SAMPLING AND ANALYSIS PLAN
AND WORK PLAN
FOR
PHASE II ENVIRONMENTAL SITE ASSESSMENT
Former IBCM Lot, Yigo Guam
Route 1, Marine Corps Drive
Yigo, Guam

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Acronyms and Abbreviations

AST	aboveground storage tank
°C	degrees Celsius
CASRN	Chemical Abstracts Service Registry No.
COC	chain-of-custody
DL	detection limit
DOT	Department of Transportation
DQO	data quality objective
DU	decision unit
EA	EA Engineering, Science, and Technology, Inc., PBC
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Site Assessment
Guam EPA	Guam Environmental Protection Agency
IBCM	International Bridge & Construction Marianas, Inc.
ID	identification
ISM	incremental sampling methodology
MDL	method detection limit
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
ml	milliliter
NA	not applicable
NS	not stated
PAH	polycyclic aromatic hydrocarbon
PAL	project action limit
PCB	polychlorinated biphenyl
PPE	personal protection equipment
PQL	project quantitation limit
PQO	project quality objective
PTFE	polytetrafluoroethylene
QA	quality assurance
QC	quality control
QL	quantitation limit

Acronyms and Abbreviations (Continued)

RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
SAP	Sampling and Analysis Plan
SIM	selected ion monitoring
SOP	standard operating procedure
TCLP	Toxicity Characteristic Leaching Procedure
TPESL	Tropical Pacific Environmental Screening Level
TPH	total petroleum hydrocarbons
TPH-DRO	total petroleum hydrocarbons as diesel range organics
TPH-RRO	total petroleum hydrocarbons as residual range organics
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
UST	underground storage tank
VOA	volatile organic analysis

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) presents the sampling approach, rationale, analyses, and field procedures for the Phase II Environmental Site Assessment (ESA) at the Former International Bridge & Construction Marianas, Inc. (IBCM) Lot, Yigo, Guam. The SAP will guide the technical and quality aspects of the field, laboratory, and reporting activities. This Phase II ESA will be conducted by EA Engineering, Science, and Technology, Inc., PBC (EA) on behalf of the Guam Environmental Protection Agency (Guam EPA) Contract Request for Proposal No. 2015-001, dated 13 April 2018.

The project scope of work consists of the following tasks:

- Mobilizing and performing site preparatory activities.
- Collecting soil and product samples including quality control (QC) samples from the subject site to evaluate the nature and extent of potential contamination.
- Analyzing the samples collected for the identified parameters of concern.
- Surveying sample locations and site features at the subject site.
- Performing data validation and assessment on the collected data.
- Preparing a Phase II ESA report detailing field activities, deviations from this SAP if any, and recommendations for additional studies or remedial actions, along with associated rough order of magnitude costs.

1.1 Site Name or Sampling Area

The common name for the overall subject site is the Former International Bridge & Construction Marianas, Inc. Lot ("subject site"). The subject site is located in Yigo, Guam (Figure 1).

1.2 Site Location

The subject site is located off of Route 1, Marine Corps Drive, in the Municipality of Yigo, Guam. The subject site, Lot No. 7054-R9, is a consolidation of Lot Nos. 7054-8 (3.5 acres) and 7054-R8 (8 acres) totaling to approximately 11.5 acres (Figure 2).

1.3 Responsible Agency

Guam EPA is the responsible agency for the Phase II ESA activities. This Phase II ESA includes site characterization, and preparation of a Phase II ESA report that includes recommendations and a rough order of magnitude cost estimate for solid waste removal, if necessary.

1.4 Project Organization

The project organizational chart (Figure 3) presents the list of project personnel and their responsibilities related to the implementation of field activities described in this SAP.

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2.0 BACKGROUND INFORMATION

The following section presents background information including a site description, operational history, summary of the findings of the previous investigation, physical setting, and the potential source(s) of contamination at the subject site.

2.1 Site Area Description

The subject site is an irregularly shaped parcel that was used as an equipment laydown yard for IBCM until July 2017. The subject site is bounded by Route 1 Marine Corps Drive to the west, a roadway and Hills Market to the south, the Guam Power Authority substation to the north and undeveloped vegetated land to the east (Figure 2). The site is accessed by the roadway south of the subject site.

2.2 Operational History

The subject site was used as an equipment lay down yard for IBCM until July 2017. Prior to development of the current improvements, the subject site was used as a debris collection station following Super Typhoon Pongsona in December 2002. Prior to its use as a debris collection station, the subject site was unused. A tire pile that accumulated during this time as a transition site following Super Typhoon Pongsona in December 2002 is the primary focus and concern of this ESA, as it may impact underlying soil quality and increase risk of tire fires and vector habitat. Located east of the subject site is proposed as the future Guam Police Department Northern Precinct and Forensic Laboratory.

2.3 Previous Investigations

A Phase I ESA was conducted during the period of 19 November 2010 through 09 January 2012. A second Phase I ESA was conducted during the period from June through August 2018. The Phase I ESAs included a combination of historical research activities, interviews, site observations, and database records searches that were used to develop an understanding of the history and current environmental condition of the subject site (EA, 2012 and EA, 2018a).

EA conducted a Phase I ESA of the subject site between 19 November 2010 thru 09 January 2012. The following recognized environmental conditions (RECs) were identified (EA, 2012):

- The subject site was used as a transfer station for the storage of tires and debris accumulated from Super Typhoon Pongsona in December 2002. The nature of the debris is unknown and may have impacted the soil surface areas.
- IBCM was responsible for addressing the following observed RECs:
    - An asphalt drum storage area containing 224 fifty-five-gallon drums that are stored without secondary containment.
    - An unlabeled fifty-five-gallon drums stored onsite without secondary containment.

- Tires located in large piles within shipping containers.
- Construction equipment and vehicles in various stages of decay stored onsite.
- Petroleum products and regulated materials stored in deteriorating shipping containers onsite.

When IBCM moved out on July 2017, most RECs were removed; however, both the tire pile still remain on the subject site, as does the solid waste located on the Eastern perimeter of the subject site.

A second Phase I ESA was conducted from June through August 2018. The following RECs were identified (EA, 2018a):

- The subject site was used as a transfer station for the storage of tires and debris accumulated from Super Typhoon Pongsona in December 2002. The nature of the debris is unknown and may have impacted the soil surface areas.
- One Fibreglass Reinforced Plastic tank; possible underground storage tank (UST) or aboveground storage tank (AST) was observed on the subject site. It is unknown if this UST/AST contained hazardous materials or waste that may have been released onto the subject site.
- A large tire pile and debris remain on-site and are located on the southern portion of the subject site.

2.4 Physical Setting

Guam consists of two geologically distinct areas. Northern Guam is comprised of undulating limestone plateau and southern Guam is volcanic highland with some limestone outlier. The subject site is located in northern Guam.

Review of the United States Department of Agriculture (USDA) Soil Survey of Guam, dated 1988, indicates that the subject site is underlain by soils of the Guam cobbly clay loam characterized by 3 to 7 percent slopes. The Guam cobbly clay loam is very shallow, well-drained soil on limestone plateaus. It is formed in sediment overlying porous coralline limestone (USDA, 1998).

The elevation of the subject site is approximately 500 feet above mean sea level (United States Geological Survey, 1984). There are no surface water features on or near the subject site. Northern Guam has a permeable limestone that supports a groundwater aquifer. Groundwater is relatively deep between 360 and 370 feet below ground surface. The groundwater flows in a general easterly direction.

2.5 Environmental and/or Human Impact

The RECs defined in the Phase I ESAs and described above in Section 2.3 have potential impact to not only the environment, but also to site workers and occasional users/trespassers at the subject site.

Groundwater is not considered a completed pathway for potential contaminants as the depth to water is relatively deep (approximately 500 feet below ground surface).

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3.0 PROJECT DATA QUALITY OBJECTIVES

An integral part of the SAP is the formulation of the project quality objectives (PQOs). The PQOs incorporate the elements of the United States Environmental Protection Agency (USEPA) data quality objective (DQO) process, which in turn consists of a series of seven planning steps that are designated to ensure the type, quantity, and quality of the environmental data used in the decision making are appropriate for their intended application. The DQO process is outlined in the guidance document entitled "Guidance on Systematic Planning Using the Data Quality Objectives Process" (USEPA, 2006).

The PQOs for this site are defined by covering the following elements: (1) who will use the data, (2) what are the project action limits, (3) what will the data be used for, (4) what type and matrix of data are needed, (5) how "good" the data need to be in order to support the environmental decision, (6) how much data are needed, (7) where, when, and how should the data be collected/generated, (8) who will collect and generate the data, (9) how will the data be reported, and (10) how will the data be archived.

This section documents the seven-step DQO process used to develop the PQOs in this SAP as well as the data quality indicators.

3.1 State the Problem

Based upon the recommendations and RECs identified in the Phase I ESA (EA, 2018a), contamination may be present in surface soil at the subject site. Chemical data will be collected to confirm the presence or absence of contamination, and if the project-generated wastes are suitable for the planned disposal options.

3.2 Identify the Decision

The following section identifies how environmental data will be used to meet project objectives and to solve the problem.

3.2.1 Principal Study Questions and Alternative Actions

The PQO goal is to evaluate if the Tropical Pacific Environmental Screening Levels (TPESLs) have been exceeded at the subject site. The following principal study questions and alternative action have been identified.

- If the concentrations of contaminants of potential concern for soil, including total petroleum hydrocarbons-diesel range organics (TPH-DRO), total petroleum hydrocarbons-residual range organics (TPH-RRO), polycyclic aromatic hydrocarbons (PAHs), and metals in soil samples are below the current TPESLs (Fall 2017), then no further action will be recommended. If contaminant concentrations are at or above the TPESLs, then further action will be recommended.

- If the concentrations of metals in a soil sample for a specific decision unit (DU) are equal to or exceed the TPESLs, then the remaining soil sample that was already collected and sent to the laboratory for that DU, a waste characterization of that soil sample will be analyzed. The laboratory will analysis the soil sample for Toxicity Characteristic Leaching Procedure (TCLP) parameters. If the TCLP results are below the site-specific action levels, then the waste may be disposed of as nonhazardous.

- If contaminant concentrations are at or above the site-specific action levels, then alternative disposal options will be identified for the waste (i.e., off-island disposal, etc.).

3.2.2 Decision Statement

Decision Statement #1: Determine if contaminants of concern in soil at the subject site due to historical activities are equal to or exceed TPESLs and therefore pose a hazard to human health or the environment, or if the concentrations of TPH-DRO, TPH-RRO, PAHs, and metals are below the TPESLs and a recommendation of proceeding with no further action is warranted.

Decision Statement #2: Determine if there is product within the UST/AST, and if so, how it may be disposed of during potential future remedial actions is nonhazardous by testing for ignitability, TPH fuel fingerprint, polychlorinated biphenyls (PCBs) as Aroclors, and metals.

3.3 Identify Inputs and Sources to the Decision

This section identifies data and information necessary to answer the study questions.

3.3.1 Action Levels

The laboratory results from the soil samples collected will be compared to Fall 2017 TPESLs for both unrestricted land use (residential) and commercial land use direct contact exposure scenarios to determine whether impacts exist at concentrations at or above levels found to be protective of human health and the environment. These screening levels were selected based upon consideration of the potentially complete exposure pathways.

The site-specific action levels for the parameters used to characterize the project-generated wastes (total and TCLP parameters and waste characteristics) are based upon the requirements of the receiving disposal facility and 40 Code of Federal Regulations Part 261.24 for soil and Part 279.11 for used oil specifications.

Tables 1 and 2 summarize the testing parameters along with the appropriate analytical methods, screening limits, and laboratory detection limits.

Table 1. Contaminants of Potential Concern Analytical Reference Limits and Evaluation

Analyte	CASRN	PAL[(a)]		Laboratory Detection Limits	
		Residential	Commercial/ Industrial	MDL	QL
Total Petroleum Hydrocarbons by SW8015B (milligrams per kilogram [mg/kg])					
Diesel Range Organics (C_{10}-C_{28})	NS	220	500	TBD	TBD
Residual Range Organics (C_{28}-C_{40})	NS	500	2,500	TBD	TBD
Polycyclic Aromatic Hydrocarbons by SW8270C SIM (mg/kg)					
Acenaphthene	83-32-9	40	40	TBD	TBD
Acenaphthylene	208-96-8	5.5	5.5	TBD	TBD
Anthracene	120-12-7	1.4	1.4	TBD	TBD
Benzo(a)anthracene	56-55-3	3.3	3.3	TBD	TBD
Benzo(a)pyrene	50-32-8	3.6	5.9	TBD	TBD
Benzo(b)fluoranthene	205-99-2	11	21	TBD	TBD
Benzo(g,h,i)perylene	191-24-2	35	35	TBD	TBD
Benzo(k)fluoranthene	207-08-9	39	39	TBD	TBD
Chrysene	218-01-9	30	30	TBD	TBD
Dibenzo(a,h)anthracene	53-70-3	1.1	9.6	TBD	TBD
Fluoranthene	206-44-0	29	29	TBD	TBD
Fluorene	86-73-7	31	31	TBD	TBD
Indeno(1,2,3-cd)pyrene	193-39-5	11	31	TBD	TBD
1-Methylnaphthalene	90-12-0	0.89	0.89	TBD	TBD
2-Methylnaphthalene	91-57-6	1.9	1.9	TBD	TBD
Naphthalene	91-20-3	3.1	3.1	TBD	TBD
Phenanthrene	85-01-8	23	23	TBD	TBD
Pyrene	129-00-0	41	41	TBD	TBD
Polychlorinated Biphenyls as Aroclors by SW8082 (mg/kg) for Product Sampling					
Aroclor 1016	12674-11-2	NA	NA	TBD	TBD
Aroclor 1221	11104-28-2	NA	NA	TBD	TBD
Aroclor 1232	11141-16-5	NA	NA	TBD	TBD
Aroclor 1242	53469-21-9	NA	NA	TBD	TBD
Aroclor 1248	12672-79-6	NA	NA	TBD	TBD
Aroclor 1254	11097-69-1	NA	NA	TBD	TBD
Aroclor 1260	11096-82-5	NA	NA	TBD	TBD
Total PCBs	1336-36-3	1.2	9.7	TBD	TBD
Metals by SW6010B/6020/7471A (mg/kg)					
Arsenic	7440-38-2	24	95	TBD	TBD
Barium	7440-39-3	1,000	2,5000	TBD	TBD
Cadmium	7440-43-9	14	74	TBD	TBD
Chromium	7440-47-3	1,100	1,100	TBD	TBD
Lead	7439-92-1	200	800	TBD	TBD
Mercury	7439-97-6	4.7	70	TBD	TBD
Selenium	7782-49-2	78	1,200	TBD	TBD
Silver	7440-22-4	78	1,200	TBD	TBD

Analyte	CASRN	PAL[(a)]		Laboratory Detection Limits	
		Residential	Commercial/ Industrial	MDL	QL

CASRN = Chemical Abstracts Service Registry No. MDL = method detection limit QL = quantitation limit

NS = not stated
NA = not applicable
Notes:
(a) Project Action Limits (PALs) refer to Tropical Pacific Environmental Screening Levels (TPESLs) for direct contact exposure to soils for residential and commercial/industrial land use (Fall 2017) for shallow soil (≤3 m below ground surface) and groundwater is a current or potential source of drinking water (Table A).
(b) Analytes shown in bold and highlight have a PAL lower than or equal to the MDL and/or QL.

Table 2. Waste Characterization Analytical Reference Limits and Evaluation

Analyte	CAS Registry Number	Regulatory Levels*	Laboratory Detection Limits	
			MDL	QL
TCLP Metals by SW1311/6010C/7470A (mg/L)				
Arsenic	7440-38-2	5.0	TBD	TBD
Barium	7440-39-3	100	TBD	TBD
Cadmium	7440-43-9	1.0	TBD	TBD
Chromium	7440-47-3	5.0	TBD	TBD
Lead	7439-92-1	5.0	TBD	TBD
Mercury	7439-97-6	0.20	TBD	TBD
Selenium	7782-49-2	1.0	TBD	TBD
Silver	7440-22-4	5.0	TBD	TBD
Characteristics				
TPH Fuel Fingerprint	NS	NS	NA	NA
Ignitability (flashpoint)	NS	<140	NA	NA

* Regulatory levels for the Toxicity Characteristic (40 Code of Federal Regulations Part 261.24).

CAS = Chemical Abstracts Service MDL = method detection limit NS = not stated

QL = quantitation limit NA = not applicable

3.3.2 Data Collection

The strategies for collecting data are presented in detail in Section 4.0. The following samples are planned:

- Incremental sampling methodology (ISM) surface (0-6 inches) soil samples will be collected at the subject site. The ISM sample method provides a reliable estimate of the average concentration of analytes across a DU. By collecting increment samples using a systematic-random approach, distributional heterogeneity within the DU is reduced. The ISM sample better represents chemical characteristics of the DU. The subject site will be divided into six DUs (Figure 4). One ISM surface soil sample will be collected at each DU. In addition a duplicate and triplicate sample will be collected at one of the DUs to ensure that the initial sample approach is representative of site conditions. Each ISM surface soil samples will be collected using a dedicated EasyDraw Syringe®. The ISM surface soil samples will be analyzed for TPH-DRO and TPH-RRO (USEPA Method SW8015B), PAHs (USEPA Method SW8270C using selected ion monitoring [SIM] mode), and metals (USEPA Methods SW6010B/6020/7471A).

  If concentrations of metals in a soil sample exceed the TPESLs then the remaining soil sample that was already collected and sent to the laboratory for that DU will be used to perform further testing of waste characterization. That soil will be analyzed for TCLP metals and ignitability.

- A petroleum product sample will be collected from the UST/AST, if present, and analyzed for ignitability, TPH-fuel fingerprint, PCBs (USEPA Method SW8082), and metals (arsenic, cadmium, chromium, and lead).

3.3.3 Data Users

The data users will include the regulatory authorities Guam EPA and USEPA Region 9, and the project stakeholders, which also include the nearby residents and users of the area.

3.4 Define the Study Boundaries

The study area boundaries and environmental media that require data acquisition to support project decisions are defined below.

The vertical boundary of the study area for soil sampling is bedrock. No temporal boundary exists since the concentrations of contaminants are not likely to change over the project duration. The horizontal boundary of the subject site is shown in Figures 2 and 4. Various environmental media at the subject site will be sampled and analyzed, including surface soil and petroleum product.

3.5 Develop a Decision Rule (If/Then Statements)

Rules defining the conditions that would cause the decision maker to choose among alternative response actions are stated below.

- If contaminant concentrations in the soil samples are below the TPESLs, then the extent of contamination has been identified. If the contaminant concentrations are at or above the TPESLs, then further investigation may be recommended.
- If the contaminant concentrations in waste characterization samples [soil (samples already collected and initially held by the laboratory) and product in unknown UST/AST] are below the site-specific action levels, then the waste may be disposed of as nonhazardous. If contaminant concentrations are at or above the site-specific action levels, then alternative disposal options will be found for the waste (i.e., off-island disposal, etc.).

3.6 Specify Limits on Decision Error (Performance or Acceptance Criteria)

This section evaluates the consequences of making incorrect decisions and considerations and/or actions taken to mitigate decision error.

3.6.1 Decision Error and Potential Consequences

The acceptable limits for false positive or false negative decision errors will be based on evaluating the potential consequences of these decision errors (such as risks to human health and the environment or unnecessary expenditures for additional sampling) if specific contaminants are detected or are not detected above action levels.

Two potential decision errors could be made based upon interpreting the results of sampling and analytical data:

1. Concluding that concentration of a specific chemical at a sample location within an area is below the action level when it truly is at or above the action level.
2. Concluding that concentration of a specific chemical at a sample location within an area is greater than or equal to the action level when it truly is below the action level.

The consequences of the first error could result in unacceptable risk to human health or the environment because contaminants would be left onsite at concentrations at or above the action levels. The consequences of the second error would result in unnecessary expenditure, and diversion of resources that could be used for cleanup of other contaminated areas.

The consequences of the first error are deemed more serious because of the potential risk. The baseline condition, therefore, is established such that the contaminant concentration is truly greater than or equal to the action level. The baseline condition is defined as the null hypothesis (H_0). The alternative is defined as the alternative hypothesis (H_a). This may be summarized as follows:

H_0: [concentration] $\geq$ action level

H_a: [concentration] $<$ action level

A false positive error, also known as a Type I error, occurs when the null hypothesis is falsely rejected (*i.e.*, the sample data shows that the concentration of a chemical is below the action level when it actually is at or exceeds the action level). The measurement of the size of this error is

called alpha (α), the level of significance. Alpha is expressed numerically as a probability or the tolerance for uncertainty.

A false negative error, also known as a Type II error, occurs when the null hypothesis is falsely accepted (*i.e.*, the sample data shows that the concentration of the chemical is at or above the action level when it actually is below the action level). The measurement of the size of this error is called beta (β), or the complement of the power of the hypothesis test.

The tolerance limits for decision error have been established at α=5% or 0.05 for false positives and β=20% or 0.2 for false negatives.

The analytical data and sampling design performance will be statistically evaluated based on the detected contaminant concentrations at the subject site.

3.6.2 Sources of Error

Total study error potential is equally attributable to sampling and measurement error because of the steps and sample volume associated with the planned sample collection and analysis. Successfully managing the magnitude of total study error is the result of understanding the error sources, generating an appropriate sampling design, and choosing accurate measurement techniques. The approach used to manage study error for the planned sampling and analysis is discussed below.

- *ISM Soil Samples and Product Samples*-the source of decision error for these results are equally attributable to sampling or measurement error. This conclusion is based upon review of the sampling and analysis strategy. The sampling design uses the ISM sampling approach for soil. Analysis will be performed using the services of a National Environmental Laboratory Accreditation Program accredited laboratory with standard USEPA SW-846 methods.

The quality of sampling and analysis has to be at a level that results in representative, precise, and reproducible data. The data generated will be sufficient for the intended use. "Good" data will be defined as data that are produced following the specified standard operating procedures (SOPs) and meeting the established criteria in this SAP, including precision, accuracy, comparability, representativeness, completeness, and sensitivity.

The analytical data that are not qualified or qualified but not rejected (R-flagged data) are deemed acceptable for project use. The project data will be assessed by the Project Chemist.

3.7 Optimize the Design for Obtaining Data and Conclusions

ISM sampling will be used for the soil samples collected at the subject site. This method is well suited to confirm if the RECs identified in the Phase I ESA are present at the subject site.

The ISM sampling approach is for sites that require representative results in clearly specified DUs and is beneficial for data reproducibility and as an initial screening tool; these descriptors apply to

the project presented in this SAP. Further details on the ISM sampling approach are presented in Section 4.0.

The data will be presented in a Phase II ESA Report. The report will include a detailed narrative of each field activity and a summary of the sampling and analyses conducted. Site drawings, figures, survey coordinates, photographs documenting field activities, and disposal documentation for wastes that may be generated during the field investigation will be included as attachments to the report. The analytical data will be reported in summary tables to facilitate data analysis. The Phase II ESA Report will be comprehensive in nature and no additional sources of information will be necessary to capture the full extent of the field operations and data collected.

The electronic data deliverables and the laboratory data reports will be collected in project archives in existing electronic formats provided by the analytical laboratory. These will include the executable files delivered by the laboratory.

3.8 Summary of Data Quality Indicators

Precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity are the data quality indicators used to assess the data produced during the project. Each data quality indicator is described below, including a definition of the terminology and the referenced process for calculating the indicator.

3.8.1 Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance, percent difference, or range, in either absolute or relative terms. The quality control (QC) measures for precision include field duplicates, laboratory duplicates, matrix spike, matrix spike duplicates, analytical replicates, and surrogates. The laboratory will perform matrix spike and matrix spike duplicate analysis at a rate of 1 set per 20 discrete surface soil samples.

Precision may be the result of one or more of the following: field instrument variation, analytical measurement variation, poor sampling technique, sample transport problems, or spatial variation (heterogeneous sample matrices). The field sampling design rationale and sampling techniques will be evaluated, and both field and analytical duplicate/replicate sample results will be reviewed to identify the cause of imprecision. The laboratory may be the source of error if poor precision is indicated in both the field and analytical duplicates/replicates. However, the sampling technique, field instrument variation, sample transport, and/or spatial variability may be the source of error if poor precision is limited to the field duplicate results.

3.8.2 Accuracy/Bias

Accuracy is the degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) that are

due to sampling and analytical operations. Examples of QC measures for accuracy include matrix spikes, laboratory control samples, and equipment blanks (if non-dedicated sampling equipment is used).

3.8.3 Representativeness

Representativeness is the measure of the degree to which data accurately and precisely represent a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition. Replicates will be collected for the ISM soil samples to verify the representativeness of the data collected. Additional scoping meetings and subsequent resampling may be needed in order to collect data that are more representative of a non-homogeneous site if field replicates precision checks indicate potential unacceptable spatial variability.

3.8.4 Comparability

Comparability is the degree to which different methods, data sets, and decisions agree or can be represented as similar. Comparability describes the confidence (expressed qualitatively or quantitatively) that two data sets can contribute to a common analysis and interpolation. The samples will be collected using SOPs and the analysis of samples will be performed using USEPA standardized methodology to meet the needs of the data users.

3.8.5 Sensitivity and Quantitation Limits

Sensitivity is the capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include laboratory fortified blanks, method detection limit (MDL) studies, and low-level calibration standards.

The laboratory will establish a detection limit (DL), typically the MDL, using a scientifically valid and documented procedure. The MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The DL is the laboratory's "best case" sensitivity for a given analytical method. The laboratory may establish MDLs for each method, matrix, and analyte for each instrument the laboratory plans to use for the project using the statistical method presented in the 40 Code of Federal Regulations Part 136, and will be added as an attachment at a later time.

3.8.6 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal circumstances. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. Completeness measures the effectiveness in sample collection, analysis, and result reporting of the entire investigation, and is calculated on a per-analyte basis by the following equation:

$$\%Completeness = \frac{Number\ of\ valid\ results}{Number\ of\ possible\ results} \times 100$$

The numerator of this calculation becomes the number of possible results minus the number of possible results not reported for any instances of samples that could not be analyzed for any reason (holding time violations in which re-sampling and analysis were not possible, samples spilled or broken, etc.).

A completeness check will be done on the data generated by the laboratory. For this project, 90 percent of usable sample data is considered the minimal acceptance criteria for completeness; the goal is to achieve 100 percent completeness.

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4.0 SAMPLING RATIONALE

Solid waste observed on the subject site included tires and other debris located in the southern portion were identified as RECs. In addition, an unknown UST/AST was identified at the subject site. A discrete sample of product in the UST/AST, if present, will be collected.

The number of samples to be collected at the subject site are summarized in Table 3 and discussed further below.

Table 3. Sample Summary

Parameter	Analytical Method	Sample Type	Field Samples(1)	Field Replicates
Surface ISM Soil Samples (DU1 through DU6)				
TPH-DRO and -RRO	SW8015B	ISM	6	2
PAHs	SW8270C SIM	ISM	6	2
Metals	SW6010B/6020/7471A	ISM	6	2
Waste Characterization				
TCLP Metals	SW1311/6010B/7470A	ISM	6	2
Petroleum Product Sample				
Ignitability	SW1010A	Grab	1	0
PCBs as Aroclors	SW8082	Grab	1	0
TPH fuel fingerprint	SW8015B	Grab	1	0
Metals (arsenic, cadmium, chromium, and lead)	SW6010B	Grab	1	0

Notes:
NA—not applicable
SIM—selected ion monitoring
(1) Applies to samples collected using dedicated sampling equipment.

4.1 Incremental Sampling Methodology

ISM surface soil samples will be collected in each DU to assess if a potential impact to soil had occurred related to the subject site. Each DU will be divided into a 30 grid sub-sample location, and one increment of the sample will be collected from each of these locations. One ISM surface soil sample will be collected from each DU. In addition, a duplicate and triplicate sample will be collected at one of the DUs to ensure that the initial sample approach is representative of site conditions. The locations of the samples will be surveyed after the samples are collected as described in Section 6.5. Approximate locations of the proposed soil sample locations are shown in Figure 4.

The ISM surface soil samples will be analyzed for the following:

- TPH-DRO and -RRO
- PAHs
- RCRA metals

- TCLP metals (if soil sample results exceed TPESLs)

4.2 Petroleum Product Samples

One petroleum product sample is proposed for the subject site. The petroleum product sample will be collected from the one unknown UST/AST and analyzed to determine waste characteristics for disposal options.

The waste characteristic petroleum product sample will be analyzed for the following:

- Ignitability
- PCBs
- Metals (arsenic, cadmium, chromium, lead)
- TPH fuel fingerprint.

5.0 REQUEST FOR ANALYSES

The following section describes the preparation and analysis that will be performed on the samples to be collected at the subject site.

The laboratory quality assurance (QA)/QC criteria have been reviewed and meet the project requirements. The laboratory QA Manual and SOPs for the analytical tests scoped within this project will be added into this SAP at a later time.

5.1 Laboratory ISM Sampling Procedures

The ISM samples will be properly containerized and submitted to TestAmerica located in Irvine, California under standard chain-of-custody (COC) procedures for processing prior to analysis.

Each ISM sample will be air dried then sieved to less than two millimeters particle size. Sub-sampling may be accomplished with a sectorial splitter (also called a rotary riffle splitter), or a representative subsample may be hand collected by taking approximately 30 small increments from systematic random locations from the dried and sieved sample spread out in a thin layer. Sub-sampling is used to provide a representative laboratory subsample (and any laboratory replicates) for a single ISM sample, and to provide representative sub-samples for multiple analyses. The mass of sample needed for the subject analytical test or tests is used to determine the parameters for splitting the sample with the sectorial splitter, or in selecting the mass of each increment if hand collecting the sub-sample. It is critical that the entire mass of dried and sieved sample is used in the sub-sampling process.

The laboratory will verify that the maximum sub-sample mass for preparation and analysis of soil samples is used to reduce inherent sources of fundamental error. For analyses of fine particulates (e.g., <250 micrometers), a one-gram sub-sample may be adequate to reduce fundamental error below 15 percent; however, if a larger mass may be reliably run by the method (e.g., 2 to 10 grams), a larger mass will be used to help reduce potential error.

5.2 Grab Sampling Procedure

A liquid grab sample (petroleum product) will be collected in the field from the UST/AST, properly containerized and shipped to TestAmerica located in Irvine, California for analysis under standard COC procedures.

5.3 Analytical Methods

The analytical methods to be performed for the planned samples are presented in Section 4.0.

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6.0 FIELD METHODS AND PROCEDURES

The following section describes the methods and procedures to be used during the Phase II ESA field investigation.

6.1 Standard Operating Procedures

The SOPs to be used in support of this project are presented in Appendix A of this SAP and are listed below:

- EA SOP No. 001 - Sample Labels
- EA SOP No. 002 - Chain-of-Custody Form
- EA SOP No. 004 - Sample Packing and Shipping
- EA SOP No. 057 - Multi-Incremental Sampling (known as ISM Sampling).

6.2 Field Activities

6.3 Soil Samples - Incremental Sampling Methodology

ISM surface soil samples will be prepared by collecting a minimum of 30 small increments of soil from the specified DU using a dedicated EasyDraw Syringe® for each DU and combining these increments into a single sample, referred to as the ISM sample. Individual soil increments will weigh approximately 30 grams, with the field ISM sample weighing 900 grams and providing mass sufficient to minimize fundamental error for sample collection after sieving soil samples to the target particle size. Note that sieving of soil samples to the less than 2-millimeter particle size, will be performed in the laboratory during the sample preparation process by TestAmerica.

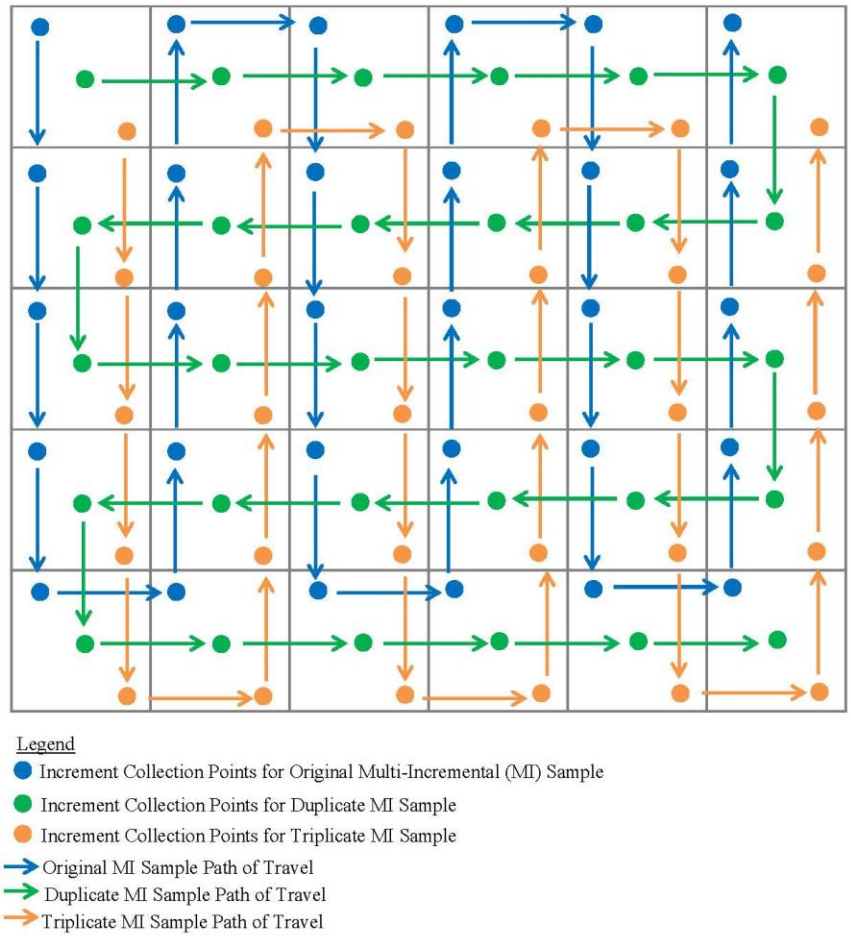
To collect the ISM sample, a systematic-random sample collection scheme will be utilized. Each DU will be divided into 30 equally sized cells (Figure 5). The ends of each row and column will be marked with flags to help establish approximate lines for the collection of increments. Thirty individual increment samples will then be collected by collecting one ISM sample at the start of each rows and columns, if feasible. The exact distance does not need to be individually measured.

Replicates (one duplicate and one triplicate) ISM surface soil samples will be collected at a randomly selected DU. The duplicate and triplicate ISM surface soil samples from the same DU will be collected following a different path, as shown in Figure 5.

Individual incremental samples will be collected by using a dedicated EasyDraw Syringe® to collect a 30-gram increment that will then be transferred into a sample container consisting of wide mouth glass 1-liter jar or a plastic bag to produce the ISM sample. Soil samples will not include rocks, pebbles, or other non-soil material. It is not necessary to decontaminate the sampling tool between the increments within a DU.

Sample containers will be closed as soon as they are filled, placed on ice and chilled to 6 degrees Celsius (ºC), and processed for shipment to the laboratory. The laboratory will homogenize the sample from the plastic bag for analysis.

Figure 5. ISM Sampling in a Decision Unit



6.4 Petroleum Product Samples

A petroleum product sample will be collected from the one unknown UST/AST at the tanks access port. If product is found in the UST/AST, a liquid grab sample will be collected from a dedicated sampling bailer and placed in a wide-mouth glass jar with Teflon™-lined lid. Sample containers will be closed as soon as they are filled, placed on ice and chilled to 6 degrees ºC, and processed for shipment to the laboratory.

6.5 Equipment Decontamination

Dedicated/disposable equipment will be utilized for the sampling activities. Dedicated/disposable equipment intended for one-time use will not be decontaminated and will be packaged for

appropriate disposal. Because dedicated equipment will be used during field sampling activities, it is anticipated that no rinsate water will be generated and no equipment blank will be collected.

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7.0 SAMPLE CONTAINERS, PRESERVATION, AND STORAGE

The recommended sample container type and volume, initial preservative, and holding times for the analytes that will be tested are shown in Table 4. The sample containers will be obtained from the analytical laboratory in pre-cleaned condition.

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Table 4. Soil Sample Storage and Preservation Requirements

Parameter	Analysis Method(s)	Holding Time	Container(s)	Storage Requirements
Soil Samples				
TPH-RRO/TPH-DRO	SW8015B	14 days until extraction, 40 days to analyze extract	(1) 1-gallon size bulk resealable bag (i.e., Ziplock™ bag)	≤6°C
PAHs	SW8270C SIM	14 days until extraction, 40 days to analyze extract	(1) 1-gallon size bulk resealable bag (i.e., Ziplock™ bag)	≤6°C
PCBs as Aroclors	SW8082	14 days until extraction, 40 days to analyze extract	(1) 4-ounce wide-mouth glass jar with Teflon™-lined lid	≤6°C
RCRA Metals	SW6010B/6020/7471A	180 days until analysis for metals with the exception of mercury (28 days)	(1) 1-gallon size bulk resealable bag (i.e., Ziplock™ bag)	≤6°C
TCLP Metals	SW1311/6010B/7470A	180 days until TCLP preparation for metals with the exception of mercury (28 days) 180 days to analyze TCLP leachate for metals with the exception of mercury (28 days)	(1) 1-gallon size bulk resealable bag (i.e., Ziplock™ bag)	≤6°C
TPH Fuel Fingerprint	SW8015B	14 days until extraction, 40 days to analyze extract	(1) 4-ounce wide-mouth glass jar with Teflon™-lined lid	≤6°C
Ignitability	SW1010A	none	(1) 4-ounce wide-mouth glass jar with Teflon™-lined lid	≤6°C

Notes:
°C = degrees Celsius

8.0 DISPOSAL OF RESIDUAL MATERIALS

The investigation-derived wastes generated during the proposed investigations may include:

- Used personal protection equipment (PPE)
- Dedicated sampling equipment

Used PPE and dedicated sampling equipment will be placed in a trash bag and disposed of offsite in a municipal refuse dumpster. These wastes are not considered hazardous and shall be sent to the municipal landfill.

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9.0 SAMPLE DOCUMENTATION AND SHIPMENT

9.1 Field Notes

This section discusses required recordkeeping in the field, which will consist of the use of field logbook, photographs, and pre-printed forms.

9.1.1 Field Logbooks

The information recorded in field logbooks will document sample locations, sampling dates, sampling procedures, and names of field personnel responsible for conducting the sampling activities. Logbook entries will also include descriptions of the field activities. Logbooks will be bound with consecutively numbered pages. Each page will be dated, and the time of entry will be noted in military time. The entries will be legible, written in black ink, and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions. At a minimum, the following information will be recorded, as appropriate, during sampling activities:

- Time of arrival/entry on site and time of departure
- Other personnel on site
- A brief summary of meetings or discussions with any potentially responsible parties, or representatives of any federal, state, or other regulatory agency
- Deviations from sampling plans, safety plans, and QA procedures
- Records of photographs
- Sample location and description
- Site sketch showing sample location and measured distances
- Sampler's name
- Date and time of sample collection
- Designation of sample
- Type of sample (matrix)
- Field observations and details important for laboratory analysis or integrity of samples (e.g., sediment grain size, rain, odors, etc.)

If a correction needs to be made to a field logbook, draw a single line crossing-out the error and place an initial of the person making the change.

9.1.2 Photographs

Photographs will be taken at representative sample locations and at other areas of interest on subject site. A photograph log will be maintained in the field logbook.

9.2 Sample Custody and Documentation

Sampling information will be recorded on a COC record and in a permanently bound field logbook. The entries will be legible and recorded in indelible black ink. The requirements presented in EA SOP No. 002 (2018b) (Appendix A) will be followed for completing the COC record.

9.3 Sample Identification

EA SOP No. 001 (2018b) (Appendix A) will be followed for sample labeling. A sample identification (ID) system has been developed to provide uniform classification and to assist project personnel to interpret data reports and field notes. Sample identification numbers will be affixed to each sample container and entered on the COC record. The sample number will uniquely identify the sample to a specified location.

Soil Description Sample

For example: IBC-S001

- The first three characters (IBC) represent the site name (International Bridge & Construction Marianas, Inc.).
- The next character (S) represent a soil medium
- The next three digits (**001**) represent the sequential sample number.

Product Description Sample

For example: IBC-P001

- The first three characters (IBC) represent the site name (International Bridge & Construction Marianas, Inc.).
- The next character (P) represent a petroleum product medium
- The next three digits (**001**) represent the sequential sample number.

For samples requiring multiple containers, a single sample number will apply to every container for that sample. The sample number, along with the date and time of sample collection, and the type of sample collected will be recorded in the field logbook, on the sample log sheet, and on the sample label affixed to every container and entered on the COC record.

9.4 Sample Packaging and Shipping

The laboratory will supply sample containers and appropriate preservation additives, if needed. On-site personnel will be responsible for ensuring that adequate sample containers are available for the work scheduled at the sample collection points. The sample containers will be bubble-wrapped, taped for shipping, and placed in coolers with ice and chilled to $\leq$6°C (not frozen) for transport to the laboratory after the appropriate labeling and COC records are completed. The procedures to be

followed for sample packaging and shipping are presented in EA SOP No. 004 (2018b) (Appendix A).

Environmental samples from this project will be packaged and shipped in a manner that will ensure the safety and accountability of each sample, and all procedures will be in accordance with applicable federal and local requirements (i.e., USDA permit requirements for shipping soil samples). The persons packing and shipping environmental samples will review and be aware of state, federal, Department of Transportation (DOT), and International Air Transport Association regulations governing environmental and hazardous sample packaging. The person(s) shipping the samples is responsible for being in compliance with applicable packaging, labeling, and shipping requirements.

9.5 Chain of Custody

COC documentation is required for each sample to track collection, shipments, laboratory receipt, custody, and disposal. The COC record is preprinted with appropriate space for the applicable data to be entered.

Each individual who has the samples in their possession will sign the COC record. A sample is considered to be in custody under the following conditions:

- It is in actual possession or in view of the person who collected the sample
- It is locked in a secure area
- It is placed in an area restricted to authorized personnel.

Each sample will be assigned a unique sample ID number, which will be entered on the COC record. Samples to be transported to an off-site laboratory by a courier service will have the courier name and/or airbill number noted on the COC record. As a final step, custody seals are attached to the front and back of the lid of the shipping container. The samples in the cooler are checked against the COC record by laboratory personnel upon arrival at the laboratory. The samples in question will be segregated and field personnel will be immediately notified if discrepancies are noted. The person accepting the delivery will sign and date the COC record.

9.6 Sample Shipment

The samples will be transported or shipped to the analytical laboratory in insulated containers within the appropriate holding time and will be accompanied by a COC record that identifies the sample bottles, date and time of sample collection, and analyses requested. Shipped samples will be packaged and shipped in accordance with DOT standards. The original COC record will be given to the lab with the samples and a copy will be retained in project records. Once received by the laboratory, a sample receipt and storage record will be generated.

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10.0 QUALITY CONTROL

This section details the QC samples that are to be collected to support the sampling activities. Field QA/QC is intended to provide an assessment of possible field contamination and assessment of field variability. The latter may include variability in sampling techniques and instrument variability.

10.1 Temperature Blanks

For each cooler that is shipped or transported to an analytical laboratory, a container filled with water will be included that is marked "temperature blank." This blank will be used by the laboratory to check the temperature of samples upon receipt.

10.2 Field Replicates

Field replicates will be taken for ISM sampling efforts. ISM field replicate samples will be collected at a one randomly selected DU location of the six DUs (DU1, DU2, DU3, DU4, DU5, and DU6).

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11.0 FIELD VARIANCES

As conditions in the field may vary, it may become necessary to implement minor modifications to sampling as presented in this plan. For example, a petroleum product sample will not be collected if there is no liquid present in the UST/AST. When appropriate, the client representative will be notified, and a written approval will be obtained before implementing the changes. Modifications to the approved plan will be documented in the Phase II ESA Report.

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12.0 FIELD HEALTH AND SAFETY PROCEDURES

A Site Health and Safety Plan has been prepared to minimize the threat of serious injury to workers engaged in sampling activities while performing site work. The Site Health and Safety Plan is presented in Appendix B.

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13.0 ENVIRONMENTAL PROTECTION PLAN

The following sections describe the environmental protective measures that will be used to control and correct conditions that may develop at the subject site during fieldwork associated with this project. Protective measures for this project will include erosion and sediment controls and work practices that minimize damage to site features and adjacent vegetation.

Shipping procedures that will prevent the accidental transportation of plants, insects, or animals will be used for soil samples shipped out of Guam. The samples will be shipped in sample coolers with a USDA foreign soil permit affixed that allows the selected laboratories to receive samples and the Contractor's USDA Compliance Agreement for the shipping of soil samples. Samples will be packed to comply with International Air Transportation Association requirements.

This Environmental Protection Plan provides site-specific information for the following:

- Emergency Planning and Community Right-to-Know Act (EPCRA) requirements
- Protection of natural resources (land, air, water, and fish and wildlife)
- Archeological and cultural resources preservation
- Erosion and sediment control
- Spill prevention.

This plan will be implemented in accordance with applicable federal, state, and local laws, regulations, and permits for protecting the environment.

13.1 Emergency Planning and Community Right-to-Know Act Reporting Requirements

Reporting requirements established for hazardous chemicals in accordance with the EPCRA regulation (USEPA, 2012), also known as Title III of the Superfund Amendments and Reauthorization Act of 1986, will be followed at the subject site. A complete list of hazardous chemicals used for this project, which will meet the EPCRA requirements, will be completed and maintained. The list will include the following:

- Trade and/or chemical name
- Chemical Abstract Service Registry Number
- Classification
- Reportable quantity
- Maximum volume at subject site
- Average daily volume at subject site
- Total volume throughout project

Hazardous substances will be stored in accordance with applicable regulations.

13.2 Protection of Natural Resources

Project work will be performed within the subject site area shown on Figures 2 and 4. Except for designated work areas, the project site will be preserved in its original condition. Field activities will be limited to the areas described in this SAP.

Intrusive activities will be conducted in a manner that minimizes impact and protects the surrounding areas from being disturbed. The following sections detail precautions to be taken to minimize impacts.

13.3 Protection of Land

During minimal intrusive activities, efforts will be made to minimize the impact to vegetation outside the designated work areas, storage areas, and access routes. Precautions taken to minimize the impact of field activities on the existing vegetation will include the following:

- Limit vehicle operation to designated roadways and predetermined routes
- Collect debris from work activities daily.

Based on available information, no species have been identified that require special protection at this time.

13.3.1 Protection of Air Resources

Every effort will be made to prevent and limit the spread of emissions and dust to the maximum extent possible to avoid creating a nuisance and/or hazard to workers and personnel in the surrounding area. This includes limiting and/or controlling emissions at their source.

The following steps and processes will be followed to control dust from field activities at the subject site:

- If dust is observed caused by wind, dust suppression using water will be implemented as an engineering control.
- To control engine exhaust from field activities at the subject site, field vehicles will be properly maintained to ensure that no unusually heavy emissions are generated during project activities and will be turned off when not in use.

13.3.2 Protection of Water Resources

Minimal intrusive activities will be conducted in a manner to prevent chemicals, fuels, oils, grease, and contaminated material from entering potential nearby surface water and to minimize infiltration of contaminants into groundwater. Erosion and sediment control measures will be implemented to minimize the potential for discharges of waste impacted storm water, if deemed necessary during field conditions. Absorbent material will be available for quick response to a release of fluids other than clean water.

Should a leak occur, absorbents will be used to prevent runoff onto the surrounding area.

13.3.3 Protection of Fish and Wildlife Resources

Precautions will be taken during project site activities to minimize disturbances to fish and wildlife and their habitat adjacent to the subject site. Project personnel will minimize the actual work area as much as possible and practical to minimize the impacts to wildlife. Based on the Phase I ESA site assessment information, no species have been identified that require special protection at this time. No surface bodies of water are found near the subject site.

13.4 Archeological and Cultural Resources Preservation

There are no archeological or cultural resources believed to be located at the site, based on the Phase I ESA land use and background data for this project site.. In the event that archaeological resources are encountered, measures will be taken to carefully preserve and immediately report these findings to the Government of Guam. If archaeological resources such as artifacts (e.g., stone tools), features (e.g., stone walls), deposits (e.g., sea shells and charcoal-stained soil), human bones, and other cultural remains are encountered, that portion of the work will immediately cease, and the Government of Guam will be immediately notified.

13.5 Spill Prevention

Measures will be taken to avoid spills. Spill control techniques will be used that may include temporary soil berms, surface cover mesh, and/or sandbags.

13.5.1 Contingency Plan

In the event of a spill, the Contractor will notify the authorities immediately.

The following actions/measures will be implemented during a spill response action:

- Take immediate measures to control and contain the spill using above mentioned equipment and materials
- Isolate and contain hazardous spill areas
- Deny entry to unauthorized personnel
- Do not allow anyone to touch spilled material
- Stay upwind
- Keep out of low areas
- Keep combustibles away from the spilled material
- Use water spray to reduce dust, as needed
- Perform cleanup activities as directed by using certified personnel

- If released from tanks, prevent discharge beyond site boundaries
- Any other actions as needed.

If a spill occurs on the ground:

- Dig up contaminated soil, placing it onto a layer of plastic.
- Cover the hole and pile of soil in a manner that will prevent any water from entering the covered area; the cover must be replaced at the end of each day
- Collect soil samples from the hole and the soil pile.
- Provide the results to Guam EPA.
- Guam EPA will review the sample results from the hole and advise if further excavation is needed or the hole may be filled with clean soil.
- Dispose of the stockpiled soil in accordance with Guam EPA based on the sample results.
- Provide Guam EPA a letter stating the disposition procedure and location of the soil.

If the spill occurs on pavement or asphalt:

- Place absorbent down to clean up the entire product.
- Place all the absorbent into an open top drum which meets all DOT requirements for the contents.
- Collect a sample of the spill residue and dispose of the material in accordance with Guam EPA requirements based on sample results.
- Provide Guam EPA with a letter stating the disposition procedure and location.

13.5.2 Notification of Spills and Discharges

Spill notifications under federal, state, and local regulation will be made immediately upon discovery of a spill or discharge. The Contractor will notify the appropriate authorities. A report, submitted no later than 24 hours after a release, will include the following items:

- Description of material spilled, including identity, quantity, and a copy of the waste disposal manifest
- Exact time and location of the spill, and the description of the area involved
- Containment procedures utilized
- Description of the cleanup procedures employed at the site, including disposal of spill residue
- Summary of the Contractor's communications with other agencies

14.0 REFERENCES

EA Engineering Science, and Technology, Inc. (EA). 2012. Former Typhoon Transfer Station Phase I Environmental Site Assessment Report, Yigo, Guam. January 2012.

EA. 2018a. Phase I Environmental Site Assessment Report, Former IBC Lot, Yigo, Guam. September.

EA. 2018b. Corporate Standard Operating Procedures for Environmental Services. September.

Guam Environmental Protection Agency. 2017. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater - Tropical Pacific Edition (Fall 2017): prepared by Hawaii Department of Health, Hazard Evaluation and Emergency Response. Fall 2017

United States Department of Agriculture (USDA). 1998. Soil Survey of Territory of Guam. May.

United States Environmental Protection Agency (USEPA). 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA/240/B-06/001. February.

USEPA. 2012. Emergency Planning and Community Right-to-Know Act; Amendments to Emergency Planning and Notification; Emergency Release Notification and Hazardous Chemical Reporting. Federal Register: July 21, 2016 (Volume 81, Number 140). 26 March.

United States Geological Survey. 1984. Topographic Map of Guam, Mariana Islands.

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Figures

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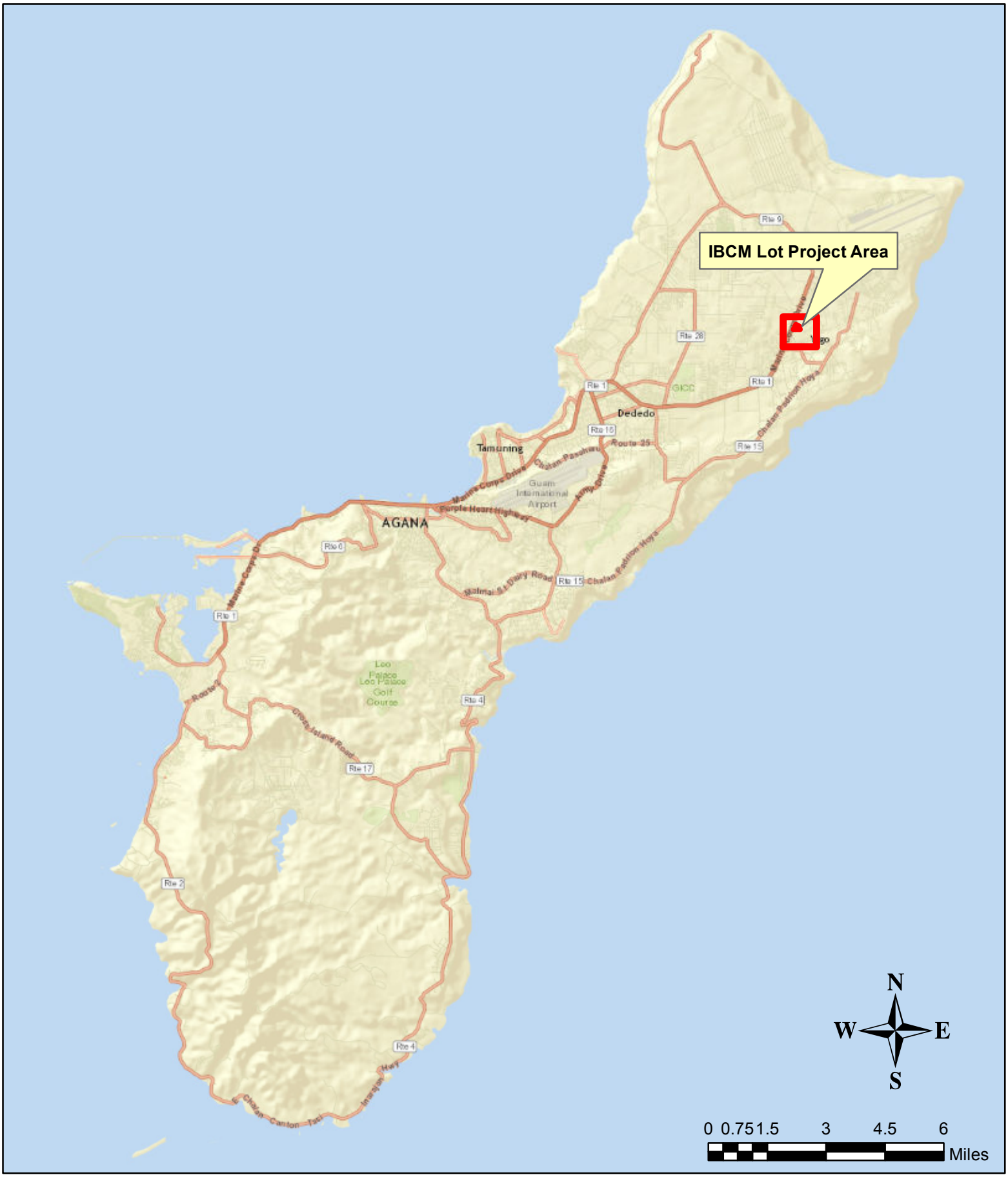

Legend

Project Location

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N: IMAGERY 2016

EA Engineering, Science, and Technology, Inc., PBC
1001 Army Drive, Suite 103,
Barrigada, 96913-1402
Telephone: (671) 646-5231
Facsimile: (671) 646-5230

Project No/TO.:RFP No. 2015-001
Guam EPA Brownfields 2017
Phase II ESAs

Figure 1
Site Vicinity Map

Drawing No.	Date	Drawn By	EA Project No.
Fig 1_Project Site Location	08/15/2018	TChargualaf	1567201

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MARINE DRIVE RT. 1

GAIN Animal Shelter

Yigo GYM

GPA Substation

LOT 7054-R8
AREA=32,407+/-SQ.M.
=8+/-ACRES

CHN. PAHARU

MILALAK DR.

LOT 7054-8
AREA=14,146+/-SQ.M.
=3.5+/-ACRES

TUN LUIS DUENAS RD.

TUN JOSEN DIEGO RD.

JUAN ANACO AVE.

RT. 29

Yigo Village

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N: IMAGERY 2016

Legend

- Streets
- Projects Site Location

740 370 0 740 1,480 Feet

N

EA Engineering, Science, and Technology, Inc., PBC
1001 Army Drive, Suite 103,
Barrigada, 96913-1402
Telephone: (671) 646-5231
Facsimile: (671) 646-5230

Project No/TO.:RFP No. 2015-001
Guam EPA Brownfields 2017
Phase II ESAs

Figure 2
Site Location Map

Drawing No.	Date	Drawn By	EA Project No.
Fig 1_Project Site Location	08/15/2018	TChargualaf	1567201

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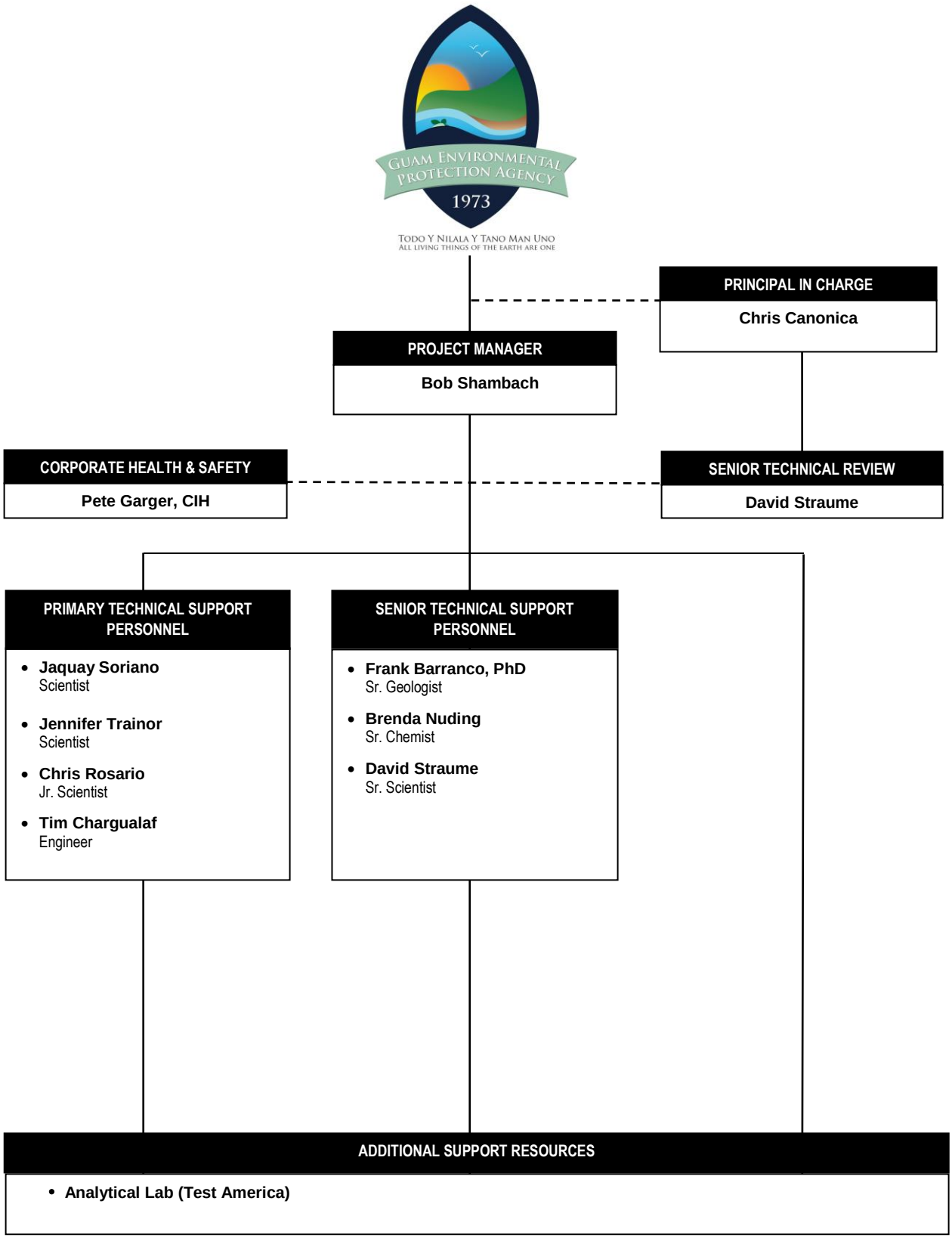
FIGURE 3. PROJECT ORGANIZATIONAL CHART



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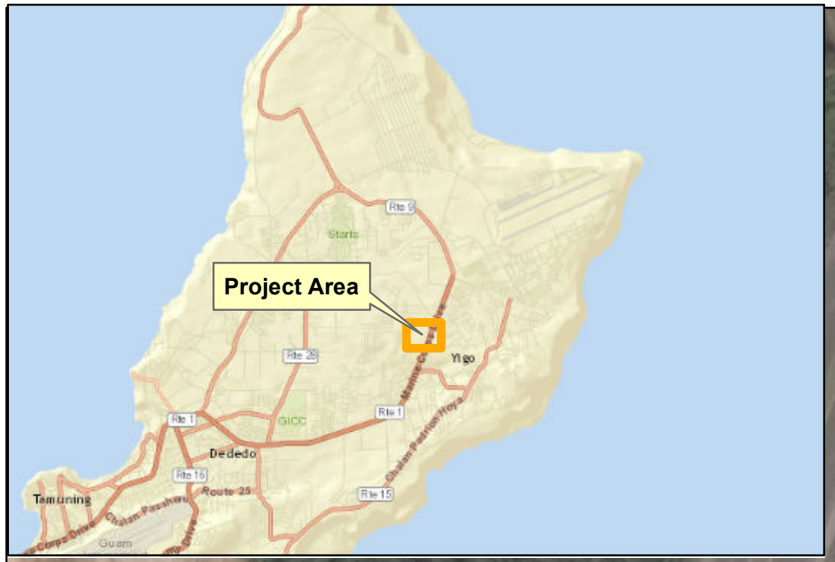

Yigo Village

DU-1

DU-2

DU-3

DU-4

DU-5

DU-6

PUBLIC ACCESS AND UTILITY RIGHT OF WAY

Storage Tank

A.S.T. Containment

Waste Pile

Tire Pile

Legend

- Incremental Sampling Methodology (ISM)- Each DU consist of 30 surface grab samples collected to make 1 composite ISM
- Petroleum Product Sample
- Decision Unit (DU) Boundary Location
- RoadwayEasement
- Grid
- SiteFeatures
- Projects Site Location

110 55 0 110 220 Feet

N

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N: IMAGERY 2016

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Project No/TO.:RFP No. 2015-001
Guam EPA Brownfields 2017
Phase II ESAs

Figure 4
Proposed Sample Location Map

Drawing No.	Date	Drawn By	EA Project No.
Fig 1_Project Site Location	08/15/2018	TChargualaf	1567201

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Appendix A

Standard Operating Procedures

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Standard Operating Procedure No. 001
for
Sample Labels

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
225 Schilling Circle, Suite 400
Hunt Valley, Maryland 21031

Revision 0
December 2014

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CONTENTS

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1. SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure is to delineate protocols for the use of sample labels. Every sample will have a sample label uniquely identifying the sampling point and analysis parameters. An example label is provided below. Other formats with similar levels of detail are acceptable.

PROJECT NAME _____ PROJECT NUM. _____
SAMPLE LOCATION/SITE ID _____
DATE: ____/____/____ TIME: _____:_____
ANALYTES: METALS VOC EXPLOSIVES ORGANICS OTHER
FILTERED: [NO] [YES]
PRESERVATIVE: [NONE] [HNO_3] [OTHER _____]
SAMPLER: _____

2. MATERIALS

The following materials may be required: sample label and indelible laboratory marker.

3. PROCEDURE

The following sections describe how to use the sample labeling system.

3.1 LABEL INFORMATION

As each sample is collected/selected, fill out a sample label. Enter the following information on each label:

- Project name
- Project number
- Location/site identification—Enter the media type (i.e., well number, surface water, soil, etc.) sampling number, and other pertinent information concerning where the sample was taken
- Date of sample collection

- Time of sample collection
- Analyses to be performed (NOTE: Due to number of analytes, details of analysis should be arranged with laboratory *prior to start of work)*
- Whether filtered or unfiltered (water samples only)
- Preservatives (water samples only)
- Number of containers for the sample (e.g., 1 of 2, 2 of 2).

3.2 ROUTINE CHECK

Double-check the label information to make sure it is correct. Detach the label, remove the backing, and apply the label to the sample container. Cover the label with clear tape, ensuring that the tape completely encircles the container.

3.3 RECORD INFORMATION

Record the sample number and designated sampling point in the field logbook, along with the following sample information:

- Time of sample collection (each logbook page should be dated)
- Location of the sample
- Organic vapor meter or photoionization meter readings for the sample (when appropriate)
- Any unusual or pertinent observations (oily sheen on groundwater sample, incidental odors, soil color, grain size, plasticity, etc.)
- Number of containers required for each sample
- Whether the sample is a quality assurance sample (split, duplicate, or blank).

3.3.1 Logbook Entry

A typical logbook entry might look like this:

- 7:35 a.m. Sample No. MW-3. PID = 35 ppm
- Petroleum odor present. Sample designated MW-3-001.

NOTE: Duplicate samples will be given a unique sample designation rather than the actual sample number with an added prefix or suffix. This will prevent any indication to the laboratory that this is a duplicate sample. This fictitious sample number will be listed in the logbook along with the actual location of the sample.

3.4 SHIPMENT

Place the sample upright in the designated sample cooler. Make sure there is plenty of ice in the cooler at all times.

4. MAINTENANCE

Not applicable.

5. PRECAUTIONS

5.1 INCIDENTAL ODORS

Note that although incidental odors should be noted in the logbook, it is unwise from a safety and health standpoint to routinely "sniff test" samples for contaminants.

5.2 DUPLICATE SAMPLE

No indication of which samples are duplicates is to be provided to the laboratory.

6. REFERENCES

U.S. Environmental Protection Agency. 1980. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans. QAMS-005/80.

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Standard Operating Procedure No. 002
for
Chain-of-Custody Form

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
225 Schilling Circle, Suite 400
Hunt Valley, Maryland 21031

Revision 0
December 2014

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CONTENTS

Page

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1. SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure is to delineate protocols for use of the chain-of-custody form. An example is provided as Figure SOP002-1. Other formats with similar levels of detail are acceptable.

2. MATERIALS

The following materials may be required: chain-of-custody form and indelible ink pen.

3. PROCEDURE

- Give the site name and project name/number.
- Enter the sample identification code.
- Indicate the sampling dates for all samples.
- List the sampling times (military format) for all samples.
- Indicate “grab” or “composite” sample with an “X.”
- Specify the sample location.
- Enter the total number of containers per cooler.
- List the analyses/container volume.
- Obtain the signature of sample team leader.
- State the carrier service and airbill number, analytical laboratory, and custody seal numbers.
- Sign, date, and time the “relinquished by” section.
- Upon completion of the form, retain the shipper copy, and affix the other copies to the inside of the sample cooler, in a zip-seal bag to protect from moisture, to be sent to the designated laboratory.

4. MAINTENANCE

Not applicable.

5. PRECAUTIONS

None.

6. REFERENCES

U.S. Environmental Protection Agency (U.S. EPA). 1980. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80.

———. 1990. Sampler's Guide to the Contract Laboratory Program. EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C. December.

———. 1991. User's Guide to the Contract Laboratory Program. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response. January.

Company Name:	Project Manager or Contact: Phone:	Parameters/Method Numbers for Analysis	Chain-of-Custody Record EA Laboratories 231 Schilling Circle Hunt Valley, MD 21031 Telephone: (410) 584-7000
Project No. Dept.: Task:	Project Name:		
Sample Storage Location:	ATO Number:		**Report Deliverables:** **1 2 3 4 D E** **EDD: Yes/No** **DUE TO CLIENT:** _________
Page of	**Report #:**		

Date	Time	Water	Soil	Sample Identification 19 Characters	**No. of Containers**														**EA Labs Accession Number**	Remarks
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Company Name:	Project Manager or Contact: Phone:	Parameters/Method Numbers for Analysis	Chain-of-Custody Record EA Laboratories 231 Schilling Circle Hunt Valley, MD 21031 Telephone: (410) 584-7000
Project No. Dept.: Task:	Project Name:		
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Page of	**Report #:**		

Date	Time	Water	Soil	Sample Identification 19 Characters	**No. of Containers**														**EA Labs Accession Number**	Remarks
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Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)		Date/Time
Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle) Fed Ex. Puro. UPS Hand Carried Other:	

Cooler Temp. _______C pH: ___ Yes ___ No Comments: Custody Seals Intact ___ Yes ___ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

Standard Operating Procedure No. 004
for
Sample Packing and Shipping

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
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Hunt Valley, Maryland 21031

Revision 1
September 2018

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PROJECT-SPECIFIC VARIANCE FORM

This form is to be completed to indicate if there are any client-, project-, or site-specific variances to this Standard Operating Procedure (SOP) (**also check Box A**), or if this SOP is being used with no changes (**only check Box B**).

☐ **A. Variances required; cite section(s) of the SOP to which there is a variance**

☐ **B. No variances**

SOP No. 004	
SOP Section	**Variance**

Project Manager (Name)

Project Manager (Signature) Date

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CONTENTS

DOCUMENT REVISION HISTORY

ORIGINAL (MASTER) DOCUMENT REVISION HISTORY				
Revision Number	**Revision Date**	**Revision Summary**	**Revised By**	**Reviewed By**
1	25 September 2018	Systematic update and review	Cristina Radu, Amanda Kohn	Matthew Bowman

1. SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for the packing and shipping of environmental samples to the laboratory for analysis. Additional requirements are applicable when shipping samples under the U.S. Environmental Protection Agency's Superfund Contract Laboratory Program.

NOTE: Samples collected from process wastewater streams, drums, bulk storage tanks, soil, sediment, or water samples from areas suspected of being highly contaminated could require shipment as dangerous goods; procedures for shipping of such samples are not covered in this SOP.

2. MATERIALS

The following materials may be required:

- Clear tape
- Custody seals
- Ice
- Packing material
- Plastic garbage bags
- Sample documentation
- Waterproof coolers (hard plastic)
- Zip-seal plastic bags.

3. PROCEDURE

Refer to SOP Numbers (Nos.) 001, 002, 016, and 039 as applicable.

Samples will be placed in clean, bubble-wrap lined sample coolers with double-bagged ice immediately after collection to ensure proper preservation. Most sample analyses require that the sample material is maintained at 2-6 degrees Celsius (°C). It is also important to ensure that sample containers are maintained at all times at the temperature required by the analytical method used to analyze the sample media; as such, samples should be retained in a chilled cooler during the inventory, quality control, and packaging process.

Check cap tightness and wipe down outside of each sample container. Verify that information on sample labels is correct and matches chain-of-custody forms. Ensure that both waterproof labels and indelible ink are used to label sample containers. Clear tape should be placed completely over the label. Wrap breakable sample containers in bubble wrap. Enclose each sample in a clear zip-seal plastic bag.

Prepare cooler for shipping. Empty any water that has accumulated in coolers from melting ice. Securely seal all valves and/or drain holes in the shipping container, both inside and out, with duct tape to prevent leakage in the event of sample container breakage or melting ice. Place several layers of bubble wrap on top of absorbent material and line the cooler sidewalls with bubble wrap. Line cooler with open garbage bag.

Prepare sample containers for shipping as follows:

- ***Glass Containers***—Wrap each glass sample container in bubble wrap or closed cell foam sheets. It is acceptable to package up to three 40-milliliter vials in one bubble wrap bag that is usually provided by the analytical laboratory. Enclose sample containers in a clear zip-seal plastic bag.

- ***Polyethylene Containers***—Place sample containers in clear zip-seal bags.

- ***Zip-Seal Bags***—Double-bag the samples to ensure that moisture will not reach the label.

Place all the sample containers upright inside garbage bag. Do not stack glass containers or lay them on their sides. Add additional bubble wrap between and around sample containers as needed to ensure containers do not shift during transport. If a second garbage bag was used, tie the (inner) garbage bag to isolate samples.

Double bag and seal loose, fresh ice to prevent melting ice from soaking the packing material. Fill gallon-size or larger zip-seal bags with fresh ice about two-thirds full and squeeze excess air out of the bags before sealing. Turn bag upside down and place in a second zip-seal bag, also removing excess air. Prepare sufficient bags to cover sample containers and ensure that the proper temperature (2-6° C) is maintained during transport.

Place ice on top of sample containers. Ensure that packing material does not insulate samples from ice. Do not use loose ice in sample coolers. Do not use bagged ice as packing material between or around sample bottles. Tie the garbage bag ensuring that the cooler lid will close securely.

Place a temperature blank into the cooler. The temperature blank consists of a plastic bottle containing either potable or deionized water. Temperature blanks are typically provided by the analytical laboratory. If temperature blanks are not provided, field staff must add a clean container filled with deionized water; ensure the cap is tight and container is labeled before placing in cooler.

If aqueous volatile organic analyte samples are being submitted, ensure a trip blank sample set is placed in each cooler containing volatile organic analyte samples. Trip blanks are used to check for contamination of volatile organic compound samples during handling, storage, and shipment from field to laboratory. The trip blanks consist of volatile organic analyte vials filled with deionized water and are typically provided by the analytical laboratory. Ensure that the trip blank samples and analyses are included on the chain-of-custody record.

Make copies of sample documentation (chain-of-custody forms or other field records) and retain in field files for record. Enclose the original field documentation forms in a waterproof plastic bag and tape the bag to the underside of the cooler lid. If more than one cooler is being used, each cooler will have its own documentation.

Seal coolers with signed and dated custody seals such that if the coolers were opened, the custody seals would be broken. Place clear tape over the custody seals to prevent damage to the seals.

Tape the cooler shut with packing tape over the hinges and custody seals. Tape should be wrapped around the cooler a minimum of five times. Ship all samples via overnight delivery on the same day they are collected if possible. Project-specific shipping requirements (e.g., Saturday delivery, communication with the receiving laboratory, etc.) should be discussed with the sample manager or project manager during project planning.

After samples are packaged within shipping containers, place shipping labels clearly on the outside of the container; clearly mark the number of containers in the shipment on the shipping label. Mark each cooler as “1 of 2,” “2 of 2,” etc.

4. MAINTENANCE

Not applicable.

5. PRECAUTIONS

The project manager and field team leader are responsible for determining if samples collected during a specific field investigation meet the definitions for dangerous goods. If a sample meets or is suspected to meet the definition of “dangerous goods” per the Dangerous Goods Regulation of the International Air Transport Association, then that sample must be handled according to the instructions given for that material. Dangerous goods must be prepared for shipping only by personnel trained and certified by International Air Transport Association in dangerous goods shipment.

6. REFERENCES

Not applicable.

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Standard Operating Procedure No. 057
for
Multi-Incremental Sampling

Prepared by

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Hunt Valley, Maryland 21031

Revision 0
December 2014

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CONTENTS

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1. INTRODUCTION

1.1 SCOPE AND APPLICATION

Multi-incremental (MI) sampling (sometimes designated by the acronym MIS), originally utilized by the mining industry, was initially proposed for environmental sampling at explosives-related sites (U.S. Environmental Protection Agency Solid Waste 846 Method 8330B, Appendix A Collecting and Processing of Representative Samples for Energetic Residues in Solid Matrices from Military Training Ranges [2006]). MI sampling is particularly effective at such sites because explosives residue is found in surface soil as opposed to at depth, and the potentially impacted areas are relatively easy to delineate because the area of the firing ranges is, in most cases, well defined.

Although MI sampling was initially implemented for the assessment of impacts from explosives, there has been recent movement to extend the list of acceptable contaminants to include metals, semivolatile organic compounds, and even volatile organic compounds (State of Alaska Department of Environmental Conservation [2009] and State of Hawai'i Department of Health [2009]). However, the adequacy of MI sampling is evaluated on a case-by case basis at the time the planning documents are prepared to ensure that the resulting analytical data are appropriate to make the decisions required by the project. This evaluation process considers:

1. Planning elements based on the decisions to be made for each potentially complete pathway (based on the conceptual site model), including contaminants distribution, hot spot size, future land use scenarios, contaminant fate and transport, etc.

2. Sample preparation procedures to be employed by the analytical laboratory (limitations and impacts on the analytical data due to the various preparation methods that can be employed)

3. Data evaluation requirements (i.e., the data needing to meet a certain level of confidence). In addition to technical considerations, stakeholders' input is also folded into the planning stages. Consequently, specific field requirements may be outlined in the planning documents for the sampling program implementation to supplement this Standard Operating Procedure (SOP).

This SOP focuses on the actual collection of MI samples, not project planning or data evaluation to follow, and assumes that successful project planning and scoping have been performed, documented, and agreed to by all stakeholders. Because Sampling Units (SUs) are defined so that the mean concentration value obtained is relevant to an explicitly articulated end use of the data, it is imperative that any changes to the SUs or sampling strategy deemed necessary by actual field conditions unanticipated at the time the sampling plan was designed should be made by the project technical lead rather than by field personnel. This way, field deviations from the approved plan during sample collection will not negatively impact the adequacy of the data for the planned purpose.

1.2 GLOSSARY OF TERMS

1.2.1 Sampling Units

An SU (sometimes termed Decision Unit [DU]) is the area and depth of soil (the sampled population) to be characterized by the average concentration of the MI sample. A DU may contain several SUs that are sampled using MI techniques or may consist of just one SU. SUs are restricted to actual source zones and must incorporate only areas that are similar as far as impact (i.e., not to "dilute" contamination) as well as future use. SUs/DUs selected based on future land use scenarios may be called Exposure Units. SUs must be delineated so that the mean analyte concentrations obtained are directly relevant to well defined project objectives. They are the smallest volume of soil for which a concentration value will be obtained, and the basic unit about which a decision or conclusion based on an analytical result can be made.

1.2.2 Decision Units

A DU is a specific area (or volume of soil) about which a decision is to be made. In the ideal and most direct case, the DU and SU are the same volume of soil. As noted above, a DU may be composed of a single SU, or may include multiple SUs, if the DU is very large in size. The important thing is that the entire area of a DU is consistent as far as contamination distribution and future use/exposure scenario, just like an SU. Either all or a percent of the SUs composing the DU may be sampled in an MI fashion, the number of SUs sampled depending on the confidence of the data that are extended from the SUs to the DU.

1.2.3 Grid Cell

A grid cell is a sub-division of the SU. SUs are divided into uniform-size grid cells, and one increment is collected from each cell, from the same relative location within each grid cell. The shape of the cells is not specified—the only criterion for cell shape selection is that the cells should be of equal size (they can be triangular, square, rectangular, etc.) so the increments collected from each cell are equally weighted over the SU.

1.3 GENERAL CONCEPTS

The use of standard discrete samples to characterize soil contamination has two significant sources of error:

1. Field sampling error is at least 10 times greater than analytical (laboratory-associated) error.

2. A source of analytical error was found to be that in sample processing and sub-sampling (a single subsample from the 4- or 8-ounce soil jar is taken at the laboratory).

Depending on the areal and vertical contaminant distribution profile, MI sampling and processing are designed to minimize these sources of error, resulting in an average concentration that is a much more precise and accurate estimate for the SU.

It is also important to note that the horizon characterized by MI sampling is usually superficial, although MI can be implemented at greater depth, this resulting in much higher associated sampling costs.

The purpose of this SOP is to delineate protocols for the application of MI field sampling of surface soil. The procedure, which can be adapted to allow for MI sampling in other environments, i.e., in an excavation trench, has been adapted from U.S. Army Corps of Engineers sampling guidance (2009).

2. EQUIPMENT AND MATERIALS

The following equipment and materials may be required:

- Spray paint[1], pin flags, or rope to mark either grid corners or outline the sampling grid
- Incremental sampling tool (i.e., the MI tool developed by the Cold Regions Research and Engineering Laboratory or alternative[2] coring device); stainless steel spoons or scoops may be used but only in conjunction with scales, so that aliquots of equal mass are collected from each location
- Clean Zip-lock® bags, 5-gallon plastic containers, or other appropriate large container for placing the increments; the size of the container should be adequate to hold the sample volume, which is approximately 1-2 kilograms
- If MI sampling is used for volatile organic compound analysis, the increments of equal mass are collected with tools such as En Core® sampler and placed in a container obtained from the analytical laboratory that is partially filled with methanol
- Coolers and ice for cold storage of samples after collection
- Field logbook and pen with waterproof black ink for field documentation
- Global Positioning System instrument or other survey equipment to document locations of DU or SUs

[1] Avoid if spray paint is likely to affect MI sample quality.

[2] A source for the MI sampling tool shown in this SOP is Ike Loukos, LES Engineering, Inc. Telephone No. 301-471-3393, email i.loukos@att.net.

- Personal protective equipment should be worn during sample collection as required by the Health and Safety Plan for the project.

3. MULTI-INCREMENTAL SAMPLING PROCEDURE

Increments of soil will be collected within each cell of the SU. Increments should be approximately of the same weight. For surface soil sampling, a coring tool may be used to facilitate the rapid collection of uniform, representative increments from a consistent depth interval. This way, equal volumes are collected for each increment and equal mass is obtained under the assumption that the density of the sampled medium is uniform across the cell of the SU. The size of the coring tool will be selected based on the volume of the increments, which is in turn calculated based on number and depth of the increments and the fact that an adequate total sample mass is typically 1-2 kilograms dry weight (to overcome effects of compositional heterogeneity due to the inherent particulate nature of soil and sediment). It is not necessary to determine by the Global Positioning System location of every increment collected, as long as the SU has been properly identified and the relative position of the increment location within each cell is recorded.

The SU or DU will be demarcated in the field using pin flags, spray paint, or rope and fixed with a Global Positioning System. Increments will be selected as defined in the sampling plan.

Prior to MI sampling activities, the field team will don the personal protective equipment. The increments will be collected from the depth specified in the planning documents (usually up to 6 inches deep) using a coring tool or other method that ensures equal volume is collected for each increment. Unless specified in the sampling plan, the vegetative mat will be included in the sampled interval. Of note is that some plans may require only sampling native soil; the horizontal limits of sampling will be dependent on past disposal practices and the decision to be made. If used, the stainless-steel sampler will be pushed into the soil until the sampler is full and will not penetrate further. The sampler is then removed carefully, and the soil is pushed out of the sampler with the lever on the side of the instrument (see photos below).

Place the sample (increment or aliquot) directly into a large re-sealable bag, 5-gallon bucket, or alternative large container (note the above photos show placing the aliquot into a sampler's hand only for aliquot visualization purposes). Field experience has found that placing samples into a decontaminated 5-gallon bucket and then pouring the whole sample into a bag is a better process. The likelihood of spilling increases with the use of a bag alone because as the bag fills up it is harder to eject additional soil increments into the bag. The bucket is more stable and may prevent loss of fines. The holes left by sampling will be filled using surrounding soil or, if necessary, sand may be used to bring the subsurface sampling areas back to original grade. Soil samples should not include large rocks or pebbles unless they are part of the overall soil matrix. It is not necessary to decontaminate the sampling tool between the increments within a DU or SU.

If collecting an MI sample for volatile organic compound analysis, a wide-mouth glass container and methanol will be obtained from the analytical laboratory for sample aliquot preservation. The collection of the increments will be performed using EnCore™ or TerraCore™ sampling tools, meaning that a much smaller increment volume will be collected, resulting in a smaller total sample volume. The field team will place the 5- to 15-milligram increments into the glass container and care should be taken to follow the health and safety precautions associated with methanol handling. To prevent loss of methanol through volatilization, the sample container will be kept closed as much as feasible and only opened to place sample aliquots within the container.

Prior to the collection of replicate samples or MI samples from another SU or DU, the sampling tool will be decontaminated according to requirements set forth in EA SOP No. 005 – Field Decontamination. The replicate samples from the same SU/DU will be collected following a different path, as shown in Figure SOP No. 057-1. The specific relative location of the replicate increments within each SU cell will be established in a random manner to eliminate potential bias. To select the relative increment location for a replicate increment in a cell, the cell may be divided in turn into sub-grids and a sub-cell may be selected by randomly generating a number on a calculator. Another selection method is performed by rolling a dice for a 6 × 6 sub-grid in the SU cell; the first die would indicate the row and the second die the column of this sub-grid.

The large re-sealable bag containing the total sample volume will be labeled with indelible ink and then double-bagged. The samples will be bubble-wrapped and taped for shipping and placed into iced coolers for transport under chain-of-custody protocol to the analytical laboratory. The field procedures will follow the requirements set forth in EA SOP No. 002 – Chain-of-Custody Form and EA SOP No. 004 – Sample Packing and Shipping. Copies of the chain-of-custody forms and shipping documents will be retained in the project file. Field activities will be documented according to logbook procedures specified in EA SOP No. 016 – Surface Water, Groundwater, and Soil/Sediment Field Logbooks.

4. MAINTENANCE

Not applicable.

5. PRECAUTIONS

Safety precautions documented in the Site Health and Safety Plan will be followed. If sampling procedures are to occur in areas where unexploded ordnance is known or potentially exist, the area will not be entered until unexploded ordnance support is provided. If, at any time, an unsafe condition is identified, stop work immediately until the unsafe condition is mitigated. If sampling for volatile organic compound analysis, follow precautions associated with handling methanol. Also, because much larger quantities of methanol are employed for MI sampling, follow all requirements associated with transportation of these samples. In most cases, these samples are driven to the analytical laboratory rather than shipped via air, which constitutes a limitation in using this method at sites not located in close proximity of a laboratory.

6. REFERENCES

State of Alaska Department of Environmental Conservation. 2009. *Draft Guidance on Multi Increment Soil Sampling.* Division of Spill Prevention and Response Contaminated Sites Program. March.

State of Hawai'i Department of Health. 2009. *Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan Interim Final.* Office of Hazard Evaluation and Emergency Response. June.

U.S. Army Corps of Engineers. 2009. Interim Guidance 09-02, *Implementation of Incremental Sampling of Soil for the Military Munitions Response Program.* 20 July.

U.S. Environmental Protection Agency. 2006. *SW-846 Method 8330B, Appendix A Collecting and Processing of Representative Samples for Energetic Residues in Solid Matrices from Military Training Ranges*.

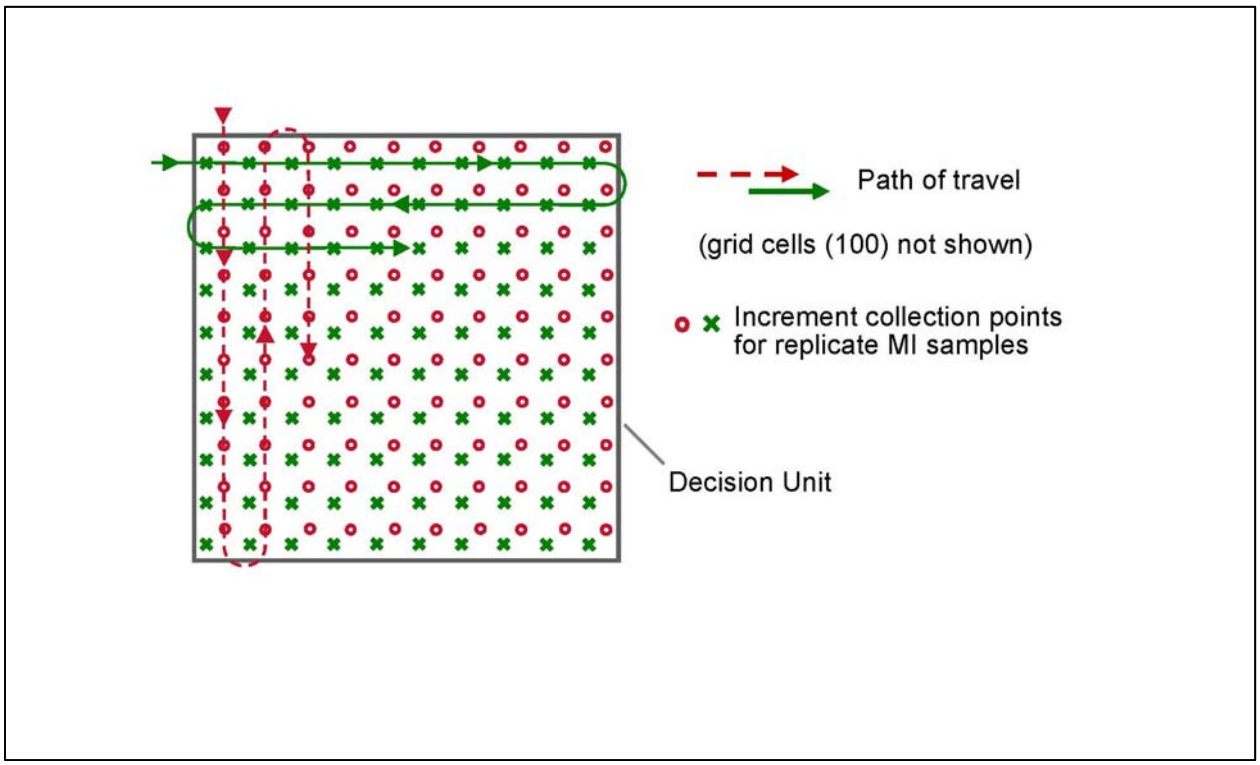

Figure SOP057-1. Example incremental sampling in a Decision Unit.

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Appendix B

Site Health and Safety Plan

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SITE HEALTH AND SAFETY PLAN

FOR

PHASE II ENVIRONMENTAL SITE ASSESSMENT

Former IBCM Lot, Yigo Guam

Route 1, Marine Corps Drive

Yigo, Guam

October 2018

Prepared for:
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EA Project No. 15672.01

TABLE OF CONTENTS

ATTACHMENTS

FIGURE

ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CSP	Certified Safety Professional
EA	EA Engineering, Science, and Technology, Inc., PBC
ESA	Environmental Site Assessment
°F	degrees Fahrenheit
HAZWOPER	Hazardous Waste Operations and Emergency Response
HR	heart rate
IBCM	International Bridge & Construction Marianas, Inc.
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
SHSO	Site Health and Safety Officer
SHSP	Site Health and Safety Plan
SOP	Standard Operating Procedure

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1. INTRODUCTION

1.1 Purpose

The Site Health and Safety Plan (SHSP) specifies mandatory operating procedures, identifies physical, chemical, and biological hazards, establishes personal protection standards, and provides for response to emergency situations that may arise during the environmental investigation at the Former International Bridge & Construction Marianas, Inc. (IBCM) Lot (subject site), Yigo, Guam. This plan currently addresses activities that will be conducted during the environmental investigations.

This SHSP has been prepared in accordance with the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard 29 Code of Federal Regulations (CFR) 1910.120, OSHA Hazard Communication Standard 29 CFR 1910.1200 (CFR, 2010a), and all applicable health and safety procedures of EA Engineering, Science, and Technology, Inc., PBC (EA). Additional safety and health requirements are found in the Activity Hazard Analyses (AHAs), supplemental plans and EA's Health and Safety Standard Operating Procedures (SOPs) as identified below.

The procedures and standards in this SHSP are prepared for employees of EA. These policies are based on the available current information on potential hazards and contaminants, as identified in previous investigations. Personnel covered by this SHSP must consider newly acquired data or conditions when conducting their work, and must use appropriate, generally accepted practices to safeguard the health of onsite personnel.

1.2 Health and Safety Policy

The following basic policies apply to field operations involving hazardous wastes:

1. Personnel assigned to field operations involving hazardous wastes will participate in a medical surveillance program for hazardous waste operations.
2. Only personnel who have been certified and trained through the Federal OSHA HAZWOPER (29 CFR 1910.120) will be assigned to both supervise and do work involving hazardous waste or hazardous substances.

Compliance with this SHSP will be documented by the Site Health and Safety Officer (SHSO) in the master copy of the SHSP. All personnel will be required to signify that they have read and understand the contents of the SHSP (Attachment A).

Health and safety issues associated with specific activities, methods, and equipment must be provided by the SHSO to the rest of the team members. The forum for disseminating this information includes pre-project health and safety briefings, daily tailgate meetings, and site inspections. An example of the site inspection form can be found in Attachment B.

All personnel shall follow the EA's Corporate Safety and Health Program Manual (EA, 2017).

1.3 Site History and Description

The subject site is located off of Route 1, Marine Corps Drive, in the Municipality of Yigo, Guam (Figure 1). The subject site, Lot No. 7054-R9, is a consolidation of Lot Nos. 7054-8 (3.5 acres) and 7054-R8 (8 acres) totaling to approximately 11.5 acres. The subject site is an irregularly shaped parcel that was used as an equipment laydown yard for IBCM until July 2017. The subject site is bounded by Route 1 Marine Corps Drive to the west, a roadway and Hills Market to the south, the Guam Power Authority substation to the north and undeveloped vegetated land to the east. The site is accessed by the roadway south of the subject site.

The subject site was used as an equipment lay down yard for IBCM until July 2017. Prior to development of the current improvements, the property was used as a debris collection station following Super Typhoon Pongsona in December 2002. Prior to its use as a debris collection station, the subject property was empty. A tire pile that accumulated during this time as a transition site is the primary focus and concern of this Environmental Site Assessment (ESA), as it may impact underlying soil quality and increase risk of tire fires and vector habitat. Located east of the subject site is proposed as the future Guam Police Department Northern Precinct and Forensic Laboratory.

1.4 Project Objective

Based on the recommendation from the Phase I ESA (EA, 2012 and EA, 2018), a Phase II ESA will be conducted. The results of the proposed investigation will be used to characterize the nature and extent of contamination at the subject site and make recommendations based on the findings.

1.5 Project Organization

The Chain of Command that will be observed during these investigations is discussed below.

Program Health and Safety Director

The EA Program Health and Safety Director is a Certified Industrial Hygienist (CIH) and a Certified Safety Professional (CSP) and will be responsible for establishing, implementing, monitoring, and administering and providing oversight to the health and safety program. The Program Health and Safety Director is responsible for ensuring that the company Health and Safety program is in compliance with Federal, State, and contract specific health and safety requirements and that this SHSP addresses the health and safety requirements for the environmental assessment of the subject site. He will approve all amendments to this plan. Mr. Peter Garger, CIH, CSP is the EA Program Health and Safety Director.

Project Manager

The Program Manager is responsible for directing all project related activities in a safe manner, coordinating the project team, auditing compliance with this SHSP, and for reviewing all technical reports and SHSP amendments prepared by the project team. Mr. Bob Shambach is the Project Manager.

Site Health and Safety Officer (SHSO)

The SHSO will provide daily tailgate health and safety briefings for all personnel prior to any onsite activities. A copy of the tailgate health and safety meeting form is located in Attachment C. The briefings will include such topics as onsite hazards and site-specific emergency procedures. The SHSO will maintain health and safety training records for all onsite personnel and will record in a daily logbook the site conditions, any site monitoring activities, personal protective equipment (PPE) used and any upgrading or downgrading of PPE levels, and other site specific or personnel related health and safety information.

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2. HAZARD ASSESSMENT

The following section outlines the AHAs, referenced SOPs, and Chemical Hazards associated with this project:

2.1 Field Activities

The following lists the site activities for the Phase II ESA at the subject site:

- Mobilization of supplies
- Site Preparation
- Collection of surface soil samples
- Collection of petroleum product sample.

A list of AHAs related to the field activities at the subject site are presented in Attachment D. The AHAs will be reviewed periodically and revised as applicable.

During daily safety tailgate meetings, applicable AHAs will be reviewed with the work crew prior to commencing work. All site visitors will be required to review the daily tailgate safety issues and sign the visitor log. Applicable SOPs are presented in Attachment E of this plan.

The AHAs should be revised for site-specific activities and reviewed with work crew before commencing any work.

Based on the Phase I ESA, the following contaminants could be present on the site:

- Total petroleum hydrocarbons as residual range organics
- Total petroleum hydrocarbons as diesel range organics
- Polychlorinated biphenyls
- Polycyclic aromatic hydrocarbons
- Resource Conservation and Recovery Act Metals

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3. HEALTH AND HAZARD MONITORING

3.1 Special Medical Monitoring

The medical surveillance program documents that personnel are capable of performing their assigned activities and that the health of employees is not compromised by potential exposure to chemical or physical agents found at work sites. This program is designed to support and monitor the effectiveness of the primary health and safety goal of controlling worker exposure to hazardous materials. Medical surveillance is performed by or under the direct supervision of a licensed physician board certified in occupational medicine. All field personnel (and management personnel onsite) are required to have a current medical certification in accordance with OSHA standards (i.e., 1910.120, 1926.65) prior to entering regulated areas (Attachment F). Medical monitoring approvals shall be documented and maintained in each employee's personnel file.

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4. HEALTH AND SAFETY

4.1 Personal Protection Equipment Requirements

Unless otherwise approved by SHSO, all activities will include PPE. The AHA tables summarize the PPE anticipated during performance of field work based on previous investigations at the site.

4.1.1 Foot Protection

Safety-toe boots will be worn by onsite employees during investigation activities. All safety-toe boots will meet the requirements specified in American National Standards Institute (ANSI) Standard Z41.1-1967 as required by 29 CFR 1926.96 and 29 CFR 1910.136.

4.1.2 Hand Protection

Appropriate hand protection, as determined in the hazard assessment, will be used by EA employees when employees' hands are exposed to hazards such as those from skin absorption and harmful substances; severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes.

4.2 Chemical Hazards

OSHA requires that lists of hazardous chemicals known to be present be compiled for the workplace as a whole or for individual work areas.

The Project Manager will develop and maintain the hazardous chemical list for each project. The list may be included as part of the SHSP for HAZWOPER projects which will be available and accessible at a location made known to all affected parties during the conduct of field operations. Alternatively, or for non-hazardous waste operations and emergency response field operations, the list may be maintained with the project files but will be available and accessible at a location made known to all affected parties during the conduct of field operations.

The lists of hazardous chemicals will be kept current and updated, as necessary. The lists of hazardous chemicals will contain the location, the name of each chemical as referenced on the Safety Data Sheets, the type of compound (i.e., flammable, corrosive, poison, etc.), the date of the inventory, and the name of the person generating the list.

4.3 Slip/Trip/Fall Hazards

Work sites may be in remote locations, and some areas may have slippery locations, and other slip/trip/fall hazards. Team members are required to wear ANSI Z41 approved steel toed or approved composite footwear and are to take special care in obtaining sure footing and walking slowly, when necessary.

4.4 Heat Stress

As Guam has a warm and humid climate, heat stress is a concern during site activities. The stress of working in a hot environment can cause a variety of illnesses including heat exhaustion or heat stroke; the latter can be fatal. Wearing impermeable clothing can significantly increase heat stress. To reduce or prevent heat stress, frequent rest periods and controlled beverage consumption to replace body fluids and salts may be required. If necessary, a work rest regimen will be established based on the physiological monitoring guidance described below. Quantitative physiological monitoring for heat stress may be conducted when ambient temperatures exceed 78 degrees Fahrenheit (°F). Physiological monitoring for heat stress includes using the worker's heart rate (primary indicator) and oral temperature (secondary indicator) measured during work assignments. The frequency of monitoring depends on the ambient temperature, the PPE level, and the degree of acclimation the person has to the heat. To determine the initial monitoring frequency, after a work period of moderate exertion, use the following information:

Adjusted Temperature*	Level D	Level C
90°F or above	after 45 minutes	after 15 minutes
87.5 to 90°F	after 60 minutes	after 30 minutes
82.5 to 87.5°F	after 90 minutes	after 60 minutes
77.5 to 82.5°F	after 120 minutes	after 90 minutes
72.5 to 77.5°F	after 150 minutes	after 120 minutes

* Adjusted air temperature (°F) = observed temp + (13 x percent sunshine). Air temperature measured with bulb shielded from radiant heat. Percent sunshine is the time sun is not covered by clouds thick enough to produce a shadow (100 percent = no cloud cover and a sharp, distinct shadow; 0 percent = no shadows). From The Industrial Environment, its Evaluation and Control; U.S. Department of Health and Human Services, 1973.

The following procedures and action levels are to be used for the physiological monitoring of heat stress:

Heart Rate (HR): HR will be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by one third, while the length of the rest period stays the same. If the pulse rate exceeds 110 beats per minute at the beginning of the next rest period, the next work cycle should be shortened by another 33 percent.

Oral Temperature: Use a clinical thermometer to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6°F, shorten the next work cycle by one third without changing the rest period. If oral temperature exceeds 99.6°F at the beginning of

the next rest period, shorten the following work cycle by on third. DO NOT allow a field team member to wear OSHA Level C protection when oral temperature exceeds 100.6°F.

Personal Monitoring Devices: The use of personal monitoring devices is encouraged during the initial work periods, if applicable. This will help each worker monitor his/her physiological response to heat, humidity, and the work activity. As the worker acclimates, the work rest regimen can be adjusted accordingly.

Even though physiological monitoring is not always necessary, it is essential that personnel understand the significance of heat stress and its recognition. Personnel will be trained to recognize the symptoms of heat stress and the appropriate action to take upon recognition.

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5. CONTAMINATION CONTROL, SANITATION, AND WASTE MANAGEMENT

The purpose of site control is to minimize chemical exposures, hazards, and other injuries to workers and the public during site activities.

5.1 Site Entry Requirements

In order to allow an individual into regulated areas of the site, he/she must meet the following requirements:

- Review of this SHSP and sign-off on the SHSP Acknowledgement form (Attachment A)
- Document completion of HAZWOPER
- Obtain authorization from the SHSO
- Don the appropriate PPE.

5.2 Waste Materials Management

The investigation-derived wastes produced at the site will consist of waste PPE. PPE will be segregated into separate waste streams. Visibly clean PPE will be combined with miscellaneous trash and disposed at the local municipal landfill. General trash will be hauled to the local municipal landfill for disposal.

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6. EMERGENCY RESPONSE PLAN

This SHSP has been established to allow site operations to be conducted in a manner that minimizes hazardous health impacts on both employees and the community. In addition, this ERP has been developed to cover extraordinary conditions that might occur at the site. Prior to the commencement of work, personnel will be familiar with emergency condition identification, notification, and response procedures in accordance with the EA's Corporate Health and Safety Plan (EA, 2017). Emergency response training shall be a part of the initial SHSP pre-work training required of all employees. Additional discussions or refreshers shall take place periodically throughout the project as part of the daily tailgate safety meetings. See the Tailgate Safety Meeting Form for contact numbers and emergency call information (Attachment C). In case of an emergency, the crew must be transported to the designated medical center.

6.1 Emergency Conditions

Fire, medical emergency, spill, severe weather, criminal/terrorist activity, incidents, accidents, injuries, and mishaps are the conditions that may lead to an emergency situation.

6.2 Evacuation and Rally Points

The SHSO will review procedures (including life-threatening or immobilizing injuries) during the first tailgate safety meeting. Topics to be covered include conditions leading to an emergency, location of rally point, contact numbers and head counts, if applicable.

The SHSO shall designate an assembly point in case of an emergency. Whenever an employee becomes aware of an emergency condition, the employee shall immediately proceed to the assembly point and notify the Emergency Coordinator. The SHSO will act as the Emergency Coordinator, but if the SHSO is unavailable or cannot be contacted, the Field Team Leader will act as the Emergency Coordinator.

6.3 Directions to Hospital

The emergency telephone numbers will be posted at the site. The Guam Memorial Hospital will be used for medical assistance (Figure 1).

The address is:

850 Gov. Carlos G. Camacho Road
Oka, Tamuning, Guam 96913-3128

The Guam Memorial Hospital emergency contact number is **647-2281 or 647-2489.**

The route to the Guam Memorial Hospital is as follows:

1. Turn right (south) onto Marine Corps Drive.
2. Turn right onto Governor Carlos G. Camacho Road in Tamuning which leads directly to the hospital.

6.4 Reporting

6.4.1 Employee Exposure/Injury Incident Reporting

All incidents resulting in an exposure or injury to personnel on site (employee or otherwise) are to be recorded on the Accident/Loss Form found in Attachment G. This form is to be completed by the SHSO, and submitted to the Corporate Health and Safety Director, and the Project Manager within 24 hours of the incident. In the event of an accident EA will maintain the emergency contact information for all employees. This information is available by contacting the EA office (671) 646-5231.

6.4.2 "Near Miss" Incidents

A "near miss" is a situation that did not quite result in an accident or injury. Just as much can be learned about weaknesses in the job situation from events that almost happened as from things that actually occurred; therefore, a "near miss" should be investigated with the same diligence as an accident. "Near miss" reporting should be completed within a few hours of observation to ensure accurate documentation using the "Near Miss" Incident Report form found in Attachment G.

7. REFERENCES

American National Standards Institute. American National Standards Institute Standard Z358.1. Current edition

Code of Federal Regulation. Title 29, Part 1910. *Occupational Safety and Health Standards*. Current edition

EA Engineering Science, and Technology, Inc. (EA). 2012. Former Typhoon Transfer Station Phase I Environmental Site Assessment Report, Yigo, Guam. January 2012.

EA. 2017. *Corporate Safety and Health Program Manual*, February.

EA. 2018. Phase I Environmental Site Assessment Report, Former IBC Lot, Yigo, Guam. September.

Occupational Safety and Health Administration (OSHA) *Occupational Safety and Health Standards*, 29 Code of Federal Regulations 1910, Current edition

U.S. Department of Health and Human Services, The *Industrial Environment, its Evaluation and Control.* Current edition

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Figure

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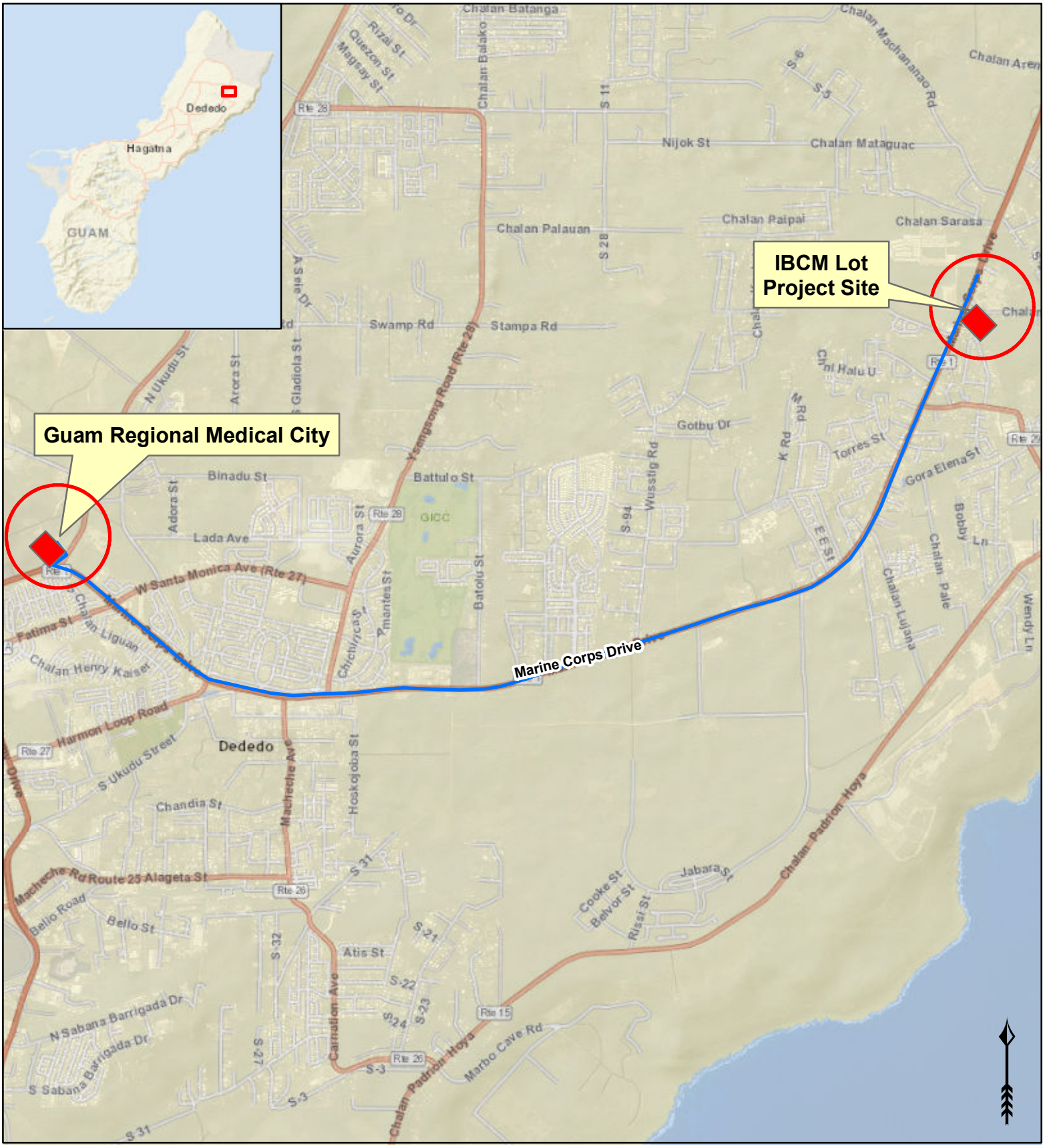

COORDINATE/REFERENCE: WGS_1984_UTM_Zone_55N

0.65 0.325 0 0.65 1.3 Miles

Legend

Hospital Route

EA Engineering, Science, and Technology, Inc., PBC
1001 Army Drive, Suite 103,
Barrigada, 96913-1402
Telephone: (671) 646-5231
Facsimile: (671) 646-5230

Project No/TO.:RFP No. 2015-001
Guam EPA Brownfields 2017
Phase II ESAs

Figure 1
Hospital Map

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Attachment A
Health and Safety Signature Form

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SITE HEALTH AND SAFETY PLAN SIGNATURE FORM

SITE NAME/NUMBER: _____

LOCATION: _____

I have read, understood, and agreed to comply with the provisions of the above-referenced Site Health and Safety Plan (HASP) for work activities on this site.

PRINTED NAME	SIGNATURE	COMPANY	DATE

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Attachment B
Safety Audit Checklist

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SAFETY AUDIT CHECKLIST

Site: _____ Prepared by: _____
Location: _____ Audit Date: _____
Project No.: _____ Project Manager: _____
Client: _____ Site Safety and Health Officer : _____

Rating	S	U	N/A	Comments
Site Health and Safety Plan (SHSP) General Requirements				
Was a pre-entry safety briefing conducted? If so, did it include the following: • Disclosure of potential hazards? • Procedures for clearances/entry to restricted areas? • Emergency response? • Vehicle rules/regulations? • Equipment to be used? • Material handling restrictions? • Transporting/storing hazardous materials? • Personal protective equipment (PPE)? • Applicable standard operating procedures? • Methods of decontamination? • Responsibilities for safety of personnel/property? • Location/use of Material Safety Data Sheets (MSDS)? • Safe work practices?				
Approved SHSP on site?				
SHSP compliance agreement form signed by onsite personnel, including subcontractors?				
New activities or hazards identified and incorporated into revised SHSP?				
Names of onsite personnel recorded in field logbook or daily log?				
Applicable MSDSs on site or available?				
Hazard labeling practices currently being used?				
Designated Site Health and Safety Officer (SHSO) present? • Designated alternate SHSO? • SHSO conducts daily inspections of site/work zones? • Records of daily inspections available for review?				
Daily tailgate safety meetings conducted and documented?				
Onsite personnel meet SHSP requirements for medical examinations, fit testing, and training (including subcontractors)?				
Documentation of training, medical examinations, and fit tests available from employer (as applicable)?				
Compliance with specified safe work practices?				
Exclusion (EZ), Contamination Reduction (CRZ), and Support Zones (SZ) delineated and enforced?				
Windsock, flag, or ribbons in place to indicate wind direction?				
SZ located upwind from EZ and CRZ, as practicable?				
Emergency Planning				
Emergency telephone numbers posted?				
Emergency telephone numbers up to date?				
Emergency route to hospital posted?				
Local emergency providers notified of site activities?				

S = Satisfactory; U = Unsatisfactory, N/A = Not applicable

Rating	S	U	N/A	Comments
Review weather emergency procedures?				
Adequate safety equipment inventory available?				
First aid provider and first aid supplies available?				
Eyewash station(s) functioning and in place?				
Communication equipment readily available for emergencies?				
Any reported accidents/incidents at this site? If so, are the accident/incident reports available for review?				
Air Monitoring				
Monitoring equipment specified in SHSP available and in working order (See Instrumentation list below)?				
Monitoring equipment calibrated and calibration records available?				
Personnel know how to operate monitoring equipment and equipment manuals available on site?				
Environmental and personnel monitoring performed as specified in SHSP?				
Heat stress monitoring being conducted and "cool-down" breaks implemented?				
Air monitoring instrumentation includes: • Combustible gas meter? • Oxygen meter? • Organic vapor analyzer? • Hydrogen sulfide monitor				
PPE				
Proper dermal protection worn when handling/ contacting hazardous chemicals or contaminated environmental media?				
Required PPE (hard hats, safety boots / shoes, eye protection with side shields) being worn?				
Reflective vests available? Worn when required?				
Hearing protection available? Worn when required?				
Heavy Equipment Operations				
Equipment operators experienced/properly trained?				
Dust control measures implemented in EZ, as necessary?				
Equipment regularly inspected and maintained?				
Utility lines located and marked prior to construction activities?				
Clearance/digging permits kept onsite and available for review?				
Drill rigs/elevated equipment maintaining minimum 10-ft distance from energized (50 kV) overhead power lines?				
Traffic control barricades in place (28-in traffic cones/flags/barricade tape)?				
Proper PPE, including hearing protection and reflective vests in use?				
When backing a vehicle up is a spotter used?				
Supplies				
Decontamination equipment and supplies on site?				
Fire extinguishers (functioning, inspected, and in field vehicles)?				
Spill cleanup supplies on site?				

Rating	S	U	N/A	Comments
Power Tools/Electrical Hazards				
Proper PPE used?				
Lock-out/Tag-out system in place and observed?				
Power tools and power cords inspected and maintained?				
Investigation-derived Waste (IDW)				
Wastes properly disposed of?				
Designated location for drummed IDW?				
IDW containers properly labeled?				

Additional Comments:

_____ _____

Auditor's Signature Site Safety and Health Officer's Signature

_____

Date

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Attachment C
Tailgate Health and Safety Form

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TAILGATE SAFETY MEETING FORM

EA Engineering Project Number: 15672.01

Client: Guam Environmental Protection Agency

Work Title: Phase II Site Investigation

Work Site: Former IBCM Lot, Route 1, Marine Corps Drive Yigo, Guam

Site ID: _____

Scope of Work: Surface soil sampling and petroleum product sampling

Personal Protective Equipment: Level D, steel toe boots, safety vest, safety glasses, and Nitrile gloves. **Note: No sunscreen or bug replant will be used, they may interfere with sampling efforts.**

Potential Chemical Hazard: PCBs (liquid product), Metals, TPH-RRO, TPH-DRO, and PAH

Potential Physical Hazards: Slip, trip, falls, heat, biological. Be sure of stable footing while traversing the site. Monitor for heat stress.

Off-Site Emergency Contacts: Fire, Police, and Ambulance **911**. Guam Memorial Hospital at **646-4282**

EA On-Site Health and Safety Officer: Tim Chargualaf at **646-5231;** Alternate SHSO: Jaquay Soriano at **646-5231**

EA Corporate Project Safety Officer: Peter Garger (EA) at **401-790-6338**

Project Manager Bob Shambach (EA) at **646-5231,** cell **727-6094**

Daily Record

Date:
Time:
Tailgate Meeting Conducted By:

List of Attendees	List of Signatures
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Attachment D
Activity Hazard Analyses

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ACTIVITY HAZARD ANALYSIS

Principal Step	Potential Hazards	Recommended Controls
Mobilization of equipment and supplies/ Site Setup	• Heavy lifting	• Use proper lifting techniques, size up the load, use teamwork, never twist or turn when lifting. • Use mechanical lifting devices whenever feasible. • Steel-toed boots.
	• Slips, trips, and falls	• Tripping hazard will be identified and feasible engineering controls implemented. • Good housekeeping practices will be observed. • Maintain proper illumination in work areas.
	• Faulty/damaged equipment	• Continual inspection of work areas. • Equipment will be inspected upon arrival and at the beginning of each shift. • Routine thorough inspection of equipment by a competent mechanic or personnel trained and familiar with the equipment.
	• Vehicle Safety	• Use seat belts/rollover protection system • Utilize only licensed and trained operators • Ensure equipment is not operated on excessive grades to prevent rollovers • Follow all traffic laws. Vehicles will not be driven at speeds greater than the posted speed limit, with due regard for weather, traffic, intersections, width and character of the roadway, type of motor vehicle, and any other existing condition. • Defensive driving principles will be practiced.
	• Noise	• Ensure adequate maintenance on equipment. • Conduct periodic sound level surveys, if applicable.
	• Heat	• Wear appropriate clothing. • Have cool drinks (water and/or electrolytes) available and take small drinks frequently. • Take regular breaks in shaded, cool areas and monitor temperature as specified in Heat Stress Monitoring Program. • Use Buddy System and report signs of heat stress to the SHSO immediately
	• Severe weather	• Shut down operations during severe electrical storms, heavy rain, high wind, and evacuate site/take cover. • Where there are warnings or indications of impending severe weather, conditions will be monitored and appropriate action taken.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS

ACTIVITY HAZARD ANALYSIS

PPE • Long pants • Long sleeves (optional) • Safety boots (steel or composite toe) • Safety glasses (potential eye injury hazard areas) • Reflective vest	• Vehicles • Check equipment daily	• Vehicle operators will possess a valid permit for equipment being operated. • Lifting and general back awareness training.

ACTIVITY HAZARD ANALYSIS

Principal Step	Potential Hazards	Recommended Controls
Handling Contaminated Soil	• Exposure to contaminants	• Wear protective equipment as required. Skin contact with potentially contaminated media by using nitrile gloves during sampling. • Use other appropriate PPE, as conditions change or action levels are met.
	• Exposure to Fugitive Dust	• If dust is visible during operations, reduce speed, or utilize water spray to control fugitive dust emissions. • If possible, equipment operator and all support ground personnel shall be located upwind.
	• Lifting	• Get assistance with moving object that may be awkward or heavier than 50 pounds (loaded sample coolers)
	• Noise	• Ensure adequate maintenance on equipment. • Conduct periodic sound level surveys, if applicable.
	• Heat	• Wear appropriate clothing. • Have cool drinks (water and/or electrolytes) available and take small drinks frequently. • Take regular breaks in shaded, cool areas and monitor temperature as specified in Heat Stress Monitoring Program. • Use Buddy System and report signs of heat stress to the SHSO immediately
	• Chemical exposure (sample preservatives)	• Be familiar with material safety data sheets for chemical products used to preserve samples. • Transport in appropriate packaging. (See Department of Transportation guidelines for appropriate equipment to transfer required aliquot to sample containers). Eyewash in accordance with 29 CFR 1910.151. • Wear proper PPE including hand and eye/face protection. • Review SDSs before use. • Properly label all chemicals. • Ensure proper storage. • Follow proper hand washing procedures. • Have eyewash readily available.

ACTIVITY HAZARD ANALYSIS

Principal Step	Potential Hazards	Recommended Controls
Handling Contaminated Soil (continued)	• Manual Lifting	• Train/Utilize correct lift techniques. • Personnel will not lift more than 50 lb. • Use Buddy System. • Use mechanical lifting procedures whenever possible.
	• Load hazards	• Load trucks on even ground surface. • Distribute load on trucks evenly.
	• Slips, Trips, and Falls	• Be aware of physical hazards - watch for uneven ground, rocks, dirt clods, etc. • Practice good housekeeping. • Use care when walking on the ground surface, especially when the ground surface is wet in the morning and/or during and after rain. • Clean all spills immediately • Proper PPE to include steel-toe boots which provide good footing. • Survey area and remove any trip hazards.
	• Biological	• Exercise caution in unknown areas. • DO NOT apply insect spray containing DEET. • Wear clothing in such a way as to restrict access by insects. • After working in infested areas, shower, inspect and properly remove insects.
	• Equipment Failure/Hazards	• Never leave equipment unattended while running. • When leave equipment, always leave safety lever in non-operating position • Inspect equipment prior to daily operation • Original equipment manufacturer's (OEM) equipment modifications only • Use machine guarding and enclosures • Utilize only trained and experienced operators for operation of equipment • Site specific training - Toolbox safety meetings, fall protection systems (if applicable)
	• Contact with Overhead and Underground Utilities	• Verify utility information prior to excavation. Intrusive soil activities conducted within a five foot "Buffer Zone" (horizontal or vertical, as measured from the outside edge of the utility) of any utility (electric, gas, high pressure chemical storage tanks, pipelines, sewers, etc.) may require the use of non-aggressive excavation methods such as hand excavation using non-conductive hand tools, use of an air spade, hydroexcavation, or similar means. • If a previously unknown utility line is identified, uncovered, or disturbed during excavation/trenching activities, the excavation activity shall stop immediately and project management notified. Excavation shall not recommence until the line has been evaluated, identified, traced, and proper precautions have been implemented. • Excavation spoil piles should not be placed atop surface features or ground markings identifying the locations of underground utilities.
Principal Step	Potential Hazards	Recommended Controls

ACTIVITY HAZARD ANALYSIS

Handling Contaminated Soil (continued)	• Struck By/Against Equipment	• Maintain radio/verbal communication. • Make eye contact with operators and indicate your movements with hand signals before approaching equipment. • Equipment will not be approached on blind sides. • Personnel will understand and review hand signals. • Obey all posted speed limits. • Properly maintain/inspect equipment.
	• Severe weather	• Shut down operations during severe electrical storms, heavy rain, high wind, and evacuate site/take cover. • Where there are warnings or indications of impending severe weather, conditions will be monitored and appropriate action taken.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Level C & D PPE (Levels will be determined by SHSO) : o Level C: Tyvek® coveralls, APR respirators, safety glasses, steel-toed boots, traffic vests, gloves, if applicable. o Level D: safety glasses, steel-toed boots, traffic vests, gloves • AM/FM RADIO • Eye wash	• Respirators (before each use, pre-project inspection and fit testing by Industrial Hygienist), if deemed applicable.	• Proper use of PPE and its limitations. • Proper use of eyewash • All field personnel will have Site Safety and Health Plan/Activity Hazard Analysis training; Hazard Communication training and Daily Tailgate Safety Meetings. Applicable Operator Certifications, HAZWOPER Certifications, Fall Protection training, Safe Tool Use, Fire Safety training, Emergency Response Training, First Aid/Cardiopulmonary Resuscitation training. • Only qualified operators permitted to operate. Qualifications and competency reviewed by Site Supervisor.

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Attachment E
Health and Safety SOPs

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MOTOR VEHICLE SAFETY POLICY

The risk of injury to personnel and property damage is probably greater during operation of vehicles than at any other time while under the employment of EA. The purpose of this section is to provide a means to implement an effective maintenance program and appropriate training to minimize this risk. By far, the most important factor in reducing the risk of injury, damage, and loss is through employee adherence to safe driving practices.

AUTHORIZATION AND TRAINING

No employee will be authorized to operate an EA vehicle unless he or she has a valid driver's license.

No employee will be authorized to operate a vehicle with a trailer or a vehicle requiring the use of mirrors due to restricted vision until he or she has been instructed in their safe operation and use.

No employee will be authorized to operate a fork lift until he or she has received training in its safe operation.

OPERATION

Operators of company-owned, leased, and privately owned vehicles while on company business will:

- Drive vehicles in a safe and courteous manner
- Obey traffic regulations; traffic citations will be the responsibility of the operator
- Use safety belts (including passengers)
- Abstain from drinking alcoholic beverages or using drugs prior to or while driving (including passengers)

MAINTENANCE

Operations Managers will establish a maintenance schedule for EA vehicle, which is consistent with the manufacturer's servicing recommendations.

Employees using EA vehicles will make their own inspection prior to each use, including:

- Coolant level
- Oil level
- Fuel level
- Windshield wipers and washer fluid
- Headlights
- Turn signals/flashers
- Tail lights/brake lights
- Tire inflation and condition (tread)

Malfunctions and deficiencies will be reported to the Office Administrator for corrective action.

VEHICLE SAFETY EQUIPMENT

The following is a suggested list of equipment to be maintained in EA vehicles:

- First aid kit
- Fire extinguisher
- Safety flares or reflective triangles
- Spare tire and jack.

HEAT STRESS SYMPTOMS AND APPROPRIATE ACTIONS

	Description	How to Recognize	What To Do
Heat Rash			
	A skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.	Looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.	Provide a cooler, less humid environment and keep the affected area dry. Dusting powder may be used to increase comfort, but avoid using ointments or creams, as they keep the skin warm and moist and may make the condition worse.
Heat Cramps			
	Usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles causes painful cramps. Heat cramps may also be a symptom of exhaustion.	Muscle pains or spasms -- usually in the abdomen, arms, or legs -- that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.	If medical attention is not necessary, take the following steps: - Stop all activity and sit quietly in cool place - Drink clear juice or a sports drink - Do not return to strenuous activity for a few hours after the cramps subside -- further exertion may lead to exhaustion or stroke Seek medical attention if the cramps do not subside in 1-hr.
Heat Exhaustion			
	A milder form of heat stress that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. Those most prone to heat exhaustion are elderly people, people with high blood pressure, and people working or exercising in a hot environment.	- Heavy sweating - Paleness - Muscle cramps - Tiredness - Weakness - Dizziness - Headache - Nausea or vomiting - Fainting	Cooling measures that may be of help: - Cool, non-alcoholic beverages - Rest - Cool shower, bath, or sponge bath - An air-conditioned environment

HEAT STRESS SYMPTOMS AND APPROPRIATE ACTIONS

	Description	How to Recognize	What To Do
Heat Stroke			
	Occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanisms fail, and the body is unable to cool down. Body temperature may rise to 106 degress F or higher within 10-15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.	Warning signs of heat stroke: - Extremely high body temp. - Red, hot, and dry skin - Rapid, strong pulse - Throbbing headache - Dizziness - Nausea - Confusion - Unconsciousness	Have someone call for immediate medical assistance if you see these signs. While you are waiting for the assistance, begin cooling the victim by: - Get victim to shady place - Cool victim rapidly with whatever methods you can (e.g. cool cloth, cool shower or water splashes) - Monitor body temperature and continue cooling efforts Sometimes a victim's muscles will begin to twitch uncontrollably. If this happens, keep the victim from injuring himself/herself, but do not place any objects in the mouth and do not give fluids. If vomiting occurs, make sure airway is open by turning victim on his or her side.
Sunburn			
	Should be avoided due to skin damage. Although discomfort is usually minor and healing often occurs within a week, a more severe sunburn may require medical attention.	Symptoms are well known: skin becomes red, painful, and abnormally warm after sun exposure.	Consult a physician if these symptoms are present: - Fever - Fluid-filled blisters - Severe pain Also, remember these tips: - Avoid repeated sun exposure - Apply cold compress or water - Do not break blisters

Attachment F
EA Occupational Health Program

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EA OCCUPATIONAL HEALTH PROGRAM

During EA operations, personnel may be exposed to environmental factors and stresses that could affect their well-being. Recognition and evaluation of the importance of these environmental factors (e.g., exposure to airborne contaminants, heat stress, and noise) will determine the need for measures to minimize and/or control exposures. In addition, medical surveillance and periodic exposure monitoring will be provided to ensure that the stresses are not affecting the health of employees.

RESPONSIBILITIES

Director of Safety and Health

The Director of Safety and Health will:

1. Coordinate with All One Health, EA's Corporate Physician, to provide guidance and oversee the Medical Surveillance Program and make all medical determinations
2. Administer the Occupational Health Program, including coordination of EA's medical and first aid program.
3. Periodically conduct an industrial hygiene survey of EA operations involving potential employee exposure to chemicals, noise, and/or radiation. During the survey, areas requiring additional evaluation, e.g., air sampling, will be identified and scheduled for a follow-up investigation.
4. Develop an occupational health management information system. This system will be used to provide medical personnel with data regarding employees' exposures to potentially hazardous materials.
5. Make recommendations to management regarding the minimization or control of exposures to potentially hazardous materials.

Review projects or programs before their application to evaluate the potential impact on the health of employees.

Corporate Physician

The Corporate Physician will:

1. Consult with EA on the appropriate examination and tests for employees potentially exposed to hazardous materials.
2. Where and when warranted, oversee personnel medical evaluations including employees ability to wear respiratory protection

MEDICAL SURVEILLANCE

Employees whose jobs require them to work with chemicals at levels that may be potentially hazardous to their health will be provided physical examinations. The Director of Safety and Health and EA's Corporate Physician will identify employees to be included in the Medical

Surveillance Program. The purpose of the examination is to establish the baseline status of the employee's health and to determine the suitability of the employee for the job. Periodic surveillance may be necessary for individuals potentially exposed to hazardous materials regularly to ensure their work exposure is not impairing their well being.

The Corporate Physician will notify the employee, in writing, of the results of their physical examination and medical tests.

Participants in the Medical Surveillance Program will initially complete the enclosed General Medical Questionnaire and the Periodic Medical Questionnaire annually thereafter. The completed questionnaires will become part of each employee's permanent Safety and Health file as well as being used for the determination of their status in the Medical Surveillance Program.

FREQUENCY OF MEDICAL EXAMINATIONS

Personnel must pass a comprehensive medical examination prior to assignment to field sampling and exploration activities. The purpose of the examination is to establish the individual's baseline physiological data and to determine his/her ability to wear PPE, especially respirators.

The examination will be repeated annually for employees who are potentially exposed to hazardous materials for 30 days or more per year, employees who wear respirators for 30 days or more per year, and for employees who are members of hazardous materials teams. Whenever an employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or the employee has been exposed above the established exposure levels in an emergency situation, a medical examination will be performed. A medical examination will also be performed whenever an employee is terminated or reassigned to work that does not require his/her participation in the medical program. Employees who are potentially exposed to hazardous materials less than 30 days per year will receive biennial examinations.

Content of Medical Examinations

The protocol for medical examinations will be determined by the examining physician.

CERTIFICATION FORM TO EMPLOYER

The certification form provides a written opinion regarding each examined employee which includes the following:

1. The physician's written opinion as to whether the employee has detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or from the use of respirators.
2. The physician's recommended limitations upon the employee's work assignment.

3. A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

The written opinion must not reveal specific findings or diagnoses unrelated to the occupational exposure.

Recordkeeping Requirements

EA's medical provider will maintain a secure medical and exposure records storage location. The following information must be retained for duration of employment plus 30 years for each employee:

1. The name and social security number of the employee.
2. Physician's written opinions as described above.
3. Employee medical complaints related to exposure to hazardous substances.
4. Medical results.

FIRST AID TREATMENT

First aid training will be provided as needed. Designation of the appropriate individuals to be trained will be made by the Site Safety and Health Officer or Regional Safety and Health Manager or the Operations Managers. Crews working in locations that require more than a 15-minute response time for medical assistance but are unlikely to encounter serious medical harm will be required to have first aid and CPR training. If operations are such that serious medical emergencies may be encountered, then first aid and CPR training will be provided whenever response times are four minutes or more.

Only trained individuals will be permitted to treat EA employees. First aid supplies will be maintained in their custody, and it will be their responsibility to ensure that an adequate supply of materials is on hand at all times. First aid kits will also be maintained in boats and vehicles.

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Attachment G
Accident/Loss and "Near Miss" Reports

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ACCIDENT/LOSS REPORT

THIS REPORT MUST BE COMPLETED BY THE INJURED EMPLOYEE OR SUPERVISOR AND FAXED TO EA CORPORATE HUMAN RESOURCES WITHIN 24 HOURS OF ANY ACCIDENT. THE FAX NUMBER IS **(410) 771-1780**.

NOTE WHENEVER AN EMPLOYEE IS SENT FOR MEDICAL TREATMENT FOR A WORK RELATED INJURY OR ILLNESS, PAGE 4 OF THIS REPORT MUST ACCOMPANY THAT INDIVIDUAL TO ENSURE THAT ALL INVOICES/BILLS/CORRESPONDENCE ARE SENT TO HUMAN RESOURCES FOR TIMELY RESPONSE.

A. DEMOGRAPHIC INFORMATION:

NAME OF INJURED EMPLOYEE: _____
HOME ADDRESS: _____
HOME PHONE: _____ DATE OF BIRTH: _____
AGE: _____ SEX: M F
MARITAL STATUS: _____ HOURLY RATE: _____
SOCIAL SECURITY NUMBER: _____ DATE OF HIRE: _____
NUMBER OF DEPENDENTS: _____
EMPLOYEES JOB TITLE: _____
DEPT. REGULARLY EMPLOYED: _____
WAS THE EMPLOYEE INJURED ON THE JOB: Y N
PRIMARY LANGUAGE OF THE EMPLOYEE: _____

B. ACCIDENT/INCIDENT INFORMATION:

DATE OF ACCIDENT: _____ TIME OF ACCIDENT: _____
REPORTED TO WHOM: _____ NAME OF SUPERVISOR_____
EXACT LOCATION WHERE ACCIDENT OCCURRED (**including street, city, state, and County**):
_____
_____

EXPLAIN WHAT HAPPENED (include what the employee was doing at the time of the accident and how the accident occurred): _____
_____
_____
_____

DESCRIBE THE INJURY AND THE SPECIFIC PART OF THE BODY AFFECTED (i.e. laceration, right hand, third finger):
_____
_____

OBJECT OR SUBSTANCE THAT DIRECTLY INJURED EMPLOYEE: _____
_____
NUMBER OF DAYS AND HOURS EMPLOYEE USUALLY WORKS PER WEEK: _____
IS THE EMPLOYEE EXPECTED TO LOSE AT LEAST ONE FULL DAY OF WORK? _____
DOES THE EMPLOYEE HAVE A PREVIOUS CLAIM? Y N if yes, STATUS: Open Closed
WAS THE EMPLOYEE ASSIGNED TO RESTRICTED DUTY? _____

C. ACCIDENT INVESTIGATION INFORMATION

WAS SAFETY EQUIPMENT PROVIDED? Y N If yes, was it used? Y N
WAS AN UNSAFE ACT BEING FORMED? Y N If yes, describe_____
WAS A MACHINE PART INVOLVED? Y N If yes, describe _____
WAS THE MACHINE PART DEFECTIVE? Y N If yes, in what way _____
WAS A 3RD PARTY RESPONSIBLE FOR THE ACCIDENT/INCIDENT? Y N
If yes, list Name, address, and phone number_____
WAS THE ACCIDENT/INCIDENT WITNESSED? Y N
If yes, list Name, address, and phone number: _____

D. PROVIDER INFORMATION

WAS FIRST AID GIVEN ON SITE? Y N
If yes, what type of medical treatment was given _____
PHYSICIAN INFORMATION (if medical attention was administered)
NAME: _____
ADDRESS (incl. city, state, and zip):_____
PHONE: _____
HOSPITAL ADDRESS (incl. Name, address, city, state, zip code, & phone)_____
_____
WAS THE EMPLOYEE HOSPITALIZED? Y N If yes, on what date_____
WAS THE EMPLOYEE TREATED AS AN OUTPATIENT, RECEIVE EMERGENCY TREATMENT OR AMBULANCE SERVICE? _____

PLEASE ATTACH THE PHYSICIAN'S WRITTEN RETURN TO WORK SLIP

***NOTE* A PHYSICIAN'S RETURN TO WORK SLIP IS REQUIRED PRIOR TO ALLOWING THE WORKER TO RETURN TO WORK**

E. AUTOMOBILE ACCIDENT INFORMATION (complete if applicable)

AUTHORITY CONTACTED AND REPORT #_____
EA EMPLOYEE VEHICLE YEAR, MAKE, AND MODEL_____
V.I.N._____ PLATE/TAG #_____

OWNER'S NAME AND ADDRESS: _____
_____
DRIVER'S NAME AND ADDRESS: _____
_____
RELATION TO INSURED: _____DRIVER'S LICENSE #_____
DESCRIBE DAMAGE TO YOUR PROPERTY: _____
_____
_____
DESCRIBE DAMAGE TO OTHER VEHICLE OR PROPERTY: _____
_____
_____
OTHER DRIVER'S NAME AND ADDRESS: _____
_____
OTHER DRIVER'S PHONE: _____
OTHER DRIVER'S INSURANCE COMPANY AND PHONE_____
_____
LOCATION OF OTHER VEHICLE: _____
NAME, ADDRESS, AND PHONE OF OTHER INJURED PARTIES:_____
_____
_____
WITNESSES NAME: _____ PHONE:_____
ADDRESS: _____
STATEMENT:_____
_____
SIGNATURE: _____
NAME: _____ PHONE: _____
ADDRESS:_____
STATEMENT:_____
_____
SIGNATURE: _____

F. ACKNOWLEDGEMENT

NAME OF SUPERVISOR: _____
DATE OF THIS REPORT: _____ REPORT PREPARED BY:_____

I have read this report and the contents as to how the accident/loss occurred is accurate to the best of my knowledge.

Signature: _____ Date: _____
Injured Employee

I am seeking medical treatment for a work related injury/illness.

Please forward all bills/invoices/correspondence to:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

11019 McCORMICK ROAD

HUNT VALLEY, MD 21031

ATTENTION: Michele Bailey
HUMAN RESOURCES

(410) 584-7000
(410) 771-1780 – FAX

"NEAR MISS" INCIDENT REPORT

A "near miss" is a potential hazard or incident that has not resulted in any personal injury or property damage. Unsafe working conditions, unsafe employee work habits, improper use of equipment, or use of malfunctioning equipment have the potential to cause work-related injuries. It is everyone's responsibility to report and correct these potential accidents/incidents immediately.

Please complete this form as a means to report these "near miss" situations.

Department/Location _____ Date: _____ Time: _____ a.m. / p.m.

Please check all appropriate conditions:

_____ Unsafe act _____ Unsafe equipment _____ Other
_____ Unsafe condition _____ Unsafe use of equipment

Description of incident or potential hazard _____

Employee Signature _____ Date _____

"NEAR MISS" INVESTIGATION

Description of the "Near Miss" Condition _____

Causes (primary and contributing) _____

Corrective Action Taken (i.e., remove the hazard; replace, repair, or retrain in the proper procedures for the task) _____

Signed _____ Date Completed _____

Form not completed within 4 hours of incident for the following reason(s) _____

_____ _____
Corporate Safety and Health Director Date

******Forward to Corporate Director of Safety and Health when completed.******

Revised July 2006

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