MODULE VII, ATTACHMENT 2
ENVIRONMENTAL PERFORMANCE STANDARDS

1.0 INTRODUCTION

This attachment presents environmental performance standards for the Tooele Army Depot South Area (TEAD-S) Open Detonation (OD) unit. The results of the soil sampling and analyses will provide data to support the human health and ecological risk assessments (Tetra Tech, 2017) and to monitor treatment effectiveness for the OD unit required by Utah Admin. Code R315-264-601, R315-270-23(a)(2), and R315-270-23(d). This attachment is organized in the following sections:

- Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the ground water or subsurface environment R315-264-601(a);
- Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in surface water, wetlands or on the soil surface R315-264-601(b);
- Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in air R315-264-601(c); and
- References.

Patterns of land use in the area are described in Attachment 6 (Facility Description). The volume and physical and chemical characteristics of waste treated at the unit are described in Attachment 1 (Waste Analysis Plan). Potential damage to wildlife and vegetation are described in *Screening Level Ecological Risk Assessment for Open Detonation Treatment Unit(Tetra Tech, 2017*).

2.0 PREVENTION OF ANY RELEASES THAT MAY HAVE ADVERSE EFFECTS ON HUMAN HEALTH OR THE ENVIRONMENT DUE TO MIGRATION OF WASTE CONSTITUENTS IN THE GROUND WATER OR SUBSURFACE ENVIRONMENT: Utah Admin. Code R315- 264-601(a); R315-264-602, R315-270-23

This section describes:

- Volume and physical and chemical characteristics of the waste in the unit including the potential for migration through soil, liners or other containing structures;
- Hydrologic and geologic characteristics of the unit and the surrounding area;
- Existing quality of ground water, including other sources of contamination and their cumulative impact on ground water;
- Quantity and direction of ground-water flow;
- Proximity to and withdrawal rates of current and potential ground water users;
- Potential for deposition or migration of waste constituents into subsurface physical structures, and into the root zone of food-chain crops and other vegetation;
- Potential for damage to domestic animals, crops and physical structures; and
- Additional information required.

2.1 Volume and Physical and Chemical Characteristics of the Waste in the Unit and Potential for Migration through Soil, Liners or Other Containing Structures R315-264-601(a)(1) and R315-264-601(b)(1)

The OD unit will be used for the energetic treatment of explosive materials. The type, volume and chemical characteristics of the material to be treated are addressed in Module VII.

The potential for contaminant migration from the OD area to the first water-bearing interval is dependent upon the chemical nature of the contaminants relative to solubility and sorption, the porosity of the soil, and a transport mechanism. Waste composition is discussed in Attachment 1 (Waste Analysis Plan). The majority of potential contaminants detected or expected within the OD area surface soils exhibit low solubility and high partitioning coefficients or cation exchange capacities that greatly reduce the potential for contaminant mobility. Regardless of contaminant sorptive capacity and solubility, both a transport mechanism and porous media must be present to allow movement of contaminants from ground surface to the uppermost water-bearing unit. In the OD area, average rainfall is eight (8) inches per year, with effectively no infiltration of water to the uppermost aquifer. The closure investigation of the former Hazardous Waste Management Unit (HWMU 31) (CH2MHill, 2014) demonstrated that previous OD activities had not resulted in vertical migration of contaminants in soil or impact to groundwater. Therefore, not only do potential contaminants generally exhibit low solubility/high sorptive capacities, contaminant transport via surface water infiltration is highly unlikely in view of the site-specific geologic and climatic conditions. The OD treatment activities disturb the uppermost portion of the unsaturated zone due to treatment of propellants, explosives, and pyrotechnic (PEP) material. The disturbance of the material in the uppermost unsaturated zone due to explosions and the subsequent re-grading of the material have a minimal effect on the overall character of the unsaturated zone material as the unsaturated zone is approximately 70 ft. thick and is composed of predominantly firm light gray to light yellowish-gray, clayey silt and silty clay (Parsons, 2013). Based on historical OD activities combined with the subsurface investigation results, there is no evidence to suggest that current OD treatment activities would have any effect upon groundwater under the OD unit.

Soil sampling supports the assumption that contamination from historic OD activities does not migrate through the soil to the unsaturated zone. The results of these analyses are summarized and described in CH2MHill, 2014. Surface soil samples covering the full extent of HWMU 31 included Incremental Sampling Methodology (ISM) samples collected from 20 sampling units encompassing each OD pit. Surface and subsurface samples were collected from the base of the five OD pits with the most historical activity/use. Discrete samples were collected from multiple depth intervals from 0 to 20 feet below ground surface (bgs). Goundwater samples were collected at three locations. Upon completion of the site characterization sampling to support HWMU 31 closure, human health and ecological risk assessments were conducted to: 1) determine any impacts to soil and groundwater, 2) assess potential risks and hazards from exposure to chemicals in soil and groundwater, 3) support decisions regarding no further action at the site, and 4) to establish baseline soil and groundwater conditions for permitting the OD unit. The conclusion of the site assessment was that the current conditions at HWMU 31 (the permitted TEAD-S OD unit) render the site suitable for no further action with respect to contamination in soil and groundwater in accordance with Utah Admin. Code R315-101.

2.2 Hydrologic and Geologic Characteristics of The Unit and Surrounding Area and Quantity and Direction of Groundwater Flow R315-264-601(a)(2) and (4) and R315-264-601(b)(5)

Details on the hydrologic and geologic conditions of the OD unit and surrounding area are presented in the *Final Hydrogeologic Assessments and Recommendations Report* (Parsons, 2013) and the *2016 Long Term Monitoring of SWMU 2, SWMU 3, SWMU 5, and HWMU 31 Annual Report* (Parsons, 2016). A summary from these reports is provided below.

Surface soil at the OD unit consists primarily of fill and mining disturbed land with quaternary lacustrine and alluvial deposits making up the central south eastern portion of the unit and quaternary lacustrine deposits of the Bonneville Lake Cycle on the northwest and southeast boundaries. Surface soil at this OD unit consist primarily of yellowish-brown, clayey sand, and clayey silt. The unsaturated zone is approximately 70 ft. thick and is composed of predominantly firm light gray to light yellowish-gray, clayey silt and silty clay. The underlying saturated zone extends to approximately 84 ft. and is comprised of light gray, silty clay and clayey silt (Parsons, 2013).

As part of the base-wide groundwater level measurements (Parsons, 2016), depth to groundwater was measured at wells in the vicinity of the former HWMU 31, specifically wells present in the eastern portion of solid waste management unit (SWMU 1) including well S-17-88, SWMU 3 and SWMU 9. Depth to groundwater was measured between May 3 and May 5, 2016, and groundwater elevations were calculated to be around 100 ft bgs. The overall groundwater elevation is approximately 5,020 ft. above mean sea level (amsl). Review of the groundwater elevations confirms a southwest groundwater flow direction exists. Based on lithologic descriptions from geotechnical testing done on background wells to the east of the former HWMU 31, hydraulic conductivity values can be estimated and are expected to range from 10^{-5} to 10^{-3} cm/sec (Parsons, 2016).

2.3 Existing Quality of Ground Water, Including Other Sources of Contamination and Their Cumulative Impact on Ground Water R315-264-601(a)(3)

Groundwater at the proposed OD area has not been impacted by historical activities or other sources of contamination (Parsons, 2013 and 2016). Groundwater is estimated to be Class II drinking water, based on wells in nearby areas (Parsons, 2013). Groundwater quality to the south of the OD unit is Class III-IV, non-potable.

2.4 Proximity to and Withdrawal Rates of Current and Potential Ground Water Users and Patterns of Land Use in the Region R315-264-601(a)(5) and (6)

There are no production wells in proximity to the OD unit. The closest production wells are location up gradient from the OD unit near the northern boundary of TEAD-S. Groundwater quality to the south of the OD unit is Class III-IV, non-potable. There are no current or potential groundwater users in the down gradient vicinity of the OD unit. Land use around the OD unit is controlled and of limited industrial use. Land to the south of the OD unit is uninhabited.

2.5 Potential for Deposition or Migration of Waste Constituents into Subsurface Physical Structures, and into the Root Zone of Food-Chain Crops and other Vegetation R315-264-601(a)(7)

The results of the surface soil sampling and risk assessments (CH2MHill, 2014) indicate that operations at the unit have a minimal potential to damage human health or the environment. In addition, the soil within the OD will be maintained clear of vegetation. Therefore, the potential for migration of waste to the root zone of food chain crops and other vegetation and the potential for damage to wildlife is minimal. The area around the unit is not used for grazing domestic animals or growing crops.

2.6 Potential for Health Risks Caused by Human Exposure to Waste Constituents and Potential for Damage to Domestic Animals, Wildlife, Crops, Vegetation and Physical Structures Caused by Exposure to Waste Constituents R315-264-601(a)(8) and (9)

Long-term (chronic) on-post and off-post impacts to human health and the environment will be controlled though operational limits on the amount and type of munitions that may be treated annually to mitigate carcinogenic risk to a cumulative risk level of 1E-06. The limits are described in Table 3-3 of the *Open Detonation Risk Management Plan* (Tetra Tech, 2017) and are summarized in Module VII.

Short-term (acute) on-post and off-post impacts to human health and the environment will be controlled though operational limits on the amount and type of munitions that may be treated hourly and daily to mitigate non-carcinogenic hazards equal to or below an acute hazard quotient of 1.0. The limits are described in Section 3.2 of the *Open Detonation Risk Management Plan* (Tetra Tech, 2017) and are summarized in Module VII.

The Permittee will ensure compliance with both chronic and acute treatment limits with an approved spreadsheet or database.

3.0 PREVENTION OF ANY RELEASES THAT MAY HAVE ADVERSE EFFECTS ON HUMAN HEALTH OR THE ENVIRONMENT DUE TO MIGRATION OF WASTE CONSTITUENTS IN SURFACE WATER, OR WETLANDS OR ON THE SOIL SURFACE: Utah Admin. Code R315-264-601(b), R315-270-23

This section describes the:

- Effectiveness and reliability of containing, confining, and collecting systems and structures in preventing migration;
- Hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- Patterns of precipitation in the region;
- Proximity of the unit to surface waters;
- Current and potential uses of nearby surface waters and any water quality standards established for those surface waters;
- Existing quality of surface waters and surface soils, including other sources of contamination and their cumulative impact on surface waters and surface soils;
- Patterns of land use in the region;
- Potential for health risks caused by human exposure to waste constituents; and potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

3.1 Effectiveness and Reliability of Containing, Confining and Collecting Systems and Structures in Preventing Migration R315-264-601(b)(2)

The TEAD-S OD unit is designed and operated to minimize the migration of wastes to the soil surface. OD operations are conducted within an OD pit and may include buried (soil cover) and unburied treatments. The treatment of reactive and explosive waste by OD will be demonstrated through the annual compliance sampling outlined in this permit attachment.

Following each OD treatment event, the detonation area shall be visually inspected for signs of untreated waste and scrap metal or other debris. Untreated or incompletely treated wastes and contaminated scrap metal shall be re-detonated. Scrap metal that is free of explosives, based on visual inspection, is collected and disposed of or recycled. As a result of these operational controls, little or no environmental contamination of surface soils is expected as a result of OD operations at the unit.

3.2 Hydrologic Characteristics of the Unit and the Surrounding Area Including the Topography of the Land Around the Unit R315-264-601(b)(3)

The general direction of surface water drainage at TEAD-S is to the south. There are no permanent streams within the TEAD-S OD unit boundaries. Most streams flowing through TEAD-S are ephemeral and intermittent, with surface water flow resulting from storm activity within the installation as well as from intermittent streams that exist in the mountains adjacent to TEAD-S. Run-off from the mountain streams and precipitation within the installation flow through well-established drainage channels. The surface water then either infiltrates into the alluvium of the stream channels or runs onto the flat plain of the desert where it evaporates quickly.

TEAD-S lies within the Rush Valley between the Oquirrh Mountain Range to the east and the Stansbury Mountain Range to the west. TEAD-S is located on the east side of the valley at the base of the Oquirrh Mountain Range. The eastern portion of TEAD-S is located on the flanks of the Ophir Creek, Mercur Creek, and West Dip Gulch Alluvial Fans. Sediment discharge from the alluvial fans has produced a gently southwestward-sloping ground surface. The elevation of the OD area ranges from approximately 5,080 to 5,130 feet amsl. A ridge is present along the west side and directs regional surface water flow to the southeast.

3.3 Patterns of Precipitation in the Region R315-264-601(b)(4)

The climate of Rush Valley is semi-arid with four well defined seasons. Prevailing winds at TEAD-S are from the southeast, with occasional winds from the north-northwest. Most precipitation occurs during the winter and early spring months as snow, and the least occurs during July and August (Parsons, 2013). In the OD area, average rainfall is eight (8) inches per year, with effectively no infiltration of water to the uppermost aquifer.

3.4 Proximity of the Unit to Surface Waters (R315-264-601(b)(6), (7), and (8)

TEAD-S lies within Rush Valley which is part of the Great Salt Lake Basin. Rush Valley has no outlet for surface water. Most of the streams in Rush Valley are intermittent and usually only flow in response to precipitation events, and most of the water is lost to infiltration or evapotranspiration. Nine perennial streams drain the mountains surrounding Rush Valley, and annual stream flow ranges from approximately 400 acre-feet (acre-ft) at Oak Brush Creek in the Sheeprock Mountains to 7,000 acre-ft at Ophir Creek in the Oquirrh Mountains (Gardner and Kirby, 2011; Figure 2.1 in Parsons, 2013). The majority of the TEAD-S lies on a gently sloping southwest flank of an alluvial fan present at the mouth of Ophir Canyon. The usually dry Ophir Creek channel crosses into the TEAD-S in the northeast, near the installation's main entrance. Rush Lake is a shallow lake located near the northern margin of Rush Valley. This feature and several other surface water bodies to the south comprise the only surface waters in the basin areas of Rush Valley. The source for these surface waters includes groundwater discharge near the central axis of Rush Valley, intermittent stream flow that reaches the central regions of the basin during above normal precipitation (Hood et al., 1969), and discharge of numerous springs located around the margins of Rush Lake. Groundwater recharge from the Oquirrh Mountains is believed to be the source for at least some of the springs located along the eastern shore of Rush Lake (Gardner and Kirby, 2011). These and other surrounding springs may be the largest source of water inputs to Rush Lake (Gardner, 2012). Oquirrh Mountain recharge moves westward into the valley and is directed by low permeability lakebed sediments to move primarily through the shallow basin fill materials before discharging in springs along the eastern shore of Rush Lake. (Gardner & Kirby, 2011). (Parsons, 2013)

3.5 Potential for Health Risks Caused by Human Exposure to Waste Constituents and Potential for Damaged to Domestic Animals, Wildlife, Crops, Vegetation and Physical Structures Caused by Exposure to Waste Constituents R315-264-601(b)(10) and (11)

Long-term (chronic) on-post and off-post impacts to human health and the environment will be controlled through operational limits on the amount and type of munitions that may be treated annually to mitigate carcinogenic risk to a cumulative risk level of 1E-06. The limits are described in Table 3-3 of the *Open Detonation Risk Management Plan* (Tetra Tech, 2017a) and are summarized in Module VII.

Short-term (acute) on-post and off-post impacts to human health and the environment will be controlled through operational limits on the amount and type of munitions that may be treated hourly and daily to mitigate non-carcinogenic hazards equal to or below an acute hazard quotient of 1.0. The limits are described in Section 3.2 of the *Open Detonation Risk Management Plan* (Tetra Tech, 2017a) and are summarized in Module VII.

The Permittee will ensure compliance with both chronic and acute treatment limits with an approved spreadsheet or database.

4.0 PREVENTION OF ANY RELEASES THAT MAY HAVE ADVERSE EFFECTS ON HUMAN HEALTH OR THE ENVIRONMENT DUE TO MIGRATION OF WASTE CONSTITUENTS IN AIR: Utah Admin. Code R315-264-601(c), R315-270-23

This section describes the:

- Volume and physical and chemical characteristics of the waste in the unit including the potential for the emission and dispersal of gasses, aerosols and particulates,
- Effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air,
- Operating characteristics of the unit,
- Atmospheric, meterologic, and topographic characteristics of the unit and the surrounding area,
- Existing quality of the air, including other sources of contamination and their cumulative impact on the air,
- Potential for health risks caused by human exposure to waste constituents, and
- Potential for damage to domestic animals, crops, and physical structures caused by exposure to waste constituents.

4.1 Volume and Physical and Chemical Characteristics of the Waste in the Unit and Potential for the Emission and Dispersal of Gasses, Aerosols and Particulates R315-264-601(c)(1)

OD will release potentially hazardous constituents to the air. That possibility is evaluated extensively in the *Air Dispersion Modeling Report* and the *OD Human Health Risk Assessment (Tetra Tech, 2017)*.

The type, volume and chemical characteristics of the material to be treated are addressed in Module VII. Module VII contains daily and annual operating limits specific to types of munitions.

4.2 Effectiveness and Reliability of Systems and Structures to Reduce or Prevent Emissions of Hazardous Constituents to the Air R315-264-601(c)(2)

Operations of the TEAD-S OD Unit are also permitted under TEAD-S Approval Order issued by the Utah Department of Air Quality. OD operations will only be allowed under the conditions described in Module VII of this Permit. There are no structures in place to minimize air emissions.

4.3 Operating Characteristics of the Unit R315-264-601(c)(3)

Operating characteristics of the unit are described in Module VII Attachment 1, Open Detonation Operations.

4.4 Atmospheric, Meteorological, and Topographic Characteristics of the Unit and the Surrounding Area R315-264-601(c)(4)

TEAD-S is located in a semi-arid, continental, steppe region, or high desert known as the Great Basin Desert. This region is often referred to as a cold desert due to its mid-latitude location. Typically winters are cold, summers are hot and dry with a high evaporation rate, and most precipitation falls in the spring.

Other weather characteristics typical of the TEAD-S area include occasional electrical storms and dust storms in summer, and temperature inversion conditions in winter. Temperature inversion conditions occur when cold Arctic air spills into the area, wind speed is low, and contrary to the normal pattern, air temperature increases with height above the ground surface. Surface airflow is reduced and any tendency toward reduced air quality is aggravated under these conditions.

Temperature data for TEAD-S show that monthly average temperatures range from 25.5 °C (77.9 °F) in July, which is the hottest month, to –2.8 °C (27 °F) in January, which is the coolest. Daily extremes for each month show a substantial range. For example, for July the daily extreme high is 42.8 °C (109 °F) and the extreme low is 2.8 °C (37 °F), a range of 40.0 °C (72 °F). Similarly, the daily extreme range for January is 50.6 °C (91 °F). The large temperature fluctuations recorded between day and night and seasonally are typical of the area's arid continental climate.

TEAD-S is surrounded by mountain ranges and peaks to the north and west. This topography creates the distinct diurnal flow patterns that are modified by regional weather patterns, such as cold frontal systems or low-high pressure gradients. At night, radiative cooling of the mountain surfaces cools the air adjacent to those surfaces, causing the air to become denser at higher elevations. This denser air drains down the slopes and then is channeled down the axis of the valleys.

The mountain to valley circulation reverses on days with clear skies and light winds. As the mountain slopes are heated by solar radiation, the air above the slopes becomes warmer than the air at the same level over the valley resulting in upslope flow along the adjacent valley axis. Upslope flow is evident in the wind roses for the summer and fall afternoon periods. At most locations, the typical afternoon flow is from the northwest to north. Unlike drainage winds, which are associated with stable thermal stratifications, upslope winds are associated with unstable thermal stratifications, which enhance the turbulent mixing of the slope winds with the winds aloft. Consequently, upslope flows are more variable than downslope winds.

In summary, local wind patterns are governed by differential heating and cooling of the higher elevations relative to the flatlands and by regional weather. These patterns usually include the onset of southeasterly or southerly downslope flow at night that persists into morning, which transitions into northwesterly through northerly flow with daytime heating. There are two periods of relative atmospheric stability in the early morning and early evening hours. These patterns are marked in summertime but weak or absent in winter, due to differences in the amount of heat in the form of solar radiation received seasonally, and the tendency of snow to reflect solar radiation away during winter.

Wind conditions at TEAD-S are summarized in *Air Dispersion Modeling Report* (Tetra Tech, 2017).

Dispersion of material released into the atmosphere occurs as a consequence of large scale and small-scale atmospheric motions. Motions that are large with respect to the volume of the released material tend to move the material along the direction of the mean flow. Smaller (turbulent) motions tend to disperse this material. The large-scale motions are characterized in terms of a time-averaged wind speed and direction. Turbulent motions are caused by the wind encountering flow obstacles (trees, buildings, hills, etc.) and by heating of air near the earth’s surface. The effects of turbulent motion on dispersion are usually evaluated in terms of atmospheric stability. Turbulent motions and dispersion are suppressed in a stable atmosphere at night and are enhanced in an unstable atmosphere during the day.

The most commonly used measure of turbulence is a letter scale which uses commonly measured variables such as time of day, wind speed, and cloud cover to describe stability. A day with calm winds and bright sunshine would have greatly enhanced turbulent dispersion due to warm air bubbling off heated surfaces. This most unstable condition is designated as “Category A” stability. Letters “B” and “C” denote progressively weaker thermal enhancement of turbulent motions due to increased wind speed and/or cloud cover. “Category D” represents an atmosphere where turbulent dispersion receives no thermal enhancement. “Categories E, F,” and “G” occur at night where radiative cooling suppresses turbulent motions. “Category G” represents the greatest degree of turbulence suppression that occurs with calm winds and clear skies. Dispersion is weakest under “Category G” stability.

“Categories D” and “E” are prevalent at TEAD-S during winter months (December, January, and February). Nocturnal temperature inversions produce a shallow layer of cold, still air just above the earth’s surface, causing “Category G” stability and poor dispersion. During summer months (June, July, and August), unstable categories “B” and “C” are common during the day. Stability categories “F” or “G” may occur during the evening and early morning hours when wind speeds approach zero.

4.5 Existing Quality of the Air, Including Other Sources of Contamination and their Cumulative Impact on the Air Particulates R315-264-601(c)(5)

TEAD-S is located in an Air Quality Control Region that is in attainment with all applicable ambient air quality standards. TEAD-S is designated as a Class II area.

TEAD-S is considered a “minor” source under the operating permit program because it does not have the potential to emit more than 100 tons per year of a criteria pollutant, and is not under a Title V Operating Permit.

4.6 Potential for Health Risks Caused by Human Exposure to Waste Constituents Particulates R315-264-601(c)(6)

There is minimal potential for public exposure to hazardous waste at the OD unit due to the distance of the unit to off-site and the extensive security measures in place at TEAD-S. Potential risks to on-site receptors are described in the *OD Human Health Risk Assessment and the Open Detonation Risk Mitigation Plan* (Tetra Tech, 2017).

4.7 Potential for Damage to Domestic Animals, Crops, and Physical Structures Caused by Exposure to Waste Constituents Particulates R315-264-601(c)(7)

The results of the air dispersion modeling indicate that OD operations at the unit have a minimal potential to damage human health or the environment. The potential for dispersed contaminants to migrate to the root zone of food chain crops and other vegetation and the potential for damage to wildlife is minimal. The area around the unit is not used for grazing domestic animals or growing crops. There are no structures located within or near the OD unit that could be damaged by exposure to waste constituents from the unit.

Long-term (chronic) on-post and off-post impacts to human health and the environment will be controlled through operational limits on the amount and type of munitions that may be treated annually to mitigate carcinogenic risk to a cumulative risk level of 1E-06. The limits are described in Table 3-3 of the *Open Detonation Risk Management Plan* (Tetra Tech, 2017a) and are summarized in Module VII.

Short-term (acute) on-post and off-post impacts to human health and the environment will be controlled through operational limits on the amount and type of munitions that may be treated hourly and daily to mitigate non-carcinogenic hazards equal to or below an acute hazard quotient of 1.0. The limits are described in Section 3.2 of the *Open Detonation Risk Management Plan* (Tetra Tech, 2017a) and are summarized in Module VII.

The Permittee will ensure compliance with both chronic and acute treatment limits with an approved spreadsheet or database.

5.0 Soil Monitoring R315-264-601 and R315-270-23

The area to be permitted as the TEAD-S OD area was historically used as an OD range. The former range, HWMU 31, was investigated under the TEAD-S Installation Remediation Program and in accordance with the TEAD-S Resource Conservation and Recovery Act (RCRA) part B permit. The purpose of the HWMU 31 investigation included: 1) remove surface debris, 2) determine if any impact had occurred to soil and groundwater, 3) evaluate risks to human health and the environment, 4) perform any corrective action needed to achieve residential risk-based levels in soil, and 5) to establish a baseline data set for soil and groundwater to be used for the TEAD-S OD unit.

The results of the HWMU 31 closure investigation indicated that while metals and explosives were detected in soils and metals were detected in groundwater at the former HWMU 31, there were no adverse risks to either human health or the environment (CH2MHill, 2014). Soil sampling shall be used to determine potential impacts to surface and subsurface soil from on-going operations. Soil samples shall be collected on an annual basis. Sampling will be conducted in accordance with a sampling plan approved by the Director of the Division of Waste Management and Radiation Control (Director). This plan shall be submitted at least 30 days prior to the date on which the Permittee plans to conduct the sampling. In addition, a trend analysis will be conducted annually to determine if there are any discernible increases in human health or ecological risks over time. The annual soil sampling shall be conducted between September 1 and November 30 of each year.

A report summarizing the sampling procedures, analytical results and data usability shall be submitted to the Director for approval within 180 days of the sampling event. These reports will also be used to demonstrate the treatment effectiveness of OD as required by Utah Admin. Code R315-270-23.

Screening level risk assessments shall be conducted for both human health and ecological risk assessments using the data from each sampling event. The assessment will be conducted in accordance with the State of Utah approved methodology contained in the TEAD-S Risk Assumptions Document (AQS, 2017). A report of the risk assessments shall be submitted to the Director within 180 days of the Permittee receiving approval from the Director of the sampling report. The risk assessments will also be used to assess trends in the data (i.e, low level increases in soil concentrations).

6.0 REFERENCES

AQS, 2017. Tooele Army Depot South Area Final Fisk Assumptions Document Solid Waste Management Units and Other Corrective Action Sites, Revision 5, March.

CH2MHill, 2014. Final Environmental Remediation Services at Solid Waste Management Unit 3 and Hazardous Waste Management Unit 31, Tooele Army Depot South Area. February.

Parsons, 2013. Final Hydrogeological Assessment and Recommendations Report, Deseret Chemical Depot. July.

Parsons, 2016. Final Long Term Monitoring of SWMU 2, SWMU 5, HWMU 31, and Implementation of the Hydrogeological Assessment and Recommendations Report Work Plan, Tooele Army Depot South Area. February.

Tetra Tech, 2017a. Open Detonation Risk Mitigation Plan, October.

Tetra Tech, Inc. 2017b. Human Health Risk Assessment Report for Open Detonation Treatment Unit for Tooele Army Depot South, Stockton, Utah, October.

Tetra Tech, Inc. 2017c. Screening Level Ecological Risk Assessment Report for Open Detonation Treatment Unit, Tooele Army Depot South, Stockton, Utah, October.