IDW MANAGEMENT

1.0 PURPOSE

This standard operating procedure (SOP) describes the activities and responsibilities of AMEC Personnel with regard to management of investigation-derived waste. The purpose of this procedure is to provide guidance for the minimization, handling, labeling, temporary storage, and inventory of investigation-derived waste (IDW) generated under the project. This SOP will also apply to personal protective equipment (PPE), sampling equipment, decontamination fluids, non-IDW trash, non-indigenous IDW, and hazardous waste generated during implementation of removal or remedial actions. The information presented will be used to prepare and implement Work Plans (WP) and Field Sampling Plans (FSP) for IDW-related field activities. Results from implementation of WPs and FSPs will then be used to develop and implement final IDW Disposal Plans (DPs).

2.0 SCOPE

This document applies to all personnel involved in the development and implementation of WPs and FSPs that include the generation of IDW.

This procedure was developed to serve as management-approved professional guidance for the management of IDW generated under the project. It focuses on the requirements for minimizing, segregating, handling, labeling, storing, and inventorying IDW in the field. Certain drum inventory requirements related to the screening, sampling, classification, and disposal of IDW are also noted in this procedure.

This procedure is not intended to obviate the need for professional judgment that may arise in unspecified or unforeseen circumstances. Moreover, specific guidance from local regulatory agencies must be obtained and acted upon. Deviations from this procedure in planning or executing planned activities must be approved by the Project Manager and documented.

3.0 DEFINITIONS

3.1 INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW) consists of all materials generated during site investigation that may be contaminated with chemicals of concern. IDW may consist of many types of potentially contaminated materials, including but not limited to, PPE; disposable sampling and decontamination equipment; investigation-derived soil, sludge, and sediment; well development and purge water; and decontamination fluids.

3.2 PERSONAL PROTECTIVE EQUIPMENT

PPE, as defined in this procedure, refers to all disposable materials used to protect personnel from contact with potentially contaminated site media, such as inner and outer gloves, Tyvek® suits and overboots, and disposable respirator cartridges. Non-consumable items such as steel-toe boots, respirators, and hard hats are not included in this procedure.

3.3 DISPOSABLE SAMPLING EQUIPMENT

Disposable sampling equipment consists of all single-use equipment that may have come in contact with potentially contaminated site media, including sample bailers, Draeger® air monitoring tubes, used soil sampling trowels and spatulas, plastic drop cloths, plastic bags and bucket liners, and sample containers from field analytical test kits.

3.4 INVESTIGATION-DERIVED SOIL, SLUDGE, AND SEDIMENT

Investigation-derived soil consists of all potentially contaminated soil that is disturbed as part of site investigation activities. The most commonly encountered form of IDW soil is drill cuttings brought to the ground surface by drilling. Other forms of disturbed soil, including trenching spoils and excess soil remaining from surface sampling, should not be stored as IDW. Excavated soil should be returned to its source, if site conditions permit.

Investigation-derived sludge consists of all potentially contaminated sludge materials generated or disturbed during site investigation activities. Generated sludge may consist of drilling mud used or created during intrusive activities. Other sludge may include solvents or petroleum-based materials encountered at the bottom of storage tanks and grease traps.

Investigation-derived sediment consists of all potentially contaminated sediments that are generated or disturbed during site investigation activities. Generated sediments may include solids that settle out of suspension from well development, purge, or decontamination water (see Definitions 3.5 and 3.6) while stored in 55-gallon drums or during sample filtration. Disturbed sediments may also consist of catch basin sediments or excess sediment from surface water activities.

3.5 Well Development and Purge Water

Development water consists of ground water withdrawn from newly installed monitoring wells in preparation for well purging or pump testing. Monitoring well development methods are discussed in SOP, *Monitoring Well Development*.

Purge water consists of ground water that is removed from monitoring wells immediately prior to sampling. Well purging methods are discussed in SOP, *Monitoring Well Sampling*. Ground water derived during aquifer testing shall be addressed on a site-specific basis. Procedures for handling ground water generated during aquifer testing shall be included in the Work Plan or equivalent document.

3.6 Decontamination Fluids

Decontamination fluids consist of all fluids used in decontamination procedures conducted during site investigation activities. These fluids consist of wash water, rinse water and solvents used for the decontamination of non-consumable PPE, sampling equipment, and drilling equipment. Decontamination procedures are discussed in SOP, *Equipment Decontamination*.

3.7 Non-IDW Trash

Non-IDW trash is all waste materials such as waste paper, drink containers, food, and packaging generated in the support zone that have not come in contact with potentially contaminated site media.

3.8 Non-Indigenous IDW

Non-indigenous IDW consists of all waste materials from offsite sources that are generated in the transition or contamination reduction zones and have not come in contact with potentially contaminated site media. Non-indigenous IDW includes materials such as PPE from "clean" field activities (e.g., field blank generation, water sampling events); and refuse from monitoring

well installation (e.g., unused sections of well casing, used bentonite buckets, sand bags, and cement bags).

3.9 RCRA Hazardous Waste

Under the Resource Conservation and Recovery Act (RCRA), a solid waste that is not excluded from regulation is defined as hazardous if (1) it is listed as a hazardous waste in Chapter 40, Code of Federal Regulations (CFR), Parts 261.31 through 261.33; (2) it exhibits any of four hazardous characteristics: ignitability, corrosivity, reactivity, or toxicity (as determined using the Toxicity Characteristic Leachate Procedure [TCLP]); or, (3) it is subject to certain mixture rules (EPA 1992). If IDW is determined to be RCRA hazardous waste, then RCRA storage, transportation, and disposal requirements may apply.

3.10 Land Disposal Restrictions (LDR)

Land disposal, as defined in RCRA, is any placement of RCRA hazardous waste on the land in a waste pile, landfill, impoundment, well, land treatment area, etc. LDRs are regulatory restrictions placed on land disposal, including pre-treatment standards, engineered containment, capacity constraints, and reporting and permitting requirements.

3.11 Area of Contamination (AOC)

The United States Environmental Protection Agency (EPA) considers the area of contamination (AOC) to be a single land-based disposal unit, usually a "landfill," and includes non-discrete land areas in which there is generally dispersed contamination (EPA 1991). Note that storing IDW in a container (i.e., portable storage devices such as drums and tanks) within the AOC and returning it to its source, whether RCRA hazardous or not, does not trigger RCRA LDRs. In addition, sampling and direct replacement of wastes within an AOC do not constitute land disposal (EPA 1992).

4.0 RESPONSIBILITIES

The Project Manager is responsible for preparing WPs and FSPs in compliance with this procedure, and is responsible for documenting instances of non-compliance.

The Field Managers are responsible for implementing this IDW procedure and for ensuring that all project field personnel follow it.

5.0 PROCEDURES

The procedures for IDW management in the field are described below in Sections 5.1 to 5.5. The implementation of these procedures requires Project Managers, Field Managers, and their designates to perform the following tasks:

- Minimize IDW as it is generated
- Segregate IDW by matrix and source location
- Apply suitable procedures for IDW drum handling and labeling
- Apply protective methods for IDW drum storage
- Prepare an IDW drum inventory
- Update and report changes to the IDW drum inventory

5.1 IDW MINIMIZATION

Field Managers and their designates shall minimize the generation of onsite IDW to reduce the need for special storage or disposal requirements that may result in substantial additional costs and provide little or no reduction in site risks (EPA 1992). The volume of IDW shall be reduced by applying minimization practices throughout the course of site investigation activities. These minimization strategies include substitution of biodegradable raw materials; using low-volume IDW-generating drilling techniques; where possible, returning excess material to the source location; use of disposable sampling equipment versus generating more decontamination fluids from reusable sampling equipment; use of bucket and drum liners; and separating trash from IDW.

Material substitution consists of selecting materials that degrade readily or have reduced potential for chemical impacts to the site and the environment. An example of this practice is the use of biodegradable detergents (e.g., Alconox® or non-phosphate detergents) for decontamination of non-consumable PPE and sampling equipment. In addition, field equipment decontamination can be conducted using isopropyl alcohol rather than hexane or other solvents (for most analytes of concern), to reduce the potential onsite chemical impacts of the decontamination solvent. Decontamination solvents shall be selected carefully so that the solvents, and their known decomposition products, are <u>not</u> potentially RCRA hazardous waste.

Drilling methods that minimize potential IDW generation should be given priority. Hollow stem auger and air rotary methods should be selected, where feasible, over mud rotary methods. Mud rotary drilling produces waste drilling mud, while hollow stem and air rotary drilling methods produce relatively low volumes of soil waste. Small diameter borings and cores shall be used when soil is the only matrix to be sampled at the boring location; the installation of monitoring wells requires the use of larger diameter borings.

Soil, sludge, or sediment removed from borings, containment areas, and shallow test trenches shall be returned to the source immediately after sampling and/or geological logging of the soils (EPA 1991, 1992). Immediate replacement of solid waste in the source location during investigation activities avoids RCRA land disposal restrictions (LDRs), which permit movement of IDW within the same area of contamination (AOC) without considering land disposal to have occurred, even if the IDW is later determined to contain RCRA hazardous material (EPA 1991). For projects conducted in the Hawaiian Islands, it is recommended that soil IDW from borings and trenches less than 10 feet deep and not penetrating into a saturated layer be placed on polyethylene sheeting (e.g., Visqueen®) during excavation. Following excavation, the soil IDW shall be replaced into the boring or trench and compacted. Soil IDW from borings or trenches deeper than 10 feet or that penetrate into a saturated layer shall be contained in drums.

The quantity of decontamination rinse water generated can be reduced by using dedicated and disposable sampling equipment such as plastic bailers, trowels, and drum thiefs, that do not require decontaminating. In general, decontamination fluids, and well development and purge water, should not be minimized because the integrity of the associated analytical data may be affected.

The storage of visibly soiled PPE and disposable sampling equipment IDW shall be minimized by implementing decontamination procedures. If, based upon the best professional judgment of the Field Manager, the PPE and disposable sampling equipment can be rendered non-hazardous after decontamination, then the PPE and disposable sampling equipment shall be double-bagged and disposed of offsite as municipal waste (EPA 1991, 1992).

Bucket liners can be used in the decontamination program to reduce the volume of solid IDW generated and reduce costs on larger projects. The plastic bucket liners can be crushed into a smaller volume than the buckets, and only a small number of plastic decontamination buckets are required for the entire project. The larger, heavy-duty, 55-gallon drum liners can be used for heavily contaminated IDW to provide secondary containment, and reduce the costs of disposal

and drum recycling. Drum liners may extend the containment life of the drums in severe climates and will reduce the costs of cleaning out the drums prior to recycling.

All waste materials generated in the support zone are considered non-IDW trash. To minimize the total volume of IDW, all trash shall be separated from IDW, sealed in garbage bags, and properly disposed of offsite as municipal waste.

Excess cement, sand, and bentonite grout prepared for monitoring well construction shall be kept to a minimum. Well construction shall be observed by Field Managers to ensure that a sufficient, but not excessive, volume of grout is prepared. Some excess grout may be produced. Unused grout (that should not come in contact with potentially contaminated soil or ground water) shall be considered non-hazardous trash and shall be disposed of offsite by the drilling subcontractor. Surplus materials from monitoring well installation, such as scrap PVC sections, used bentonite buckets, and cement/sand bags that do not come in contact with potentially contaminated soil, shall be considered non-IDW trash and shall be disposed of offsite by the drilling subcontractor.

IDW generated from the use of field analytical test kits consists of those parts of the kit that have come into contact with potentially contaminated site media, and used or excess extracting solvents and other reagents. Potentially contaminated solid test kit IDW shall be contained in plastic bags and stored with PPE or disposable sampling equipment IDW from the same source area as soil material used for the analyses. The small volumes of waste solvents, reagents, and water samples used in field test kits should be segregated, and disposed of accordingly (based upon the characteristics of the solvents as described in this SOP). Most other test kit materials should be considered non-IDW trash, and be disposed of as municipal waste.

5.2 Segregation of IDW by Matrix and Location

To facilitate subsequent IDW screening, sampling, classification and/or disposal, IDW shall generally be segregated by matrix and source location at the time it is generated. Each drum of solid IDW shall be completely filled, when possible. For liquid IDW, drums should be left with headspace of approximately 5% by volume to allow for expansion of the liquid and potential volatile contaminants. IDW from only one matrix shall be stored in a single drum (e.g., soil, water or PPE shall not be mixed in one drum). In general, IDW from separate sources should not be combined in a single drum.

It is possible that monitoring well development and purge water will contain suspended solids, which will settle to the bottom of the storage drum as sediment. Significant observations on the

turbidity or sediment load of the development or purge water shall be included in the logbook and reported in attachments to the quarterly drum inventory report (see SOP, *Logbooks* and Section 5.5). To avoid having mixed matrices in a single drum (i.e., sediment and water), it may be necessary to decant the liquids into a separate drum, after the sediments have settled out. This segregation may be accomplished during subsequent IDW sampling activities or during consolidation in a holding tank prior to disposal.

Potentially contaminated well construction materials shall be placed in a separate drum. No soil, sediment, sludge, or liquid IDW shall be placed in drums with potentially contaminated waste well construction materials, and potentially contaminated well construction materials from separate monitoring wells shall not be commingled.

Potentially hazardous PPE and disposable sampling equipment shall be stored in drums separate from other IDW. PPE from generally clean field activities, such as water sampling, shall be segregated from visibly soiled PPE, double-bagged and disposed of offsite as municipal waste. Disposable sampling equipment from activities such as soil, sediment, and sludge sampling includes plastic sheeting used as liner material in containment areas around drilling rigs and waste storage areas; disposable sampling equipment; and soiled decontamination equipment. If, according to the Field Manager's best professional judgment, the visibly soiled PPE can be decontaminated and rendered nonhazardous, then the decontaminated PPE shall be double-bagged and disposed of offsite as municipal waste (EPA 1991, 1992). PPE and disposable sampling equipment generated on separate days in the field may be combined in a single drum, provided clean and visibly soiled IDW are segregated as discussed above.

Decontamination fluids shall be stored in drums separate from other IDW. If practical, decontamination fluids generated from different sources should not be stored in the same drum. If decontamination fluids generated over several days or from different sources are stored in a single drum, information about the dates and IDW sources represented in the drum shall be recorded. This information shall be noted in the field notebook, on the drum label (see Section 5.3), and in the drum inventory (see Section 5.5).

Part of IDW segregation by the Field Manager and designated personnel should include separating the liquid and sediment portions of the equipment decontamination fluid present in the containment unit used by the drilling or excavation field crew. The contents of this unit normally consist of turbid decontamination fluid above a layer of predominantly coarse-grained sediment. When the contents of the containment unit are to be removed for storage in IDW drums, the field

crew shall be instructed by the Field Manager to place as much of the liquid into drums as possible and transfer the remaining solids into separate drums. Observations of the turbidity and sediment load of the liquid IDW should be noted in the field notebook, on the drum label (see Section 5.3), and in attachments to the drum inventory (see Section 5.5). It is likely that decontamination fluids will contain minor amounts of suspended solids that will settle out of suspension to become sediment at the bottom of IDW storage drums. As noted above, it may be necessary to segregate the drummed water from sediment during subsequent IDW sampling or disposal activities.

5.3 DRUM HANDLING AND LABELING

Drum handling consists of those actions necessary to prepare an IDW drum for labeling. Drum labeling consists of those actions required to legibly and permanently identify the contents of an IDW drum.

5.3.1 Drum Handling

The drums used for containing IDW shall be approved by the United States Department of Transportation (DOT HM-181 1990). The drums shall be made of steel or plastic, have a 55-gallon capacity, be completely painted or opaque, and have removable lids (i.e., type 17-H or United Nations Code 1A2 or 1H2). New steel drums are preferred over recycled drums. For short-term storage of liquid IDW prior to discharge, double-walled bulk steel or plastic storage tanks may be used. For this scenario, consideration must be given to the scheduling and cost-effectiveness of this type of bulk storage, treatment, and discharge system versus longer-term drum storage.

To prepare IDW drums for labeling, the outer wall surfaces and drum lids shall be wiped clean of all material that may prevent legible and permanent labeling. If potentially contaminated material adheres to the outer surface of a drum, that material shall be wiped from the drum, and the paper towel or rag used to remove the material shall be segregated with visibly soiled PPE and disposable sampling equipment. All IDW drums shall be labeled and placed on pallets prior to storage (see Section 5.4).

5.3.2 Drum Labeling

Proper labeling of IDW drums is essential to the success and cost-effectiveness of subsequent waste screening and disposal activities. Labels shall be permanent and descriptive to facilitate correlation of field analytical data with the contents of individual IDW drums.

It is essential that all relevant information recorded on individual drum labels be repeated in the field notebook for later development of the drum inventory data base (see Section 5.5 and AMEC SOP, *Logbooks*).

5.4 DRUM STORAGE

Drum storage procedures shall be implemented to minimize potential human contact with the stored IDW and prevent extreme weathering of the stored drums. All IDW drums shall be placed upright on pallets before the drums are stored. RCRA storage requirements include the following: containers shall be in good condition and closed during storage; wastes shall be compatible with containers; storage areas shall have a containment system; and spills or leaks shall be removed as necessary. However, until the IDW is conclusively determined to be an RCRA hazardous waste, the Project Manager shall manage the IDW in a protective manner, and not necessarily in accordance with these listed RCRA storage requirements (EPA 1992). In general, drums of IDW shall be stored within the area of contamination (AOC) so that RCRA land disposal restrictions (LDRs) will not apply in future, if onsite disposal is an option. If the IDW is determined to be RCRA hazardous waste, then RCRA storage, transportation, and disposal requirements may apply including a limited 90-day storage permit exemption period prior to required disposal. The AOC concept does not affect the approach for managing IDW that did not come from the AOC, such as PPE, decontamination equipment and fluids, and ground water. If RCRA hazardous, these wastes must be drummed and disposed of offsite (EPA 1991).

Drums shall be stored onsite within the AOC prior to disposal, except as directed by RCRA requirements for removal when professional judgment suggests the IDW may pose an immediate or permanent public endangerment (EPA 1991). All IDW drums generated during field activities at a single AOC shall be placed together in a secure, fenced area onsite to prevent access to the drums by unauthorized personnel. When a secure area is not available, drums shall be placed in an area of the site with the least volume of human traffic; at a minimum, plastic sheeting (or individual drum covers) and yellow caution tape shall be placed around the stored drums. Drums

from projects involving multiple AOCs shall remain at the respective source areas where the IDW was generated. IDW should not be transferred offsite for storage elsewhere, except under rare circumstances, such as the lack of a secure storage area onsite.

Proper drum storage practices shall be implemented to minimize damage to the drums from weathering and possible exposure to humans of the environment. When possible, drums shall be stored in dry, shaded areas and covered with impervious plastic sheeting or tarpaulin material. Every effort shall be made to protect the preprinted drum labels from direct exposure to sunlight, which causes ink on the labels to fade. In addition, drums shall be stored in areas that are not prone to flooding. The impervious drum covers shall be appropriately secured to prevent dislodging by the wind. It may be possible to obtain impervious plastic covers designed to fit over individual drums; however, the labeling information shall be repeated on the outside of these opaque covers.

Drums in storage shall be placed with sufficient space between rows of drum pallets and shall not be stacked, such that authorized personnel may access all drums for inspection. Proper placement will also render subsequent IDW screening, sampling, and disposal more efficient. It is recommended that IDW drums be segregated in separate rows/areas by matrix (i.e., soil, liquid or PPE/other).

If repeated visits are made to the project site, the IDW drums shall be inspected to clear encroaching vegetation, check the condition and integrity of each drum, check and replace aluminum tags as necessary, and replace or restore the tarpaulin covers.

5.5 DRUM INVENTORY

Accurate preparation of an IDW drum inventory is essential to all subsequent activities associated with IDW drum tracking and disposal. An inventory shall be prepared for each project in which IDW is generated, stored, and disposed of.

6.0 RECORDS

The Project Manager is responsible for completing and updating the site-specific IDW drum inventory spreadsheet and submitting it as needed. After disposal, the actual means and/or location of disposal shall be indicated in tabular format with supporting narrative.

Field Managers and designates are responsible for documenting all IDW-related field activities in the field notebook, including most elements of the IDW drum inventory spreadsheet. The correct methods for developing and maintaining a field notebook are presented in SOP, *Logbooks*.

Upon receipt of analytical data from the investigation, an IDW Disposal Plan shall be prepared that will include the following:

- Criteria for selecting disposal options
- Possible disposal options
- A comparison between analytical data for each drum of IDW and the comparative criteria
- The disposal option selected for each drum of IDW

The IDW Disposal Plan must be approved by the generator, and in some cases, pertinent regulatory agencies. It must also be amended following each phase of field work. IDW disposal plans shall be prepared by the Project Manager and shall be in place prior to initiating field work.

7.0 HEALTH AND SAFETY

A site-specific health and safety plan shall be prepared by the Project Manager or their designee.

8.0 REFERENCES

Department of Transportation (DOT). 1990. Transporting Hazardous Materials (HM-181). December 21.

EPA. 1991. Management of Investigative-Derived Wastes During Site Inspections. U.S. Environmental Protection Agency/540/G-91/009. May.

EPA. 1992. Guide to Management of Investigative-Derived Wastes. Quick Reference Guide. U.S. Environmental Protection Agency: 9345.3-03FS. January.

Ogden, 1995. Disposal Plan for Management of Investigation-Derived Waster, Hawaii.

Ogden, 1994. Generic IDW Screening, Sampling, Analysis, and Disposal Plan.

9.0 ATTACHMENTS

None