

WASTE STABILIZATION PLAN

For

**Response Actions
at
Class 2 Non-Hazardous Waste Landfill
Exide Technologies, Inc.
Frisco, Texas**

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1.0 INTRODUCTION

Remediation Services, Incorporated (RSI), an environmental remediation firm located in Independence, Kansas, has been contracted by Exide Technologies Inc., to develop a Waste Stabilization Plan (WSP) for the treated slag remediation project to be conducted at the Exide Technologies facility located at 7471 South 5th Street, Frisco, Texas (Facility). This document outlines the procedures that will be used to implement stabilization of slag that exceeds the Universal Treatment Standard (UTS) for treated waste. This document also includes a detailed description of the stabilization process proposed for the site. Implementation of the stabilization activities will be conducted by RSI.

The objective of this WSP is to provide a detailed overview of the proposed stabilization methodology, including the equipment and reagent to be used during the treatment process. A *Site Safety & Health Plan (SSHP)* developed for the work has been prepared and is attached.

Separate plans developed for the response actions are described below:

- *Dust Control Plan* describing procedures to control dust associated with the slag handling and re-treatment activities;
- *Sampling and Analysis Plan (SAP)* that includes a *Quality Assurance Project Plan (QAPP)* discussing overall sampling and laboratory quality assurance issues; and,
- *Perimeter Air Monitoring Plan* to monitor dust levels that may be associated with the Site activities.

Upon completion of this project a *Response Action Completion Report (RACR)* will be prepared by W&M Environmental Group, Inc., (W&M), documenting the remediation activities.

2.0 IDENTIFICATION OF MATERIAL TO BE TREATED

The material to be stabilized is treated slag placed within the Class 2 non-hazardous waste landfill located in the northeastern portion of the Exide property. Areas of concern were identified during extensive investigations completed in the landfill and are described in the March 2012 report titled "*Results of Non-Hazardous Waste Landfill Investigation, Exide Technologies, Inc. North Landfill*", prepared by W&M.

Based on the landfill investigations, the chemicals of concern (COCs) are lead and cadmium. These investigations identified levels of lead and cadmium in the slag which exceeds the UTS of 0.75 mg/L for lead and 0.11 mg/L for cadmium when subjected to the Toxicity Characteristic Leaching Procedure (TCLP). The *Response Action Work Plan (RAWP)* Revision dated January 31, 2013 describes the location of the material requiring re-treatment as being located principally within the upper two (2) feet of the active cells of the landfill, with three (3) discrete areas requiring removal at greater depths.

3.0 PROPOSED REMEDIATION PROCEDURE

3.1 Overview

Previous Site investigations indicate approximately 4,000 cubic yards of treated slag placed within the on-Site Class 2 non-hazardous waste landfill may exceed the UTS for lead and/or cadmium and will require on-Site re-treatment. The proposed re-treatment process will treat the excavated slag waste material to below the UTS for both lead and cadmium. All re-treatment of excavated material will occur in less than 90 day containers and each container will be re-treated once. After re-treatment, confirmation sampling will be conducted to verify successful treatment. Post re-treatment to levels meeting the UTS, the stabilized material will be placed back into the landfill. Excavated material not successfully re-treated will be sent to an authorized Treatment, Storage and Disposal (TSD) facility for further treatment and disposal in accordance with applicable federal and State regulations, including the land disposal restrictions set forth in 40 C.F.R. Pt. 268.

If confirmation sampling within the landfill indicates that additional areas of slag require re-treatment, provisions will be made to have the capacity (i.e. equipment and treatment chemicals) to treat this additional material.

The proposed on-Site re-treatment of slag that exceeds the UTS for lead and cadmium will consist of permanent stabilization of the slag using Free Flow 100®. This is the same material that was used by Exide on a daily basis to treat slag generated at this facility. With careful mixing and adequate confirmation

sampling, RSI can ensure the re-treated material will satisfy the land disposal criteria. Information regarding Free Flow 100® is included in Appendix A.

Portions of the lined, active landfill will be used for staging the temporary containers to be used for re-treatment of excavated materials and for staging re-treated materials prior to disposal. All excavated materials to be re-treated will be placed directly into containers meeting the requirements of 30 TAC 335.69. Materials that are excavated are expected to be re-treated on the same day they are excavated, and are expected to be sampled and demonstrate that land ban criteria are met and returned to the disposal area within seven days of excavation. Dust suppression measures detailed in **Appendices B and C** to the RAWP will be implemented to prevent fugitive dust emissions associated with the storage and re-treatment activities.

Following re-treatment, excavated materials will be placed directly into roll off containers meeting the requirements of 30 TAC 335.69. . Following the Pilot Test period described in Section 3.3.4, based on a consistent demonstration that the samples collected to date are treated successfully, i.e. TCLP analytical results less than 0.75 mg/L for lead and 0.11 mg/L for cadmium, Exide may seek a written concurrence from the TCEQ that Exide may use sample results to support a generator determination based on process knowledge that the re-treated material meets UTS and otherwise meets Class 2 waste criteria. If Exide receives such written concurrence from the TCEQ, the re-treated materials thereafter may be placed directly onto 6 mil polyethylene sheeting following re-treatment; with such stockpiles being covered with polyethylene sheeting weighted down by sandbags when not in active use and at the end of each day (as described in Section 3.3.5) during the period prior to receipt of confirmation sampling results; such stockpile being referred to herein as an “authorized stockpile.” If any sample of re-treated materials taken after any such TCEQ concurrence indicates that such material does not meet UTS, excavated material again will be placed in roll-off containers meeting the applicable container standards during the period prior to receipt of confirmation sampling results. The waste not meeting the UTS will be sent off-site to an authorized TSD facility for further treatment and disposal in accordance with applicable federal and State regulations, including the land disposal restrictions set forth in 40 CFR Pt. 268.

Conducting these temporary activities within the confines of the landfill is intended to facilitate a reliable, effective and protective response by eliminating the potential generation of dust associated with transportation of the material for storage and re-treatment. Areas where any re-treatment activities occur will undergo confirmation sampling to confirm that the material in place meets the land ban criteria. The re-treatment activities and temporary storage of re-treated materials have been designed to prevent releases of hazardous constituents or wastes into the environment, and to minimize and adequately control cross-media transfer, as

necessary to protect human health and the environment. The design of the re-treatment and the temporary activities is described in Section 3.3.

As previously noted, it is expected that processing, storage, and re-disposal of excavated materials will occur within seven days of excavation. No hazardous waste will be stored in containers for more than 90 days. Exide will maintain documentation of the date upon which accumulation or storage of any excavated material begins, the date the of receipt of sampling results for the material and a copy of the results, and the date the material is re-disposed of in the landfill following successful re-treatment. In no event shall the accumulation or storage period of excavated materials exceed 30 days.

3.1.1 Equipment

The equipment will be mobilized from the RSI yard in Independence, Kansas or obtained from local equipment vendors. Specification sheets/descriptive literature for the proposed equipment are included in Appendix B.

The equipment to be utilized during the treatment process includes the following:

Excavation	Caterpillar 324EL Excavator Caterpillar 950H Loader Caterpillar 938H Loader Box Type Low Noise Demolition Hammer Caterpillar 25 ton Off Road Haul Truck
Treatment/ Storage Containers	20 - 25 Cubic Yard Retreatment Mixing Containers 20 and 30 Cubic Yard Storage Containers
Dust Control	Ford F 750 - 2,000 Gallon Water Truck(s) 2 - Dust Boss Model DB 60, or equivalent
Particle Sizing	Antraquip Hydraulic Cutter (or equivalent)
Placement of Stabilized Slag	Caterpillar 950H Loader Caterpillar 25 Ton Off-Road Haul Truck or equivalent John Deere 550 Dozer or equivalent

3.1.2 Equipment Decontamination

An equipment decontamination area will be constructed within the active landfill at the southwest and/or southeast corner. Berms will be constructed around the perimeter utilizing stabilized slag that meets the UTS treatment standards. The decontamination area will be large enough to accommodate the largest piece of equipment that will be used during the treatment process. The area will be graded to drain to one corner to allow the fluids generated during decontamination to be removed. A 40-mil high density polyethylene (HDPE) liner will be placed over the graded area extending over the berms. The HDPE liner will be anchored in at the bottom of the berms to prevent it from becoming windblown. Timbers will be installed over the HDPE liner to protect it from the tracks and tires of the heavy equipment during the decontamination activities.

The equipment will be decontaminated using potable water and high pressure washers. The decontamination fluids will be pumped out of the lined decontamination area into a tank and transferred to the Facility on-Site wastewater treatment facility for treatment and discharge in accordance with the Facility's Industrial User Wastewater Discharge (IUWWD) Permit. The decontamination pad will be covered with poly sheeting weighted with sandbags during periods of inactivity and during storm events.

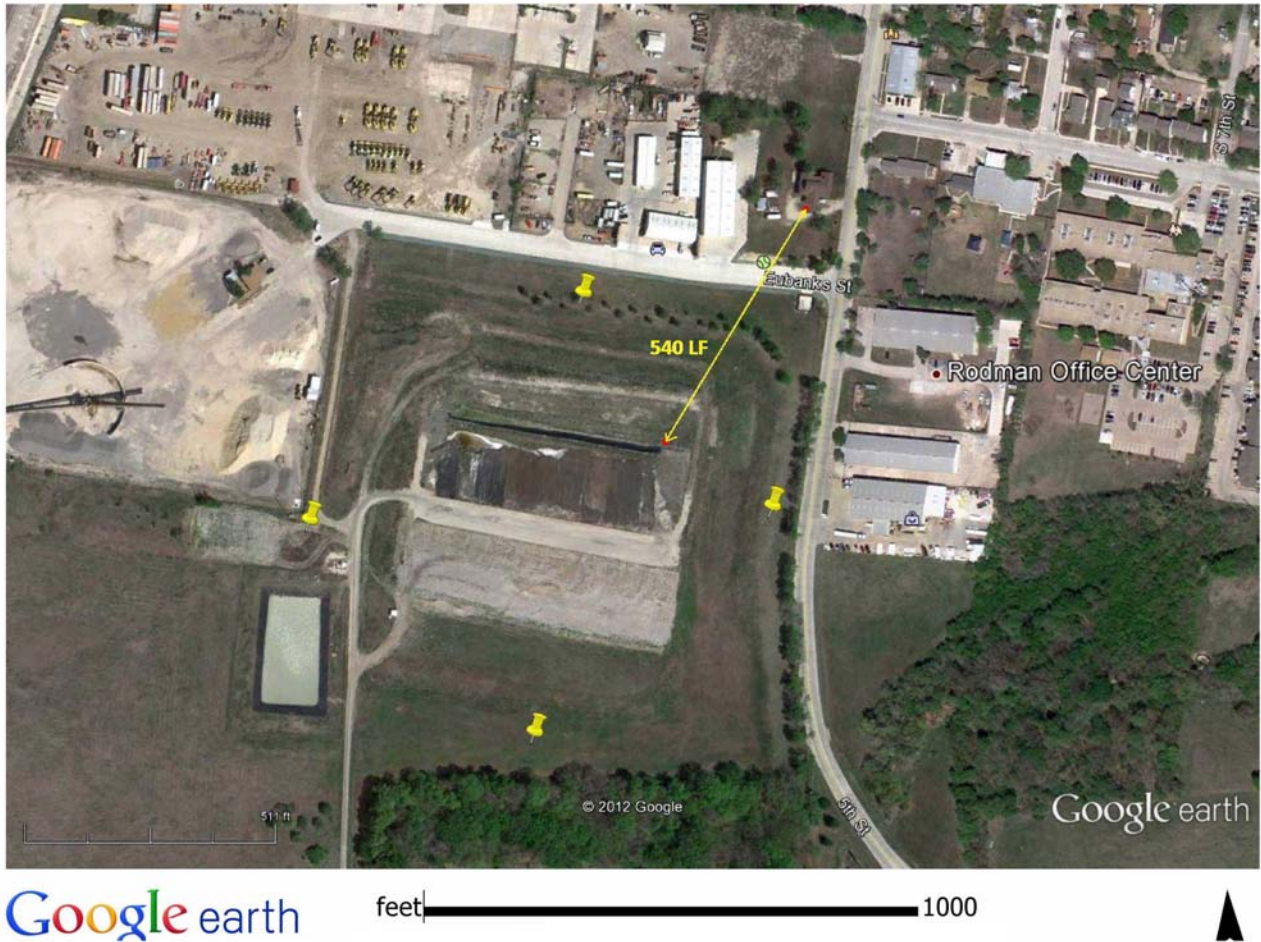
During the stabilization activities, decontamination residue will be placed with material requiring treatment in a less than 90 day temporary container for treatment. At the completion of the work, the sediments will be removed and transferred to the existing slag treatment building at the Facility for treatment or transferred to a less than 90 day container for characterization, storage and disposal in accordance with local, state and federal requirements. The liner and timbers will be decontaminated using high pressure water which will subsequently be collected and transferred to the Facility's on-Site wastewater treatment facility for treatment and discharge in accordance with the Facility's IUWWD Permit. Once decontamination is complete, the liner and timbers will be transferred to a less than 90 day container for characterization, storage and disposal in accordance with local, state and federal requirements.

Three grab samples will be collected from beneath the decontamination area and analyzed for TCLP lead and cadmium. Should any of the results exceed the UTS for either metal, a minimum of six (6) inches of material underlying the decontamination area will be removed and placed into a temporary less than 90 day container meeting applicable standards for waste characterization and analysis. This process will be repeated as required until the grab samples exhibits TCLP results that meet the UTS for lead and cadmium. Material that does not meet the UTS will be transferred to the existing slag treatment building at the Facility for treatment or transported offsite for disposal in accordance with local, state and federal requirements.

3.1.3 Noise Levels

All of the equipment to be utilized will be late model or new equipment used on general construction and earthmoving projects on a daily basis. The specification sheets for the equipment that will be utilized are included in Appendix B. The closest occupied properties to the landfill are commercial properties, an aggregate supplier located northwest of the landfill and Rodman located northeast of the landfill. The noise levels expected with the stabilization activities are consistent with the noise levels associated with the neighboring operations and are not expected to increase the current noise level. The closest residence is approximately 540 feet NNE of the North landfill (see Figure 1). Background noise monitoring will be performed prior to the start of the work.

Figure 1
Residence Location Map



3.1.4 Noise Mitigation

Although not expected to be necessary, if the noise monitoring between the Site boundaries and the residences or businesses to the north and east exceeds 85 decibels (dB) during the initial Site activities, a noise abatement barrier will be installed prior to continuing work. The noise barrier will be constructed by installing an eight (8) ounce fabric on the inside of temporary 6' tall chain link fence. Additional noise monitoring will be performed on the next working day. If the additional noise monitoring continues to exceed 85 dB between the Site boundaries and the residences or businesses, additional noise mitigation measures will be undertaken including the consideration of the construction of an earthen berm inside of the boundary fence.

3.1.5 Schedule for Site Activities

A project schedule will be prepared prior to the start of work. The schedule will be based upon working six (6) days per week and receipt of any other authorizations required for the proposed activities. Site operations will be conducted from 7AM until 5PM.

3.2 Summary of Free Flow 100® Chemistry

Free Flow 100® is a proprietary blend of stabilizing reagents manufactured by Free Flow Technologies, Ltd. of Machesney Park, Illinois that ensures long term stability of heavy metals in waste across a wide range of pH values (www.freeflowtech.com). Free Flow 100® uses a combination of phosphate, carbonate and hydroxide fixation chemistry. The addition of water is not expected to be required at the time of treatment because when moisture in the excavated material or dust suppression water used on the excavated material comes into contact with Free Flow 100® during mixing, phosphates are immediately released to initiate fixation reactions with elevated concentrations of lead by forming insoluble lead phosphates, for example:



However, should the addition of water be necessary to provide the required moisture, it will be available and introduced as needed. Over time, lead will be further converted into the mineral hydroxypyromorphite [$\text{Pb}_5(\text{PO}_4)_3\text{OH}$] ($K_{\text{sp}} \sim 5 \times 10^{-77}$) where the lead is completely locked within the insoluble matrix of the mineral.

Other metals will be converted into stable carbonate or hydroxide compounds, depending on the least soluble form of the metal. For example, cadmium is stabilized as a phosphate.



Two (2) representative samples of the slag that requires treatment were submitted to Free Flow Technologies, Ltd. for a treatability study to determine the dosage required to properly stabilize the slag. Testing was carried out using the treatment formula currently used by the facility Exide facility, i.e., 6% Free Flow 100®, as well as using different combinations of Free Flow 300®. Based upon this treatability study, 6 % Free Flow 100® by weight of slag will be used in the treatment process. The results of the treatability study are included in Appendix A.

Additional information relative to the Free Flow 100® is included in Appendix A.

3.3 Material Handling Plan

Descriptive brochures of the heavy equipment to be utilized during the project are included in Appendix B.

3.3.1 Storm Water Management

The north landfill is constructed with perimeter berms to prevent stormwater from surrounding areas from flowing into the active landfill. The only water that enters the landfill is from precipitation that falls directly into the landfill footprint. Waste materials are placed in the landfill to provide positive flow of storm water into a collection point at the northwest corner end of the active landfill and above the landfill liner. Storm water from this collection area is captured and pumped to the lined solar evaporation pond directly west of the landfill. The water is allowed to either evaporate in this pond or is pumped to the on-Site wastewater treatment plant for treatment and discharge in accordance with Exide's IUWWD Permit. These methods are consistent with existing practices for stormwater management associated with landfill operation and are in accordance with the Facility's Multi-Sector General (MSG) Permit and Best Management Practice (BMP) Plan.

3.3.2 Excavation and Grade Control

The landfill surface will be profiled on 25-foot centers to establish the baseline grades of the landfill using a GPS or laser based survey system. The base line survey will be used to verify and control the depth of excavation of the slag requiring treatment. An excavator equipped with a smooth edge bucket will be used to remove the slag requiring treatment. The slag will be placed into a loader bucket and transferred to the treatment tank. All excavation, material movement and treatment will be performed using active dust control procedures outline in the dust control plan.

3.3.3 Stabilization

RSI proposes to perform stabilization of the excavated slag within the confines of the active landfill. Excavated material that is characteristically hazardous will be re-treated in separate batches from excavated material that is non-hazardous. Excavated slag will be mixed with Free Flow 100 ® in a mixing container using a hydraulic excavator. Slag will be temporarily stored in accordance with Section 3.1, 3.3.4 and 3.3.5 and analyzed to ensure the stabilization has been successful and the re-treated slag meets the UTS. Once validated sampling results are received confirming that the stabilized slag meets the UTS and is a Class 2 non-hazardous waste, such material will then be consolidated and placed back into the landfill. If validated sampling results are received indicating a failure to meet UTS standards, the re-treated material will be sent for off-site to an authorized TSD facility for further treatment and disposal in accordance with applicable federal and State regulations, including the land disposal restrictions set forth in 40 C.F.R. Pt. 268.

The required stabilization reagent, as a percentage of waste by weight, will be known based upon the

treatability study. The weight of the raw slag will be verified in the field by weighing a container with a known volume. The slag requiring re-treatment will be placed into the treatment container to obtain approximately 22 cubic yards of material. Each 22 cubic yards of slag will weigh approximately 33 tons and will require 2 tons of Free Flow 100®.

A clean loader/forklift will be used to transfer the reagent from the storage area to the landfill area. Another loader/forklift, which is dedicated for use inside of the active landfill, will be used to place the Free Flow 100® into the mixing container. The bags that the reagent is delivered in are manufactured with bottom opening chutes which allow the reagent to be spread close to the surface which minimizes the generation of dust. The empty bags will be placed in a roll off container for off-site transportation and disposal as a non-hazardous waste.

Once the reagent has been placed into the mixing/treatment container, an excavator will be used to mix the reagent and the slag. The excavator will mix the slag and the Free Flow 100® until a homogenous mixture has been achieved. A homogenous mixture is easily verified thru the color change of the mixture of the slag and the Free Flow 100®.

Once the stabilization activities for a batch of material stabilized in the mixing container have been completed, the stabilized waste will be removed from the mixing container and, stored as provided by this plan while awaiting analytical results. Each roll off container will contain approximately 20 – 25 cubic yards. Any authorized stockpile will contain approximately 50 cubic yards. The mixing container and each of the storage containers and any authorized stockpiles will be covered with a water proof tarp when material is not being actively added to or taken from the container or stockpile as well as during wind or particulate Stop Work notifications and storm events.

3.3.4 Pilot Test

Stabilization of the slag will be completed as described above. A Pilot Test is proposed to demonstrate that the re-treatment process is consistently treating the excavated material to achieve a non-hazardous waste classification and to meet the UTS criteria.

During the Pilot Test, each roll off container of material that has been re-treated in the mixing tank will be sampled for TCLP lead and cadmium to insure the slag has been treated successfully. The Pilot Test will be performed for the first 20 containers or approximately 400 cubic yards. Following the Pilot Test period described in Section 3.3.4, based on a consistent demonstration that the samples collected to date are treated successfully, i.e. TCLP analytical results less than 0.75 mg/L for lead and 0.11 mg/L for cadmium, Exide may

seek a written concurrence from the TCEQ that Exide may use sample results to support a generator determination based on process knowledge that the re-treated material meets UTS and otherwise meets Class 2 waste criteria. . If Exide receives such written concurrence from the TCEQ, the re-treated materials thereafter may be placed following retreatment in authorized stockpiles as described in Section 3.3.5 below and as provided in Section 3.1 above.

If any sample of re-treated waste taken after any such TCEQ approval indicates that such material does not meet UTS, excavated material again will be placed in roll off containers pending receipt of TCLP/UTS sampling results. The waste not meeting the UTS will be sent off-site to an authorized TSD facility for further treatment and disposal in accordance with applicable federal and State regulations, including the land disposal restrictions set forth in 40 CFR Pt. 268.

3.3.5 Authorized Stockpiles

In the event Exide receives written concurrence from TCEQ for the use of authorized stockpiles pending receipt of confirmation sampling results pursuant to this Plan, re-treated material may be placed into 50 cubic yard stockpiles for sampling and analysis; these stockpiles pending confirmation sampling results will be limited to 25 ft. x 25 ft. in lateral extent and will be no higher than 8 feet. Authorized stockpiles of re-treated material will be placed in an area where the slag exceeding the UTS criteria has been removed, as verified by confirmation samples collected in accordance with the SAP /QAAP confirming the removal. The stabilized material will be placed into a haul truck or loader and transported to the stockpile area. The haul truck will dump near the area designated for each stockpile onto 6-mil polyethylene sheeting. A loader equipped with an electronic totalizing bucket scale will be used to construct the 50 cubic yard stockpiles based upon the weight of the slag. Each stockpile will be sampled and covered with 6-mil plastic sheeting which will be weighted with sandbags. The stockpiles will be identified by marking the sample number on the stockpile cover and a pin flag inserted into the stockpile below the cover. The sampling and analysis for the stabilized slag is provided in the QAPP and SAP.

3.3.6 Milling and Sizing of Hard Slag

A milling head attachment mounted on a hydraulic excavator will be used to remove approximately 450 cubic yards of hard, cement-like slag that is located greater than 2 feet below the surface and requires re-treatment. This type of machine is used to remove rock and other hard materials in the construction and mining industries. A descriptive brochure for this piece of equipment is included in Appendix B. The operation of the milling attachment will reduce the size of the hard slag as it is being removed. The milled material will be immediately transported to the stabilization area for retreatment as described above. Hard non-hazardous slag material overlying the slag that does not requires retreatment will be broken utilizing a

demolition hammer, removed with the excavator and stockpiled adjacent to the excavation.

All milling and breaking of hardened slag material will be completed using appropriate dust suppression techniques as described in the *Dust Control Plan*. All stockpiles of non-hazardous materials will be covered with 6-mil poly sheeting when material is not being actively added to or removed from the stockpile.

3.3.7 Stabilized Slag Placement

Analytical results for each container or authorized stockpile will be reviewed by Exide, RSI and W&M prior to removal from the container or stockpile area to insure that the material meets the treatment standards and the sampling meets the quality assurance/quality control (QA/QC) standards. It is anticipated that approximately 1,000 cubic yards of treated slag confirmed to meet the Class 2 non-hazardous waste and UTS criteria will be bulked together in several stockpiles within the landfill until enough waste has been removed and re-treated to allow placement. These stockpiles will be no greater than eight (8) feet high and will be covered with 6-mil poly sheeting when material is not being actively added to or removed from the stockpiles.

Stabilized slag which meets the land disposal criteria for lead and cadmium (i.e., <0.75 mg/L lead and / or 0.11 mg/L cadmium) will be placed back into the active landfill. The stockpile cover poly sheeting will be removed and staged for reuse or stored, characterized and disposed in accordance with local, state and federal requirements.

Stabilized slag that meets the Class 2 non-hazardous waste and UTS criteria will be loaded into an off road haul truck, transported to the placement area within the landfill, dumped and spread with a bull dozer. The material will be compacted with the tracks of the bulldozer. Active dust suppression will be completed during these activities as described in the *Dust Control Plan*. Overburden materials will be replaced using the same methodology.

3.4 Health and Safety

The health and safety of our employees is paramount to RSI and Exide. The personnel protective measures and air monitoring to be used during the work at this Site are detailed in the SSHP included as Appendix C.