Report for each of the source area soil vapor extraction and air sparging

remediation systems. These reports shall be submitted, per Condition I.DD., no later than September 15th of each year.

IX.L.2. The Permittee shall submit to the Director the analytical results required by Conditions IX.H and IX.I., and the groundwater elevation data required by Condition X.C., in accordance with the schedule outlined in Table IX-1. Groundwater model updates, annual monitoring reports, potentiometric surface maps, and contaminant concentration maps shall be submitted by October 15th of the reporting year as required by IX.I.3.

IX.M. ASSURANCE OF COMPLIANCE

IX.M.1. The Permittee shall assure that monitoring and corrective action measures necessary to achieve compliance with the groundwater protection standards are taken during the term of the Permit.

TABLE IX-1
SWMU 58 CORRECTIVE ACTION PROGRAM
REPORTING REQUIREMENTS AND SCHEDULE

REPORTING REQUIREMENT	FREQUENCY
Soil vapor extraction/Air sparging Performance Evaluation Reports (each system)	Annual
Contaminant concentration maps of the impacted aquifer.	Annual
Potentiometric surface maps of the impacted aquifer	Annual
Results of groundwater flow and transport model recalibration and a summary analysis of model findings.	Every Five Years