



TETRA TECH FOR USAID

Architect–Engineer Services II for Dioxin Remediation at Bien Hoa Airbase Area

SITE-WIDE HEALTH AND SAFETY PLAN

Revision 005: December 10, 2024

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Revision 005: Submitted December 10, 2024

This report was review and revised for the United States Agency for International Development by Architect-Engineer Services II for Dioxin Remediation at Biên Hòa Airbase Area (A&E II) Activity under Contract No: 7200AA21D00002 / Task Order No.: 72044023F00002.

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RECORD OF REVISION

Revision	Date	Pages	Revisions	Submitted By	Approval
000	November 11, 2019	All	Initial development/submittal of draft Health & Safety Plan.	Trigon Associates, Inc.	USAID CO/COR
001	December 5, 2019	All	Response to USAID and Trigon Comments	Trigon Associates, Inc.	USAID CO/COR
001.1	June 23, 2020	9-7, M-10	Updated the map to the hospital	Trigon Associates, Inc.	Not applicable
001.2	August 10, 2020	2-1	Updated the overview map	Trigon Associates, Inc.	Not applicable
002	February 5, 2024	All	Review and revision of initial Health & Safety Plan (Rev 001.2).	Tetra Tech, Inc.	
003	May 28, 2024	Appendix Updates	Update Appendix N UXO Awareness Training / Appendix O Silica Exposure Control	Tetra Tech, Inc.	
004	November 11, 2024	Blood Dioxin Monitoring Group Clarification	Clarified the adherence to the site required health/blood monitoring requirements and added the Medical Surveillance Program Orientation to Appendix L.	Tetra Tech, Inc.	
005	December 10, 2024	LSECS modification Update EM 385 version to 2024	Changed LSECS designation to ECS (environmental compliance specialist) or HSO (health and safety officer) Update EM 385 version to January 2024 version Updates to emergency contact numbers		

LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
°C	degree(s) Celsius
°F	degree(s) Fahrenheit
A&E	Architecture and Engineering
ACGIH	American Conference of Industrial Hygienists
ADAFC	Air Defense Air Force Command
AED	Automatic External Defibrillator
AEGCP	Assured Equipment Grounding Conductor Program
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APR	Air purifying respirator
BBP	Bloodborne Pathogens
CBC	Complete Blood Count
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CIT	Certified Instructional Trainer
CM	Construction Manager
CO	Contracting Officer
COP	Chief of Party
COR	Contracting Officer Representative
CPM	Contractor Project Manager
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSO	Contractor Safety Officer
CSP	Certified Safety Professional
CZ	Clean Zone
dB	Decibels
dba	Decibels measured on the A-Weighted scale
DCOP	Deputy Chief of Party
Decon	Decontamination
EA	Environmental Assessment
EM 385-1-1	USACE Safety and Health Requirements Manual
EMR	Experience Modification Rate
EPA	U.S. Environmental Protection Agency
ERT	Emergency Response Team
EZ	Exclusion Zone
FMP	Fatigue Management Plan
GFCI	Ground-fault Circuit Interrupter

GHS	Globally Harmonized System
GPS	Global Positioning System
GVN	Government of Vietnam
HASP	Health and Safety Plan
Hazwoper	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HCS	Hazard Communication Standard
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HSO	Health and Safety Officer
HTRW	Hazardous, Toxic, and Radioactive Waste
JECFA	Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives
km	kilometer
km	kilometer
LEL	Lower Explosive Limit
ECS	Environmental Compliance Specialist
m ³	Cubic meter
mA	milliampere
NHANES	National Health and Nutrition Examination studies
NIOSH	National Institute of Occupational Safety and Health
OPIM	Other Potentially Infectious Materials
OSHA	Occupational Safety and Health Administration
PCDD/F	polychlorobenzodioxins and polychlorodibenzofurans
PEL	Permissible Exposure Limit (OSHA)
pg/g	picograms per gram
pg/kg-day	picograms per kilogram per day
PPE	Personal Protective Equipment
QC	Quality Control
SAP/QAPP	Site-Wide Sampling and Analysis Plan/Quality Assurance Project Plan
SAR	Supplied air respirator
SCBA	Self-contained breathing apparatus
SCPM	Site Contractor Project Manager
SDS	Safety Data Sheet
SHASP	Supplemental HASP
SMA	Sequential Multi-channel Analysis
SOP	Standard Operating Procedure
SWEMMP	Site-Wide Environmental Mitigation and Monitoring Plan
TCDD	2,3,7,8-Tetrachlorodibenzodioxin
TDI	Tolerable Daily Intake
TEF	Toxicity Equivalence Factor

TEQ	Toxicity Equivalent
TLV	Threshold Limit Value
tsf	Tons per square foot
TWA	Total Weight Average
U.S.	United States
USAID	U.S. Agency for International Development
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
UXO	Unexploded ordnance
VPAF	Vietnam People's Air Force

I BACKGROUND INFORMATION

I.1 PROJECT INFORMATION AND BACKGROUND

Client:	United States Agency for International Development (USAID)
Project Name:	Dioxin Remediation at Bien Hoa Airbase Area Project (Project)
A&E Bien Hoa Contractor:	Trigon Associates, Inc. (2018 – 2023)
A&E II Contractor:	Tetra Tech, Inc. (2023 – 2026)

The Initial Site-Wide Health and Safety Plan (HASP) was prepared for USAID under the Task Order 72044019F00001, Contract Number AID—OOAA-I-15-00053 by the A&E Bien Hoa Contractor. The Site-Wide HASP was reviewed and updated by “Architect-Engineer Services II for Dioxin Remediation at Bien Hoa Airbase Area (A&E II) Activity” under Contract No. 7200AA21D00002, Task Order (TO) No: 72044023F00002 in February 2024.

This Site-Wide HASP presents health and safety procedures that apply to Project personnel and activities. This HASP applies to Project activities including site investigations/evaluations, remediation, construction, and post-construction activities. USAID requires compliance with this Site-Wide HASP by Project Contractors, base personnel, and associated third parties to ensure a safe work environment for Project personnel.

The Project location is the Bien Hoa Airbase Area which includes the Bien Hoa Airbase and associated off-Airbase locations (Figure I). The Bien Hoa Airbase is an active Air Defense Air Force Command (ADAFC) airbase located in Bien Hoa City, Dong Nai Province, approximately 30 kilometers (km) northeast of Ho Chi Minh City. The Bien Hoa Airbase property is located within the Tan Phong Ward and is adjacent to the Trung Dung, Quang Vinh, and Buu Long Wards, which are densely populated residential neighborhoods.

The Bien Hoa Airbase Area is one of three major dioxin contamination hotspots in Vietnam identified through studies completed in the 1990s. Bien Hoa, along with Phu Cat and Danang Airport, were used by the United States (U.S.) military for the import, storage, and loading of Agent Orange between 1961 and 1971. In 2016, USAID, in close collaboration with the GVN, completed the "Environmental Assessment of Dioxin Contamination at Bien Hoa Airbase". The overall objective of the Environmental Assessment (EA) was to inform potential future actions at the Bien Hoa Airbase Area to address dioxin-related contamination. The EA serves as the primary resource documenting characterization of dioxin contamination on and around the Bien Hoa Airbase Area.

I.2 CONTRACTOR INFORMATION

This Site-Wide HASP applies to Project personnel and activities. Project activities will be implemented by the Project Contractors. Project Contractors will be identified through awards by USAID to implement the dioxin remediation activities at the Bien Hoa Airbase Area. USAID is expected to specify particular health and safety requirements for each contractor in these awards. However, in general, this Site-Wide HASP will be an essential guide for all contractors and establishes the minimum safety and health requirements for Project Contractors and personnel to follow.

I.3 SCOPE

This Site-Wide HASP defines the required Project health and safety procedures and programs that apply to Project personnel and activities. Project workers speak either English and/or Vietnamese, and safety and training material will be made available in the appropriate language through either written or oral translation. As the Project progresses, supplemental HASPs (SHASPs) will be prepared by the Project Contractors (including the A&E Bien Hoa Contractor and A&E II Contractor) for site investigations/evaluations, remediation, construction, and post-construction activities. The types of activities may expand to include confined space entry, electrical, and elevated work depending on the Project needs. These SHASPs will comply with this Site-Wide HASP and be included as annexes. The A&E II Contractor is responsible for maintaining this Site-Wide HASP.

This Site-Wide HASP has been prepared and/or revised to meet the requirements of Government of Vietnam (GVN) Occupational Safety and Health standards, United States Occupational Safety and Health Administration (OSHA) standards found in Title 29 Code of Federal Regulations (CFR), Parts 1910 and 1926; and the United States Army Corps of Engineers (USACE) “Safety and Health Requirements Manual” (January, 2024 edition) (EM 385-1-1).

FIGURE I: BIEN HOA AIRBASE SITE MAP



2 SAFETY AND HEALTH POLICY STATEMENT

2.1 PROJECT SAFETY AND HEALTH POLICY STATEMENT

The objective of the Project safety and health program is to establish work procedures that ensure Project work is performed in a safe and healthful manner. During the course of the Project, the safety and health of Project personnel will be the first consideration when planning and executing work and will not be questioned or compromised. To be successful, the Project safety and health program must encourage a culture of safety that fosters proper attitudes toward incident prevention on the part of both supervisors and employees. It also requires cooperation in all safety and health program aspects, not only between supervisors and employees, but also between employees and their fellow workers. Only through such a cooperative effort can an effective safety and health program be maintained.

One of the primary objectives of the Project safety and health program is incident prevention. The Project safety and health program strives to maintain incident-free operations, which can only be achieved through total demonstrated commitment to this safety and health policy from Project personnel. Project personnel must recognize and understand that incidents and injuries can be prevented.

To establish and maintain an effective safety and health program, Project personnel must:

- Maintain a safe workplace, equipment, and materials;
- Establish and comply with safe work operations and accepted safe work rules, procedures, and practices in compliance with safety and health regulations;
- Provide effective safety and health training that teaches Project personnel how to identify potential hazards and provides the necessary protocols, tools, and equipment to appropriately mitigate identified hazards;
- Understand that they have a duty and responsibility to maintain their own safety and the safety of their coworkers; and
- Actively support the Project safety and health program and embrace the philosophy that “Incidents Can Be Prevented.”

2.2 PROJECT SAFETY GOALS

The Project accident experience goal is zero incidents. Project personnel will complete required training and, when necessary, retraining will be provided. Project personnel will report near misses and site hazards in a timely manner. Several measures will be taken to achieve and maintain the goal of zero incidents.

- Project Contractors must engage in open dialog with site workers to identify and mitigate hazards that could cause injury, accident, environmental incident, security incident, or property damage.
- Project Contractors will conduct daily inspections to monitor the proper use of personal protective equipment (PPE), general safe work practices, and housekeeping. The results of inspections will be presented in Project Contractor meetings, and mitigation measures will be discussed and implemented.
- Prior to beginning a new work activity, Project Contractors must provide to USAID, through the A&E II Contractor, an Activity Hazard Analysis (AHA) that describes the work,

associated hazards, mitigation measures, training requirements, engineering controls, work practices, and PPE to be used.

- Project Contractors will require their personnel to report accidents or injuries. When an incident occurs, Project Contractors must conduct a thorough investigation to ascertain the cause and measures to be taken to prevent recurrence.
- Project Contractors must initiate a hazard and “Near Miss” reporting system for Project personnel. Project Contractors will require their personnel to report identified hazards and, if assistance is required in removing a hazard, measures will be identified to mitigate the hazard.

2.3 SITE-WIDE HEALTH AND SAFETY PLAN DESCRIPTION

This Site-Wide HASP establishes the written Project safety and health program that applies to Project personnel and activities to be conducted at the Bien Hoa Airbase Area. Project activities will be implemented by the Project Contractors (including the A&E II Contractor) and will include the following activities related to the treatment and isolation of dioxin contaminated soil and sediment at the Bien Hoa Airbase Area:

- Mobilization;
- Site investigations/Evaluations;
- Excavation;
- Maintenance of contaminated material short-term storage;
- General construction;
- Construction of a remedial system;
- Construction of a long-term storage area;
- Remediation;
- Environmental monitoring; and
- Demobilization.

As the Project progresses and additional site data is collected, additional activities may be added to the scope of the Project. Project Contractors will be identified through awards by USAID to implement the dioxin remediation activities at the Bien Hoa Airbase Area. USAID is expected to specify particular health and safety requirements for each contractor in these awards. However, in general, this HASP will be an essential guide for Project Contractors and establishes the minimum safety and health requirements for Project Contractors and personnel to follow. Project Contractors (including the A&E II Contractor) are required to prepare SHASPs for their contract-specific work activities that must comply with the minimum safety and health requirements established in this Site-Wide HASP. This Site-Wide HASP will be provided to Project Contractors required to prepare a SHASP. During preparation of SHASPs and/or review of the Site-Wide HASP, Project Contractors must immediately notify USAID and the A&E II Contractor if safety and health deficiencies are found in the Site-Wide HASP.

This HASP has been prepared to meet the requirements of: GVN Occupational Safety and Health standards; OSHA standards as found in Title 29 CFR, Parts 1910 and 1926; and USACE EM 385-1-1. The implementation of this HASP assists Project personnel to take proactive measures to recognize, evaluate, and control workplace hazards in order to minimize the potential for injuries and illness. The main objectives of the Site-Wide HASP are to:

- Provide personnel with a safe working environment;
- Establish an effective Project safety and health program;
- Identify key Project personnel, their safety and health responsibilities, and the lines of authority;
- Establish procedures for identifying and evaluating workplace hazards and prescribe safety control measures to mitigate them;
- Create and reinforce safety conscious attitudes amongst Project personnel;
- Establish a system to facilitate Project personnel compliance with safe work practices and procedures for correcting unsafe conditions;
- Provide safety and health training for Project personnel;
- Establish a medical monitoring program for Project personnel that includes a blood serum dioxin monitoring program; and
- Implement procedures for the reporting and investigation of Project site-related injuries, illnesses, vehicular accidents, property damage, security incidents, and environmental damage.

USAID requires compliance with the Site-Wide HASP by Project Contractors and personnel and associated third parties. A copy of the Site-Wide HASP will be maintained on site during work activities and will be available for inspection and review. Project personnel are required to review applicable aspects of the Site-Wide HASP before site work and sign a “Site-Wide HASP Review” acknowledgment form (see Appendix A – Health and Safety Plan Forms) indicating that they have reviewed the pertinent aspects of the Plan.

Project Contractors will prepare SHASP for site investigations/evaluations, remediation construction, post construction, and other activities to be included in the Site-Wide HASP. The A&E II Contractor will amend the Site-Wide HASP to incorporate SHASPs as annexes once they are approved by USAID. The A&E II Contractor may recommend, and/or USAID may direct, revision and/or amendment of the Site-Wide HASP as additional information becomes available regarding the site hazards or when significant changes occur in the scope of work, operational procedures, site hazards, or hazard control measures. This Site-Wide HASP may be modified by the A&E II Contractor Environmental Compliance Specialist (ECS) upon review and approval of the A&E II Contractor Health and Safety Officer (HSO) and Chief of Party (COP), and USAID Contracting Officer (CO). USAID will inform Project Contractors of changes to the Site-Wide HASP. Project Contractors are required to inform Project personnel of the changes in the revised/amended Site-Wide HASP through safety meetings and other means. Safety and health responsibilities of key Project personnel and lines of authority are presented in the following Section.

3 RESPONSIBILITIES AND LINES OF AUTHORITIES

Responsibility for safety and health is shared by Project Contractors and personnel. An effective safety and health program can only be maintained through a cooperative effort between supervisors and employees, and employees and their fellow workers. This section identifies key Project personnel, their safety and health responsibilities, and the lines of authority and cooperation. This section also describes designated competent persons, establishes pre-task safety and health analysis procedures, and establishes safety compliance and enforcement procedures.

3.1 KEY PROJECT PERSONNEL

USAID, the A&E II Contractor, Project Contractors, and Project personnel are responsible for the implementation and compliance with the Project safety and health program as presented in this Site-Wide HASP. Key USAID and A&E II Contractor Project personnel are identified in Table I. Additional key Project personnel are identified in the Project “Emergency Contact List” (see Table 6).

For other Project Contracts, the required SHASPs must specify and identify the following positions:

- USAID Contracting Officer’s Representative (COR)
- Contractor Project Manager (CPM)
- Site Contractor Project Manager (SCPM)
- Contractor Safety Officer (CSO)

TABLE I: KEY PROJECT PERSONNEL

POSITION	CURRENT POSITION	ORGANIZATION	CONTACT INFORMATION	START DATE	RECORD OF REVISIONS
Contracting Officer (CO) USAID	Jameson Hutton	USAID	Phone: +84 963 654 766 Email: jhutton@usaid.com		
Contracting Officer's Representative (COR) USAID	Christine Katin	USAID	Mobile: +84 962002758 Email: ckatin@usaid.gov		
Chief of Party (COP) A&E II Contractor	Matt Harder	Tetra Tech	Mobile: +84 789 431 043 Email: Matt.Harder@tetrattech.com		
Deputy Chief of Party (DCOP) / Remediation Specialist A&E II Contractor	David Liu Ph.D	Tetra Tech	Mobile: +84 862812971 Email: David.Liu@tetrattech.com		
Safety and Health Advisor A&E II Contractor	Jeffrey Streib, Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP)	Tetra Tech	Mobile: +1 2407279240 Email: Jim.Streib@tetrattech.com		
Health and Safety Officer (HSO) A&E II Contractor	Karl Tilgner	CDM Smith	Mobile: +84 933760553 Email: tilgnerkw@cdmsmith.com		
Construction Manager (CM) A&E II Contractor	Mai Trieu Quang	Tetra Tech	Mobile: +84 90 351 1779 Email: quang.mai@tetrattech.com		
Environmental Compliance Specialist (ECS) A&E II Contractor	David Liu, Ph.D	Tetra Tech	Mobile: +84 862812971 Email: David.Liu@tetrattech.com		
Contractor Project Manager Project Contractor	Doan Hong Ngoc	Vina E&C	Mobile: +84 0937 928 246 Email: ngocdoan@vinaenc.com.vn		
Site Contractor Project Manager Project Contractor	Doan Hong Ngoc	Vina E&C	Mobile: +84 0937 928 246 Email: ngocdoan@vinaenc.com.vn		
Contractor Safety Officer Project Contractor	Mahbub	Vina E&C	Mobile: +84 34 307 9392 Email: mahbub@vinaenc.com.vn		

3.2 KEY PROJECT PERSONNEL HEALTH AND SAFETY RESPONSIBILITIES

Table 2 describes the health and safety responsibilities for the identified key Project personnel and site personnel, and established lines of authority. The key Project personnel include USAID, A&E II Contractor, and other Project Contractor(s) personnel.

TABLE 2: KEY PROJECT PERSONNEL HEALTH AND SAFETY RESPONSIBILITIES

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
USAID Key Personnel		
Contracting Officer (CO)	Manages the Project contract and is the USAID primary point of contract for safety and health issues. The USAID CO can designate their safety and health responsibilities to the USAID COR.	• Provide final approval of the Site-Wide HASP prior to any work, except non-intrusive site work, and
Contracting Officer's Representative (COR)	Manages and oversees the Project technical direction.	Review the Site-wide HASP and recommend approval to Contracting Officer. Review and approve subsequent annexes to the Site-wide HASP, including SHASPs and new AHAs.
AE Contractor Key Project Personnel		
Chief of Party (COP)	Leads the A&E Services for Dioxin Remediation at the Bien Hoa Airbase Area activity and is the primary point of contact with USAID on the Site-Wide HASP.	• Direct, coordinate, and implement the A&E contract; • Review and submit to USAID the Site-Wide HASP and A&E II SHASPs; • As requested by USAID, review and comment on SHASPs and new AHAs submitted by other Project Contractors; • Review addenda to the Site-Wide HASP to incorporate updates approved by the CO; • Emphasize safety and health to workers and guests at the Bien Hoa Airbase Area; • Request dismissal of Project personnel who consistently exhibit unsafe work performance after notice to the worker from the CO and COR; • Notify the USAID CO and COR and direct or suspend Project Contractor's work when the continued performance of the work will endanger the health, or safety of the public or Project personnel;

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
		• Communicate with the CO to evaluate and resolve contractor/subcontractor safety and health issues. • Allocate the necessary resources and support required to implement and enforce this HASP; • Provide resources and support to the A&E II Contractor CM and safety and health staff (Safety and Health Advisor, HSO, and ECS); and • Communicate with the CO to evaluate and resolve safety and health issues.
Deputy Chief of Party (DCOP) / Remediation Specialist	Leads the technical aspects of the A&E Services for Dioxin Remediation at the Bien Hoa Airbase Area activity. The A&E II Contractor COP can designate their safety and health responsibilities to the A&E II Contractor DCOP.	• Direct, coordinate, and implement the technical aspects of the A&E contract; • Review the Site-Wide HASP and annexes including SHASPs and new AHAs; • Provide resources and support to the A&E II Contractor CM and safety and health staff (Safety and Health Advisor, HSO, and ECS); • Emphasize safety and health to workers and guests at the Bien Hoa Airbase Area; and • Schedule safety and health inspections and audits for the A&E II Contractor HSO to conduct.
Safety and Health Advisor	Supports and advises the A&E II Contractor COP and DCOP on safety and health aspects of the A&E Services for Dioxin Remediation at the Bien Hoa Airbase Area activity.	• Advise and support the A&E II Contractor COP and DCOP on safety and health topics; • Review the Site-Wide HASP and annexes including SHASPs and new AHAs; and • Work collaboratively with the A&E II Contractor HSO.
Health and Safety Officer (HSO)	Overall safety manager assigned to support the Project. The A&E II Contractor ECS and CWI CSO have a direct reporting relationship to the A&E II Contractor HSO regarding all safety and health matters. The A&E II Contractor HSO implements the Site-Wide HASP and oversees the activities of the A&E II Contractor ECS and CSO. The HSO has an independent reporting relationship from Project management and supervision. A summary resume for the HSO is provided in Appendix B – A&E II Health and Safety	• Develop the Site-Wide HASP and A&E II Contractor SHASPs; • Review addenda to the Site-Wide HASP to incorporate updates approved by the CO; • Review SHASPs for compliance with the Site-Wide HASP; • Review new AHAs for compliance with the Site-Wide HASP; • Review modifications to existing AHAs; • Work collaboratively with the Safety and Health Advisor;

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
	Officer Overview. The A&E II Contractor HSO can designate their safety and health responsibilities to the A&E II Contractor ECS.	• Provide safety and health technical assistance to the A&E II COP, DCOP, CM, and ECS; and • Communicate with the CO and designated representatives to evaluate/resolve safety and health issues.
Construction Manager (CM)	Provides primary oversight of Project Contractors and directly reports to the A&E II Contractor COP.	• Review the Site-Wide HASP and annexes including SHASPs and new AHAs; • Allocate resources, as required, to implement the Site-Wide HASP; • Recognize and award the safety achievements of crews/team/contractors; • Begin every meeting with a safety moment; • Recognize unsafe acts and conditions and take the necessary corrective actions; • Implement and enforce the Site-Wide HASP; and • Emphasize safety and health to workers and guests at the Bien Hoa Airbase Area.
Environmental Compliance Specialist (ECS)	The A&E II Contractor ECS leads the activities to monitoring CWI compliance of the Site-Wide Environmental Mitigation and Monitoring Plan. The ECS is designated as a competent health and safety replacement if the HSO is unavailable.	• With HSO, develop the Site-Wide HASP and A&E II Contractor SHASPs; • Review addenda to the Site-Wide HASP to incorporate updates approved by the CO; • Review SHASPs for compliance with the Site-Wide HASP; • Review AHAs for compliance with the Site-Wide HASP; • Review modifications to existing AHAs; • Maintain copies of the Site-Wide HASP on site during field activities; • Implement provisions of the Site-Wide HASP and the Project safety and health program; • Recommend safety and health inspections and audits to the A&E II Contractor COP; • Conduct safety and health inspections and audits as scheduled by the A&E II Contractor COP;

Dioxin Remediation at Bien Hoa Airbase Area Project
Site-Wide Health & Safety Plan

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
		• Require that site personnel meet training and medical surveillance requirements; • Conduct site orientation training and Site-Wide HASP reviews; • Conduct training as new activities and/or hazards are introduced; • Emphasize safety and hold personnel accountable for safe work performance; • Review site hazards and establish safety control measures; • Maintain a hazardous substance inventory list; • Maintain copies of each safety data sheet (SDS); • Maintain safety equipment and supplies; • Perform weekly safety inspections and document safety and health findings; • Collect, review, and provide comments on copies of the Daily Safety Log prepared by the CSO; • Enforce implementation and compliance with the Site-Wide HASP and Project safety and health program; • Ensure site control work zones and boundaries comply with the Site-Wide HASP; • Determine PPE requirements and monitor proper use; • Direct decontamination procedures to be used; • Perform and/or coordinate site exposure monitoring; • Report safety violations or safety and health concerns promptly to the A&E II Contractor COP and HSO; • Request dismissal of Project personnel who consistently exhibit unsafe work performance after notice to the worker from the USAID CO/COR; • Notify the USAID CO and COR and direct or suspend Project Contractor's work when continued performance of the work will endanger the health, or safety of the public or Project personnel; • Ensure correction of unsafe work conditions and/or unsafe work practices;

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
		• Monitor and evaluate safety and health performance of Project operations; • Maintain Project safety and health records including anonymous blood serum dioxin monitoring results to be shared with USAID; • Maintain and update AHAs as Project activities progress; • Report and investigate accidents and incidents; • Serve as a member of the A&E II Contractor quality control staff on safety and health matters; • Communicate with the A&E II Contractor HSO regarding site activities and Site-Wide HASP compliance; and • Communicate with the CO to evaluate and resolve safety and health issues.
Project Contractor Key Personnel		
Contractor Project Manager	Each Project Contractor (except the A&E II Contractor) will have a CPM who is responsible for overall direction, coordination, technical consistency, and review of the Project Contractor contract.	• Direct, coordinate, and implement their contract; • Review the Site-Wide HASP; • Review and submit their contract-specific SHASP; • Emphasize safety and health, and hold their personnel accountable for safe work performance; • Enforce implementation and compliance with the Site-Wide HASP, contract-specific SHASP, and Project safety and health program; • Per its contract with USAID, establish a procedure to notify the USAID CO and COR and to direct or suspend Project Contractor's work when the continued performance of the work will endanger the health, welfare, or safety of the public or Project personnel; • Provide resources and support to the SCPM and CSO; • Monitor and evaluate safety and health performance of their operations; and • Communicate with the CO to evaluate and resolve contractor/subcontractor safety and health issues.

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
Site Contractor Project Manager	Each Project Contractor (except the A&E II Contractor) will have a SCPM who is responsible for the successful completion of the Project Contractor field operations. The SCPM reports to the CPM for site-related matters.	• Prepare and organize Project Contractor activities on site; • Review the Site-Wide HASP; • Review and concur with their contract-specific SHASP; • Provide equipment and materials for site operations; • Emphasize safety and health and hold personnel accountable for safe work performance; • Enforce implementation and compliance with the Site-Wide HASP, contract-specific SHASP, and Project safety and health program; • Ensure correction of unsafe work conditions and/or unsafe work practices; • Monitor and evaluate safety and health performance of site operations; • Report and investigate accidents and incidents and sign the reports; and • Communicate with the CO to evaluate and resolve safety and health issues.
Contractor Safety Officer	Each Project Contractor (except the A&E II Contractor) will have a CSO who is the on-site Project Contractor safety and health supervisor present during Project Contractor fieldwork activities as required by EM 385 I-I. The CSO will work directly with the A&E II Contractor HSCO and ECS. If the CSO must be absent from the site, the safety and health duties must be delegated to another qualified responsible party at the site (e.g., SCPM). The CSO must ensure that the person assuming this temporary role is first aid/CPR certified and is fully aware of their role and responsibilities during the CSO's absence. If a qualified replacement is not available, then work shall stop for a safety stand-down until a qualified/certified person is available.	• Review the Site-Wide HASP; • Prepare the contract-specific SHASP and submit for approval; • Prepare and facilitate the Project Contractor serum dioxin monitoring program; • Maintain copies of the Site-Wide HASP and contract-specific SHASP on site during field activities; • Implement provisions of the Site-Wide HASP, contract-specific SHASP, and the Project safety and health program; • Ensure that Project Contractor personnel meet training and medical surveillance requirements; • Conduct site orientation training, Site-Wide HASP and contract-specific SHASP review, and daily safety meetings; • Conduct training as new activities and/or hazards are introduced;

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
		• Emphasize safety and hold Project Contractor personnel accountable for safe work performance; • Review site hazards and establish safety control measures; • Maintain a hazardous substance inventory list and provide to the A&E II Contractor HSO; • Maintain copies of each SDS and provide updates to the A&E II Contractor HSO; • Maintain safety equipment and supplies; • Perform daily safety inspections and document safety and health findings on inspection log and provide to the A&E II Contractor HSO; • Track safety and health deficiencies to ensure that they are corrected and report any deficiencies to the A&E II Contractor HSO; • Enforce implementation and compliance with the Site-Wide HASP, contract-specific SHASP, and Project safety and health Program; • Establish site control work zones and boundaries; • Enforce and monitor the PPE requirements in the Site-Wide HASP; • Enforce and monitor the decontamination procedures established in the Site-Wide HASP; • Perform and/or coordinate site exposure monitoring; • Report safety violations or safety and health concerns promptly to the SCPM and A&E II Contractor HSO; • Ensure correction of unsafe work conditions and/or unsafe work practices; • Monitor and evaluate safety and health performance of Project Contractor operations; • Maintain and report safety and health records including anonymous blood serum dioxin monitoring results to the A&E II HSO to be shared with USAID;

Dioxin Remediation at Bien Hoa Airbase Area Project
Site-Wide Health & Safety Plan

TITLE	ROLE	HEALTH AND SAFETY RESPONSIBILITIES
		• Work with the A&E II Contractor HSO to maintain and update Activity Hazard Analyses (AHAs) as Project Contractor activities progress; • Report and investigate accidents and incidents and provide reports to the SCPM and A&E II Contractor HSO; • Communicate with the A&E II Contractor HSO regarding site activities and Site-Wide HASP compliance; and • Communicate with the CO to evaluate and resolve safety and health issues.
All Project Personnel		
Site Personnel	Perform designated work activities.	• Understand and comply with the Site-Wide HASP and the applicable Project Contractor SHASP, • Follow instructions of the CSO or other competent authority, • Promptly report any unsafe work conditions or unsafe work practices, • Immediately report all injuries or illnesses to direct supervisors and the CSO, and • Stop work for a safety stand-down if unsafe working conditions are encountered.

3.3 DESIGNATED COMPETENT PERSONS

A “Competent Person” (as defined by OSHA) is a person who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authority to take prompt corrective measures to eliminate them. The Project safety and health program requires that a designated competent person be present on the job site for work to be performed. The names of Competent and/or Qualified Persons and proof of competency or qualification to meet specific OSHA Competent/Qualified Persons requirements will be provided as site operations progress (Appendix C). At a minimum, the Designated Competent Persons shall meet the OSHA requirements listed in 1926.32(f). The competent person shall present a letter from the CSO designating them as a Competent Person. For a list of Competent Persons for this Project, refer to Appendix C.

3.4 PRE-TASK SAFETY AND HEALTH ANALYSIS

The first step in safety and health planning for a new work activity is defining the types of work and associated risks. AHAs are tools to identify and define the work activities and associated tasks, identify the sequence of work and specific anticipated hazards, and establish necessary control measures to eliminated or reduce each hazard to an acceptable risk level. The Project safety and health program requires that AHAs be prepared before beginning new work activities that involve hazards not previously experienced or where a new Project Contractor is to perform the work activities. New work crews must review and familiarize themselves with the applicable AHA. The AHA is developed to identify hazards and control measures for primary work activities and tasks. Work does not proceed on a new activity (or one with a modified AHA) until the AHA (or modified AHA) has been reviewed by the CSO and A&E II Contractor HSO, accepted by the relevant, contract-specified USAID official, and the AHA has been reviewed with involved Project personnel. AHAs are living documents that are continuously reviewed and modified when appropriate to address changing site conditions or operations.

AHAs will be prepared for work activities and tasks considered potentially hazardous including the initial work tasks listed below.

- General site activities;
- Site reconnaissance;
- Site characterization activities;
- Vehicle travel;
- Mobilization;
- Decontamination/Demobilization;
- Excavation and earthmoving; and
- Working over or near water.

AHAs have been prepared for the first three tasks and are presented as example AHAs in Appendix D – Activity Hazard Analysis. However, preparation of AHAs will be required for all work activities considered potentially hazardous. The blank AHA form is included in Appendix A. AHAs will be developed to suit new site activities and annexed to the Site-Wide HASP. Project Contractors shall prepare AHAs for their specific activities and include them in their contractor-specific SHASP.

3.5 SAFETY COMPLIANCE AND ENFORCEMENT

Compliance with safe work practices and the Project safety and health program is required of Project personnel in every capacity. Project personnel have the right to stop work if they determine the conditions are unsafe or will rapidly become unsafe. Effectiveness of the Site-Wide HASP is highly dependent upon the involvement, direct supervision, and enforcement of safety requirements by supervisory personnel.

3.5.1 GENERAL SAFE WORK PRACTICES

Project personnel must work in a safe manner to ensure a safe work environment. Standard safe work procedures include, but are not limited to, the following:

- Project personnel must report to work in a ready-to-work state and in suitable work clothing;
- Illicit drugs, alcohol, and firearms are not allowed on site;
- Horseplay and gambling are not allowed on site;
- Use of personal radios or other items that may distract attention are not permitted;
- Eating, drinking, and smoking are not permitted in work areas;
- The buddy system will be observed while working at the site unless the work activity requires the work to be conducted alone, the exception has been approved by their CSO, and the HSO has been notified;
- PPE and respiratory protection will be properly used by all site workers;
- Harassment, bullying, or physical violence of any kind will not be tolerated and will result in dismissal.

3.5.2 SAFE WORK PRACTICES FOR USE OF TOOLS, EQUIPMENT AND MACHINERY

Tools, equipment, and machinery inspection and maintenance are required to promote safe working conditions. Tools (including hand and power tools), equipment, and machinery must be inspected daily or before each use for defects. Tools that are burred, mushroomed, have split or loose handles, worn or sprung jaws, or are generally unsafe must be turned into the CSO and A&E II Contractor HSO. Defective or unsafe equipment must be tagged as defective until repaired or otherwise made acceptable. Defective or unsafe equipment must be removed to a secure place to prevent inadvertent use until repaired. Repaired items must be re-inspected by the CSO or A&E II Contractor HSO before being placed back into service. Damaged or defective machinery must be removed from work until repaired. Repaired machinery must be re-inspected by the operator and the CSO or A&E II Contractor HSO before being placed back into service.

Tools, equipment, and machinery must be used properly for the purpose for which it was designed (do not use a wrench for a hammer, screwdriver for a chisel, pliers for a wrench, pipe wrenches as a substitute for other wrenches, a pipe handle-extension, or a “cheater” on a wrench, etc.). All modifications, extensions, replacement parts, or repairs of equipment must maintain at least the same factor of safety as the original equipment.

Tools, equipment, and materials must not be thrown up or down from one working level to another. A hand line must be used to lift or lower tools.

Loose or frayed clothing, dangling ties, rings, etc., must not be worn around moving machinery or other mechanical sources of entanglement.

Electrical power tools must be properly grounded by using three-wire receptacles and extension cords rated for the amperage required. Ground-fault circuit interrupters (GFCIs) must be used with temporary electrical systems or other proper grounding system. An Assured Equipment Grounding Conductor Program (AEGCP) must be implemented if GFCIs are not exclusively used.

A GFCI must be provided for all electrical tools, and the GFCI must be tested daily. Portable electric tools must not be lifted or lowered by means of a power cord. Electrical equipment cords must be kept coiled when not in use. When electrical equipment is in use, cords must be protected and positioned to avoid being run over by vehicles or equipment.

3.5.3 SAFE WORK PRACTICES FOR OPERATION OF MOTOR VEHICLES AND HEAVY EQUIPMENT

Motor vehicles and heavy machinery must not be operated without proper training and special permission if it is not a regularly assigned duty. Equipment must be used only for the purpose for which it was designed. Operators of motor vehicles, passengers riding in motor vehicles, and operators of heavy equipment shall use passenger restraint systems (e.g., seat belts) at all times. Project Contractors must include the hazards associated with operation of vehicles and heavy equipment in applicable AHAs.

3.5.4 SAFETY RULE ENFORCEMENT

In accordance with its contract with USAID, the CPM must establish a procedure to direct or suspend the Project Contractor's work and notify the USAID CO/COR and HSO when the continued performance of the work will endanger the health, welfare, or safety of the public or Project personnel. Project personnel must obey work orders from the A&E II Contractor COP and HSO to suspend the Project Contractor's work if the A&E II Contractor COP and HSO have determined that continued performance of work will endanger the health, welfare, or safety of the public or any Project worker. The A&E II Contractor COP and HSO will notify the USAID CO/COR immediately when such work suspensions are issued.

All Project personnel will report unsafe work practices to the relevant CSO, A&E II Contractor HSO, ECS, and/or COP to be shared with the USAID CO and COR for correction and mitigation. The CPM shall designate which of their staff can immediately require their personnel to leave the site who do not comply with the Project safety and health program requirements. The A&E II Contractor COP, CM, HSO, or ECS may request to the CPM/SCPM and recommend to USAID that personnel immediately leave the site who are in violation with the Project safety and health program requirements. Project personnel must strictly adhere to established safe work practices and work procedures. Violation of a safety procedure or rule may result in disciplinary action in accordance with the severity of the infraction. The CSO and the A&E II Contractor COP, CM, HSO, or ECS will immediately report unsafe work performance to the USAID CO and COR. Disciplinary action may include the following, depending upon the severity of the safety infraction:

- Verbal warning;
- Written warning notice;
- Termination of employment; or
- Other disciplinary action.

If Project personnel violate safety procedures or rules, the CSO, A&E II Contractor COP and/or HSO will recommend disciplinary action to the worker's supervisor, in accordance with the severity of the

infraction. The A&E II Contractor COP, ECS, and HOS reserve the right to recommend dismissal of workers who consistently exhibit unsafe work performance.

4 SUBCONTRACTORS AND SUPPLIERS

This section applies to subcontractors and suppliers that will support Project activities and establishes the qualifications and safety requirements they will be held to.

4.1 LIST OF SUBCONTRACTORS

The names of subcontractors and suppliers and their provided services will be recorded in Appendix E – Subcontractor List, of this Site-Wide HASP. This list will be updated as new phases of work commence and new subcontractors and suppliers are identified.

4.2 SELECTION OF QUALIFIED SUBCONTRACTORS

Selection of qualified safety-conscious subcontractors is essential for quality work performance and necessitates including contractor safety performance as a criterion for subcontractor selection. The standard operating procedure for contractor safety qualification review described below will be implemented by Project Contractors during subcontractor selection.

A prospective contractor seeking qualified subcontractor status shall complete a contractor safety qualification questionnaire as a supplement to the subcontractor prequalification packet. The questionnaire will be submitted to the Contracts Administrator, or designee, for initial review and processing. The questionnaire must also be reviewed by the applicable safety and health personnel (i.e., CSO).

Required subcontractor safety and health submittals include:

- Completed and signed contractor safety qualification questionnaire;
- For U.S. subcontractors, copies of OSHA 300 logs for the last 3 years;
- For non-US subcontractors, information regarding any employment-related injuries or illnesses requiring more than first aid treatment;
- For U.S. subcontractors, letter from the Workers' Compensation insurance carrier certifying the contractor's Experience Modification Rate (EMR) for the most recent 3 years (an EMR greater than 1.0 requires a written explanation of measures being taken to reduce this rate);
- For non-U.S. subcontractors, information regarding insurance coverage for all workers experiencing employment-related injuries or illnesses;
- For U.S. subcontractors, copies of OSHA citations (as applicable);
- For non-U.S. subcontractors, copies of safety citations received as a result of employment-related injuries or illnesses; and
- Listing or copy of the table of contents of the contractor's written safety program.

The Contracts Administrator and applicable safety and health personnel reviews the questionnaire and compares the information against the contractor safety qualification criteria. If all criteria are met, the Contracts Administrator may deem the contractor's safety qualification as acceptable.

If not all criteria are met, then the questionnaire and attachments shall be forwarded to USAID CO/COR for review/evaluation and acceptance of a variance or non-acceptance.

4.3 SUBCONTRACTOR SAFETY REQUIREMENTS

Subcontractors who come on site to perform fieldwork and/or enter controlled areas of the site are subject to Site-Wide HASP requirements. Project requirements for controlling and coordinating subcontractor compliance with safety and health requirements are detailed below.

- Subcontractors are required to follow applicable GVN laws, the requirements of the Site-Wide HASP, and ADAFC requirements for work at the Bien Hoa Airbase.
- Subcontractors are required to review, understand, and comply with the Site-Wide HASP, including the requirement for serum dioxin analysis for all site workers in areas where intrusive activities are conducted.
- Subcontractors are required to enforce applicable Site-Wide HASP requirements with their employees.
- Before site work, subcontractors are required to provide a hazardous substances inventory list and copies of applicable SDSs for hazardous substances to be brought on site to the A&E II Contractor HSO. Subcontractors will minimize the number and quantity of hazardous substances brought onto the work site.
- Subcontractors are required to provide copies of required safety and health training and certification documents to the CSO, as applicable (i.e., licenses, training certifications, medical clearance [fitness for duty] certification, first aid/CPR training, respirator fit testing). The CSO must make these documents available to the A&E II Contractor.
- Subcontractor workers are required to follow the instructions of the CSO or other competent authority.
- Subcontractors are required to provide an AHA for subcontractor work activities to the CSO. The CSO must make these AHAs available to the HSO who will share with the A&E II Contractor HSO. The detail for the AHA must be to the extent that every phase and the tasks involved in those phases are considered to identify the associated hazards and risks during the operation. These task and hazard risk analyses must be modified as needed to address a changing work environment.
- Subcontractor personnel are required to attend a site orientation briefing from the CSO to review pertinent aspects and safety and health requirements of the Site-Wide HASP and AHAs as it pertains to their planned site activities. Subcontractor personnel must sign a form documenting that they have reviewed the Plan and AHAs, understand the Site-Wide HASP and AHA requirements, and agree to follow the Plan and AHAs.
- Subcontractor personnel must attend the daily safety meeting conducted by the CSO before starting work to review work operations and to discuss pertinent site safety topics.
- Subcontractor personnel who do not comply with safety and health requirements may be immediately told to leave the site by the CSO, SCPM, A&E II Contractor HSO, ECS, or COP.
- Subcontractors are required to observe the buddy system during work activities unless the work activity requires the work to be conducted alone, the exception has been approved by their CSO, and the HSO has been notified.
- Subcontractors are required to report unsafe work conditions or unsafe work practices promptly to the subcontractor supervisor and the CSO.
- Subcontractors are required to report all incidents immediately to the CSO.

5 TRAINING

Proper training is required to conduct Project activities safely. Project training requirements include safety and occupational health orientation training at time of initial assignment; mandatory training and certifications applicable to Project activities and periodic retraining/recertification; and periodic safety and health training for supervisors and employees.

5.1 GENERAL TRAINING REQUIREMENTS

Employees will receive safety training regarding potential hazards associated with their work assignments. Site orientation safety meetings involving review of pertinent aspects of the Site-Wide HASP are completed for personnel before Project fieldwork. Daily safety meetings are conducted for field operations, and attendance is documented.

Copies of applicable safety and health training certificates for all site workers will be maintained on site by the CSO and available for review by the A&E II Contractor HSO. Project personnel are not allowed to perform fieldwork until the CSO has determined this documentation to be complete and sufficient.

Project personnel assigned to fieldwork are required to complete the following training (as applicable) (Table 3). Additional training may be required based on work activities to be conducted.

TABLE 3: TRAINING REQUIREMENTS

NAME OF COURSE	APPLIES TO	NOTES
40-Hour Hazardous Waste Operations and Emergency Response (Hazwoper) Training or equivalent	All Project personnel who will work in contaminated areas where exposure is possible. Anyone using PPE or respiratory protection on the site	Pre-Work completion is required. Hands-on training with PPE, respiratory protection, decontamination, and general site procedures is required.
3-Day On-Site Hazwoper Training	All Project personnel who will work in contaminated areas where exposure is possible	Work will be conducted using appropriate PPE and supervised by the CSO unless the training was completed prior to site work.
40-Hour USACE EM 385-I-I Training or equivalent	A&E II Contractor HSO, ECS, CSO, and all site supervisors	Online training.
30-Hour OSHA Construction Safety and Health Training or equivalent	A&E II Contractor HSO, ECS and CM, CSO, and designees	Training is available from online sources
8-Hour Hazwoper Supervisor Training or equivalent	A&E II Contractor HSO, ECS, CSO, and all site supervisors	40-Hour Hazwoper and 3-day on-site training are prerequisites
8-Hour Annual Hazwoper Refresher Training or equivalent	All 40-Hour Hazwoper Certified workers	40-Hour Hazwoper is a prerequisite
Hazard Communication Training	All site personnel	Repeated as new hazards or chemicals are discovered or introduced
First Aid / CPR Training	All worksite emergency response personnel	Minimum of two are required for every work shift

NAME OF COURSE	APPLIES TO	NOTES
Bloodborne Pathogens (BBP) Training	First aid certified personnel	Includes a review of procedures to be followed in the event of exposure to BBP
Site Orientation Briefing	All site personnel	Conducted by CSO and/or A&E II Contractor HSO, ECS, and COP
Medical Surveillance Program Orientation	Participants of the medical surveillance program (Level I and 2); and workers that will be onsite during intrusive or remedial treatment operation activities for less than 30 days (8 hours per day) per year but not doing intrusive work.	Conducted by CSO and/or A&E II Contractor HSO, ECS, and COP prior to commencement of work activities, and/or before participation in the medical surveillance program
Emergency Response Plan Training	All site personnel	Conducted by CSO prior to commencement of work activities
Daily “Tailgate” Safety Meetings	All site personnel	Conducted by CSO. Discusses lessons learned from previous day, planned work activities for present day, and special safety considerations
Monthly Supervisor Safety Meeting	CM, HSO, CSOs, supervisors, foremen	Conducted by A&E II Contractor HSO. Discuss the month’s safety performance and any concerns for upcoming activities
UXO Avoidance Training	All site personnel	Conducted prior to commencement of work activities
Fall Protection Training	Any employees working at heights over 1.5 meters above the ground surface	For use of harnesses, retraction and fall-stop systems, and use of barricades
Ladder Safety Training	Any employees using portable or fixed ladders	For safe use of all types of ladders and portable stairs

Project personnel training information is tracked in Appendix F – Project Personnel Training Information, of this Site-Wide HASP. This list will be maintained and supplemented as required by work activities. Additional safety training will be conducted including site orientation training, periodic safety meetings, and emergency response training as discussed in the following sub-sections.

5.2 SITE ORIENTATION BRIEFING

Site Project personnel must receive a site orientation briefing and review the Site-Wide HASP before start of their work activities. Project personnel will sign a form documenting that they have reviewed the Site-Wide HASP, understand the requirements, and agree to follow them.

Project personnel will provide training and medical fitness for duty documentation to the CSO if required for site work activities. The CSO shall make these documents available to the A&E II Contractor HSO. Where required for specific site activities, fitness for duty certification will include clearance for the use of PPE and respiratory protection.

Before start of work, the CSO or A&E II Contractor HSO will provide a site orientation briefing to workers related to Project operations and Site-Wide HASP requirements. The briefing will include review of (as applicable):

- Provisions of the Site-Wide HASP;

- Facility background and scope of work;
- Key personnel and safety and health responsibilities;
- Site hazards anticipated;
- Exposure monitoring program;
- Site control procedures;
- PPE requirements;
- Procedures for reporting unsafe conditions or unsafe work practices;
- Procedures for reporting an injury/illness;
- Emergency procedures including warning signals and evacuation procedures;
- Location/route to the emergency hospital;
- Training requirements;
- Medical surveillance requirements; and
- Recordkeeping procedures.

5.3 MEDICAL SURVEILLANCE PROGRAM ORIENTATION

Participants of the medical surveillance program must receive a program orientation briefing before participation in the medical surveillance program and the start of their work activities. The required participants of the medical surveillance program are detailed in section 9.18.1. Workers that are not required to participate in the medical surveillance program but will be onsite to perform non-intrusive work (i.e., vegetation clearing, topographic and other engineering surveys without generation of, or exposure to contaminated soil), or during intrusive and/or remedial treatment operation activities (but not performing these activities) for less than 30 days (8 hours per day) per year must receive the program orientation training. Visitors to the site are not required to receive the medical surveillance program orientation training. At a minimum, the program orientation training will include:

- Health risks related to dioxin exposure;
- Major site exposure routes for dioxin;
- Examinations included in the medical surveillance program;
- Frequency of examinations;
- Action limits for serum dioxin levels;
- Assurance of confidentiality; and
- Data management of anonymous dioxin blood serum results.

5.4 SAFETY MEETINGS

Daily safety meetings are required at the beginning of each work shift to discuss operational tasks to be completed and pertinent site safety topics. Meetings are documented and those in attendance are required to sign a “Tailgate Safety Meeting Record” or equivalent form.

Monthly safety meetings are held by the A&E II Contractor HSO for CSOs, team supervisors/leads, where multiple work activities are being conducted at the same location. The HSO and/or A&E II Contractor HSO will conduct the meeting and discuss safety-related issues directed toward supervisor

responsibilities. Meetings are documented and attending personnel sign a “Safety Meeting Attendance Roster” or equivalent form.

5.5 EMERGENCY RESPONSE PLAN TRAINING

Emergency response plan training is conducted by the CSO or A&E II Contractor HSO during initial site safety orientation briefings and elements are periodically reviewed during daily safety meetings. Emergency response plan training reviews: Site-Wide HASP emergency response plan information that includes escape procedures and routes, critical plant operations, employee accounting following an emergency evacuation, rescue and medical duties, means of reporting emergencies, persons to be contacted for information or clarification, and off-site emergency support services and agreements. In addition, an emergency evacuation drill will be held quarterly or more frequently if required by GVN or USAID.

6 SAFETY AND HEALTH INSPECTIONS

Periodic safety inspections are required to evaluate the effectiveness of the safety program. The responsibility for conducting safety inspections is assigned to the CSO and A&E II Contractor HSO or designee. The frequency of inspections, documentation, deficiency tracking system, and follow-up procedures are reviewed in Safety Inspections and Audits. A description of Project safety inspection and audit procedures is provided in the following Sections.

6.1 SAFETY INSPECTIONS

The CSO and A&E II Contractor HSO or designee will conduct periodic and random safety inspections of Project operations. During the Project, daily jobsite safety inspections and daily equipment inspections will be conducted when site activities require more than one day of field work. Examples of inspections required are presented in Table 4.

TABLE 4: TABLE OF INSPECTIONS

EQUIPMENT TO BE INSPECTED	PERSON RESPONSIBLE	FREQUENCY
PPE		
Hard Hats	Worker	Before each use
Gloves	Worker	Before each use
Boots	Worker	Before each use
Impermeable Coveralls	Worker	Before each use
Eye Protection	Worker	Before each use
Hearing Protection	Worker	Before each use
RESPIRATORY PROTECTION		
Dust Masks	Worker	Before each use
Respirators	Worker	Before each use
Cartridges	Worker	Before each use
SAFETY & HYGIENE		
First Aid Kits	CSO	Weekly; replenish supplies as needed
Eyewash stations	CSO, HSO	Monthly
Drench showers	CSO, HSO	Monthly

EQUIPMENT TO BE INSPECTED	PERSON RESPONSIBLE	FREQUENCY
Fire Extinguishers	CSO, HSO	Monthly
Drinking water	CSO	Beginning of every work shift
Washing water, soap, towels	CSO	Beginning of every work shift
Cool-down area	CSO	Beginning of every work shift
Condition of toilets	CSO	Beginning of every work shift
Condition of showers	CSO	Beginning of every work shift
Condition of washing facilities	CSO	Beginning of every work shift
HAND TOOLS		
Cords, plugs, receptacles, ground fault circuit interrupters	Worker	Before each use
Machine guards	Worker	Before each use
General condition	Worker	Before each use
VEHICLES/HEAVY EQUIPMENT		
Seat belts	Driver/Operator and all passengers	Before each use
Fuel supply	Driver/Operator	Beginning of every work shift
Lubricant levels	Driver/Operator	Beginning of every work shift
Interior cleanliness and repair	Driver/Operator	Beginning of every work shift
Exterior cleanliness and repair	Driver/Operator	Beginning of every work shift
Tires/tracks	Driver/Operator	Beginning of every work shift
Hydraulics	Driver/Operator	Beginning of every work shift
Brakes	Driver/Operator	Beginning of every work shift
Lights, signals	Driver/Operator	Beginning of every work shift
Horn, backup warning	Driver/Operator	Beginning of every work shift
EXCAVATIONS		
Soil conditions	Competent Person	Daily
Barriers/fencing at top	Competent Person	Daily
Shoring and shielding in place and in good condition for excavations >1.5m	Competent Person	Daily
Safe exits in place for excavations >1.25m	Competent Person	Daily
ELECTRICAL HAZARDS		
Overhead line marking	CSO or CM	Daily
Buried cable marking	CSO or CM	Daily
Ladders more than 3.05m from power lines	CSO or CM	Daily
All temporary power lines in good repair	CSO or CM	Daily
GFCI in place and working	CSO or CM	Daily

EQUIPMENT TO BE INSPECTED	PERSON RESPONSIBLE	FREQUENCY
SITE CONTROL		
Zones clearly delineated	CSO or HSO	Daily
Warning signs in place for each zone	CSO or HSO	Daily
Sign-in sheet ready	CSO or HSO	Daily
Decontamination set up and ready	CSO or HSO	Daily
Receptacles in place for soiled PPE and decontamination fluids	CSO or HSO	Daily
Contaminated waste properly stored and containment provided	CSO or HSO	Daily
CRZ dikes and spill prevention	CSO or HSO	Daily
Drinking water supply ready in CZ	CSO or HSO	Beginning of every work shift
Cool-down area prepared in CRZ	CSO or HSO	Daily
GENERAL HOUSEKEEPING		
Trash receptacles	CSO or HSO	Daily
Work areas clear of trash	CSO or HSO	Daily
Tools properly stored	CSO or HSO	Daily
Lights in good working order	CSO or HSO	Daily
Office trailers clean	CSO or HSO	Daily

Inspections are coordinated by the CSO or A&E II Contractor HSO with competent persons completing the inspections. The CSO, HSO, and/or supervisors will complete periodic safety inspections of Project sites and work areas. Project Contractor quality control (QC) personnel, as part of their QC responsibilities, will review and document safety observations. The CSO and A&E II Contractor HSO will complete daily safety inspections of work sites to identify and correct hazards and reports the information on a “Safety Inspection Report” form and/or on the Daily QC Report.

After an inspection, the CSO and A&E II Contractor HSO will record identified safety and health issues and deficiencies and indicate the actions, timetable, and responsibility for correction of deficiencies on the “Safety and Occupational Health Deficiency Tracking List” form. The CSO and A&E II Contractor HSO will conduct follow-up inspections to correct identified deficiencies and document the inspection deficiencies on the “Safety and Occupational Health Deficiency Tracking List” form.

Safety inspections will include work areas, equipment, work practices, and work procedures. Items that do not comply with Site-Wide HASP requirements will be corrected immediately or in a timely manner based on the classification of the hazard as imminent or non-imminent. In the case of unsafe or hazardous machinery, the equipment or area will be “red-tagged” (shut down or removed) until the hazard has been corrected. Employees are responsible for inspecting their work areas and equipment for unsafe or hazardous conditions. Employees must correct all unsafe conditions and report them immediately to their supervisor.

6.2 SAFETY AUDITS

The A&E II Contractor HSO and/or COP may also conduct independent safety audits based on the type of job activities and potential hazards to be encountered on the site. Compliance with the HASP

and SHASPs will be reviewed during audits to ensure that the Project safety goals are being met. A random number of workers will be interviewed to check knowledge of the Project policies and procedures, and a random sampling of training records will be reviewed for completeness and authenticity. Safety inspection forms will be reviewed to check hazards identified and corrective actions taken. Incident reports will be reviewed for complete investigation information, and the contractors' Hazard Communication Program will be reviewed for completeness and currency of information. Within 60 days of the conclusion of the audit, findings will be presented to the COP. If needed, recommendations for revision of the HASP and SHASPs will be included in the presentation.

7 INCIDENT REPORTING AND INVESTIGATION

An incident is defined as “an unplanned, undesired event that adversely affects completion of a task.” Incidents range in severity from “near misses” to fatalities. Incidents will be reported in monthly exposure data relative to man hours, or exposure hours, worked, and accident investigations, reports, and logs will be compiled for annual submittal to the GVN and USAID. A review of Project incident reporting and investigation procedures is provided in the following Sections.

7.1 INCIDENT REPORTING

Employees must immediately report all incidents, including injuries, illnesses, property damage, liability exposure cases, spills, fires, and near miss incidents to their team supervisor/lead and/or CSO. CSOs are responsible for notifying the A&E II Contractor HSO and CM, who in turn are responsible for notifying the A&E II Contractor COP and HSO. The USAID CO/COR and the A&E II Contractor HSO must be contacted immediately in injury or illness cases requiring more than first aid treatment.

FIGURE 2: INCIDENT REPORTING FLOW CHART



All incidents are required to be reported to the CSO and the A&E II HSO as soon as possible but not more than 24 hours afterwards. In addition, the HSO must report all incidents to the A&E II Contractor COP and HSO as soon as possible but not more than 12 hours afterwards. In addition to the reporting requirements identified above, property damage, days away injuries, days away illnesses, and restricted duty/transfer injuries are required to be reported. Every accident shall be thoroughly investigated by the CSO and the findings of the investigation submitted along with appropriate corrective actions to the A&E II Contractor HSO in the prescribed format as soon as possible but no later than five (5) working days following the accident. Corrective actions shall be implemented as soon as reasonably possible. Immediate accident notification is required for: a fatal injury; a permanent total disability; a permanent partial disability; the hospitalization of one or more people resulting from a single occurrence; three or more individuals become ill or have a medical condition which is suspected to be related to a site condition or a hazardous or toxic agent on the site; and property damage. The CSO, A&E II Contractor COP, DCOP, HSO, and/or ECS are responsible for notifying their CO and COR of all incidents.

The USAID CO/COR and the A&E II Contractor HSO must be notified immediately of any incident that results in the hospitalization of any employees or a fatality. The A&E II Contractor HSO is responsible for notifying the A&E II Contractor COP as soon as possible but no later than 8 hours after the accident requiring hospitalization. (Note: This notification includes weekend days as 24-hour emergency reporting access is available). The A&E II Contractor HSO and ECS will conduct an immediate investigation, reporting findings to the A&E II Contractor COP. The A&E II Contractor COP will act as the USAID interface during the investigation.

The resulting report to the A&E II COP, which will be sent to the USAID CO/COR, must include:

- Time and date of accident;
- Employer's name, address, and telephone number;
- Name and job title of person reporting the accident;
- Location of the incident/accident site;
- Name of person to contact at the site of the accident;
- Name and address of any injured employee(s);
- Nature of injury;
- Location to which the injured employee was moved;
- List and identity of law enforcement agencies present at the site of the accident; and
- Description of the accident and whether the accident scene has been altered.

7.2 INCIDENT INVESTIGATION

The CSO responsible for an activity involved in an incident will participate in a complete investigation with the A&E II Contractor HSO, ECS and/or COP. Chargeable vehicle accidents are to be investigated by the CSO and A&E II Contractor HSO, ECS and/or COP and the findings reported immediately to their USAID CO and COR. This will require employee interviews, inspection, and photographing of the unaltered accident scene and equipment involved (as applicable). Project incident reporting and investigation forms must be completed and submitted according to the Project incident reporting and investigation procedures within 24 hours of the injury or accident (immediately for a serious injury involving hospitalization or fatality). Forms to be completed include (as applicable) Injury/Illness Report Form and On-Site Vehicle Accident Report Form. The root cause of the incident and recommendations of prevention must be identified.

It is required that accidents be thoroughly investigated by the contractor and findings of the investigation submitted along with appropriate corrective actions to their USAID CO and COR and, if required, GVN in the prescribed format as soon as possible but no later than five (5) working days following the accident. Corrective actions shall be implemented as soon as reasonably possible. Where required by USAID or GVN, electronic or written reporting means shall be used by the A&E II Contractor to report all accidents that involve injuries to employees or subcontractors that result in medical treatment beyond first aid and damage to property and/or equipment.

The initial report must be prepared and submitted to the USAID CO and COR within 24 hours following such accidents and include as much information as is available at the time of the report. The final written report shall be prepared on the forms provided in Appendix A, and shall include:

- Description of the circumstances leading up to the accident;
- Cause of the accident;
- Corrective measures taken to prevent recurrence;
- Description of the injury;
- Name and location of the medical facility giving examination and treatment;
- Whether or not the employee was permitted to return to work after examination and treatment by the doctor;

- If employee was not allowed to immediately return to work, an estimate or statement of the number of days lost from work; and
- Physician's statement that the employee is fit to return to work.

7.3 INCIDENT FOLLOW-UP

After the incident investigation is complete, the CSO, HSO, ECS, and CM will take measures to prevent a repeat of the incident, including hazard mitigation, change in work practices, and revision of the AHA where necessary.

The CSO, HSO, ECS, and CM will then conduct a safety stand-down to debrief all site personnel, review preventive measures and hazard mitigation, and discuss lessons learned.

The CSO will obtain a doctor's first report of injury for every injury or illness requiring medical treatment and will immediately forward the report to the A&E II Contractor ECS, COP, and HSO. An injured worker is not allowed back to work until a return to work notice issued by the treating physician is presented to the CSO. The CSO will provide a copy of the return to work notice to the A&E II Contractor HSO immediately. Any injured worker issued a work restriction will be under the direct supervision of the CSO and will be assigned work activities within the restriction until a full duty status clearance has been received.

For information purposes, the A&E II Contractor HSO will record each injury or illness on the OSHA Form No. 300 "Log of Work Related Injuries and Illnesses" and the OSHA Form 300A "Summary of Work Related Injuries and Illnesses." Posting of the OSHA 300 form is not required for injuries or illnesses occurring outside of the 50 United States and its territories. The OSHA form will be utilized during the conduct of this Project as a means to maintain complete records of injuries/illnesses occurring as a result of exposures on this Project site.

In accordance with Vietnam Ministry of Health "Guidelines for Occupational Health and Safety Management" Circular 19/2016/TT-BYT, dated 30 June 2016, Chapter III Reporting, as a business establishment, contractors will comply with circular.

7.4 MONTHLY EXPOSURE REPORT

During the Project, A&E II Contractor will provide Project hours worked and Project injury and illness information to the USAID CO/COR on a monthly basis as requested. Incident investigation reports and an updated Project OSHA 300 log will be provided to the USAID CO should an injury or illness occur. The CSO shall provide the above information to the LSEC on a monthly basis in advance of the report to the USAID CO/COR.

8 PLANS AND PROGRAMS REQUIRED BY THE SAFETY MANUAL

This section of the Site-Wide HASP contains information specified in EM 385-I-I, Appendix A, Section 3i “Plans, Programs Procedures required by the Safety Manual.” Table 5 identifies the plans that are required for this project from those in EM 385-I-I. As the Project progresses and SHASP are developed, additional plans may become required.

TABLE 5: PLANS REQUIRED BY EM 385-I-I

PLAN NAME	EM385-I-I SECTION	REQUIRED FOR THIS PROJECT?	HASP SECTION
Fatigue Management Plan	01.A.20	Yes	9.1
Emergency Plans	01.E.01	Yes	9.2
Site Sanitation/Housekeeping Plan	02.B	Yes	9.3
Medical Support Agreement	03.A.01, 03.A.03	Yes	9.4
Bloodborne Pathogen Program and Exposure Control Plan	03.A.05	Yes	9.5, Appendix G
Automatic External Defibrillator (AED) Program	03.B.04	No	--
Site Layout Plan	04.A	Yes	9.6
Access and Haul Road Plan	4.B	Yes	9.7
Hearing Conservation Program	05.C	Yes	9.8
Respiratory Protection and Personal Protective and Safety Equipment Plan	05.G	Yes	9.8
Health Hazard Control Program	06.A	Yes	9.9
Hazard Communication Program	06.B.01	Yes	9.12, Appendix H
Process Safety Management Plan	06.B.04	No	--
Lead Compliance Plan	06.C.02 and specifications	No	--
Asbestos Abatement Plan	06.C.03 and specifications	No	--
Radiation Safety Program	06.F	No	--
Abrasive Blasting procedures	06.I.01	No	--
Heat Stress Monitoring Plan	06.J.02	Yes	9.13
Cold Stress Monitoring Plan	06.J.04	No	--
Indoor Air Quality Management	06.L	No	--
Mold Remediation Plan	06.L.04	No	--
Chromium (VI) Exposure Evaluation	06.M	No	--
Crystalline Silica Evaluation	06.N.02	No	--
Lighting Planning for Night Operations	07.A.06	No	--
Traffic Control Plan	08.C.05	Yes	9.14
Fire Prevention Plan	09.A.01	Yes	9.15
Wild Land Fire Management Plan	09.L	No	--

Dioxin Remediation at Bien Hoa Airbase Area Project
Site-Wide Health & Safety Plan

PLAN NAME	EM385-I-I SECTION	REQUIRED FOR THIS PROJECT?	HASP SECTION
Arc Flash Hazard Analysis	11.B	No	--
Assured Equipment Grounding Conductor Program	11.D.05, Appendix E	Yes	9.16, Appendix I
Hazardous Energy Control Program & Procedures	12.A.01	Yes	9.17
Standard Pre-Lift Plan – Load Handling Equipment	16.A.03	Yes	--
Critical Lift Plan – Load Handling Equipment	16.H	Yes	--
Naval Architectural Analysis – Load Handling Equipment (Floating)	16.L	No	--
Floating Plant Inspection and Certification	19.A.01	No	--
Severe Weather Plan for Marine Activities	19.A.03	No	--
Emergency Plan for Marine Activities	19.A.04	No	--
Man Overboard/Abandon Ship Procedures	19.A.04	No	--
Float Plan for Launches, Motorboats, and Skiffs	19.F.04	No	--
Fall Protection and Prevention Plan	21.D	No	--
Demolition/Renovation Plan (to include engineering survey)	23.A	No	--
Rope Access Work Plan	24.H	No	--
Excavation/Trenching Plan	25.A.01	Yes	9.18
Fire Prevention and Protection Plan for Underground Construction	26.D.01	No	--
Compressed Air Work Plan for Underground Construction	26.I.01	No	--
Erection and Removal Plan for Formwork and Shoring	27.C	No	--
Pre-Cast Concrete Plan	27.D.01	No	--
Lift Slab Plan	27.E	No	--
Masonry Bracing Plan	27.F.01	No	--
Steel Erection Plan	28.B	No	--
Explosives Safety Site Plan	29.A	No	--
Blasting Plan	29.A, 26.J	No	--
Dive Operations Plan	30.A.14, 30.A.16	No	--
Safe Practices Manual for Diving Activities	30.A.15	No	--
Emergency Management Plan for Diving	30.A.18	No	--
Tree Felling and Maintenance Program	31.A.01	No	--
Aircraft/Airbase Construction Safety and Phasing Plan	32.A.02	No	--
Aircraft/Airbase Safety Plan Compliance Document	32.A.02	No	--

PLAN NAME	EM385-I-I SECTION	REQUIRED FOR THIS PROJECT?	HASP SECTION
Site Safety and Health Plan for HTRW Services Work	33.B	Yes	9.19
Confined Space Entry Procedures	34.A.05	No	--
Confined Space Program	34.A.06	No	--

Note: Appendix G – Bloodborne Pathogens Exposure Control Plan, Appendix H – Hazard Communication Program, Appendix I – Assured Equipment Grounding Conductor Program Requirements.

Plans that are not required at this time but may be required due to addition or modification of work activities will be added as required during the course of all activities at the Bien Hoa Airbase Area. Required plans are presented in the following Sections.

8.1 FATIGUE MANAGEMENT PLAN

Extended work hours in the field environment increase worker fatigue. A Fatigue Management Plan (FMP) shall be completed by the A&E II Contractor and Project Contractors as part of the Site-Wide HASP to provide guidance on reducing fatigue and associated hazards whenever work hours:

- Exceed 10-hours a day for more than four consecutive days;
- Exceed 50-hours in a seven-day work week;
- Exceed 12-hours a day for more than three consecutive days; or
- Exceed 58-hours a week for sedentary (to include office) work.

The FMP for site activities including operation of motor vehicles (specifically excavation contractors) shall address the following conditions for operator work hour limitations:

- Operators of motor vehicles and heavy equipment, while on duty, shall not operate vehicles for a continuous period of more than 10-hours in any 24-hour period;
- No employee, while on duty, may operate a motor vehicle after being in a duty status for more than 12-hours during any 24-hour period; and
- A minimum of eight (8) consecutive hours shall be provided for rest in each 24-hour period.

The FMP shall identify affected workers, management responsibility, training, and the controls established at the worksite.

Training shall include:

- Symptoms of fatigue;
- Habits and actions the worker may take to avoid fatigue;
- Actions workers should take if they observe fatigue in a co-worker; and
- Controls in place to prevent fatigue.

Controls for fatigue shall include:

- A discussion of driving to and from work and any possible mitigation of driving as a factor of fatigue;
- Work scheduling (limit number of consecutive night shifts);
- Rotating jobs to prevent repetitive work;

- Breaks at critical times in the work cycle;
- Control of environmental factors (heat, cold, use of PPE);
- Buddy check-in for individuals working alone; and
- Alternate transportation for lengthy commutes.

8.2 EMERGENCY PLANS

Required Emergency Plans include (as applicable to Project work):

- Emergency Plan: Procedures and Tests
- Emergency Plan: Firefighting Plan
- Emergency Plan: Posting of Emergency Telephone Numbers
- Emergency Plan: Severe Weather
- Emergency Plan: Spill Prevention and Control Plan

These required plans are presented in detail in the following Sections.

8.2.1 EMERGENCY PLAN: PROCEDURES AND TESTS

Cellular telephones will be used for site and emergency communications. The CSO and A&E II Contractor HSO will maintain an “Emergency Contact List” (Table 6). The CSO and A&E II Contractor HSO is responsible for determining the route to the emergency hospital and the transportation available (ambulance, military vehicle, private vehicle, etc.) before the start of field operations. The CSO will establish emergency communication procedures before site work and will communicate this information to site personnel during site orientation briefings and safety meetings.

TABLE 6: EMERGENCY CONTACT LIST

POINT OF CONTACT	CONTACT NUMBER
Ambulance – Emergency	115
Emergency Hospital: Dong Nai International Hospital	Phone: +84 251 3955 955
USAID Contracting Officer (CO) James Hutton	Office: +84 963 654 766 Email: jhutton@usaid.com
USAID Contracting Officer Representative (COR) Christine Katin	Mobile: +84 962 002 758 Email: ckatin@usaid.gov
Government of Vietnam (GVN) Contact	Office: Security Escort (daily assignment always on site)
A&E II Contractor Project Office	Office: None
A&E II Contractor Chief of Party (COP) Matt Harder	Mobile: +84 789 431 043 Email: Matt.Harder@tetrattech.com
A&E II Contractor Deputy Chief of Party (DCOP) David Liu	Mobile: +84 86 281 2971 Email: David.Liu@tetrattech.com
A&E II Contractor Construction Manager (CM) Mai Trieu Quang	Mobile: +84 90 351 1779 Email: quang.mai@tetrattech.com
A&E II Contractor Environmental Compliance Specialist (LECS) David Liu	Mobile: +84 86 281 2971 Email: David.Liu@tetrattech.com
A&E II Contractor Home Office Project Manager Jessica Oaks	Office: +1 703 373 7666 Email: Jessica.Oaks@teratech.com
A&E II Contractor Health & Safety Officer (HSO) Karl Tilgner	Mobile: +84 93 376 0553 Email: tilgnerkw@cdmsmith.com
Vina E&C Construction Manager Doan Hong Ngoc	Mobile: +84 0937 928 246 Email: ngocdoan@vinaenc.com.vn
Vina E&C Environmental Compliance Mahbub	Mobile: +84 34 307 9392 Email: mahbub@vinaenc.com.vn
Vina E&C H&S Leader Mahbub	Mobile: +84 34 307 9392 Email: mahbub@vinaenc.com.vn

8.2.1.1 EVACUATION ROUTES AND PROCEDURES

Evacuation routes will be reviewed during site safety orientation briefings and periodically during daily safety meetings.

8.2.1.2 SAFE DISTANCES AND PLACES OF REFUGE

Safe evacuation distances will be determined based on the hazards present and the magnitude of the emergency. For a small fire which is largely contained in a small grassy area, the evacuation distance would be shorter than from an area where flammable substances are stored or used. As the Project proceeds and new work areas are created, the safe distances will be determined by the CSO, and places of refuge during an emergency will be designated and communicated to site workers. All workers will be instructed to proceed to the designated area and remain there until a headcount can be performed and safe evacuation from the Project site can be afforded.

8.2.1.3 EMERGENCY ALARMS

For major emergency events (e.g., large fires, gas line or electrical line breaks) an emergency evacuation alarm will be sounded. The alarm will be three long blasts on a vehicle horn or a compressed air horn.

EVACUATION ALARM

A compressed air horn will be used to communicate the emergency situation to personnel. **THREE LONG BLASTS** on the air horn shall signify an evacuation alarm. Personnel will be instructed to report to the evacuation assembly location and await a head count by the CSO and/or A&E II Contractor HSO and SCPM (Table 7).

Nonessential personnel will be evacuated from the work area until the CSO determines that it is safe for work to resume. Personnel will evacuate to a refuge area that has been designated by the CSO in the initial site safety orientation or tailgate safety meeting. Typically, the on-site assembly area will be at a parking area, and the off-site assembly area will be at a designated area upwind and outside of the entrance point into the site. The CSO will notify the facility emergency contact and local fire, police, and/or emergency medical services as necessary. The CSO and SCPM will complete a head count to make sure that all site personnel are accounted for.

TABLE 7: EVACUATION ALARM AND ASSEMBLY INFORMATION

EVACUATION ALARM

A compressed air horn will be used to communicate an emergency situation to personnel.

THREE LONG BLASTS on the air horn shall signify an evacuation alarm. Personnel will be instructed to report to the evacuation assembly location and await a head count by the HSO and Site Superintendent.

EVACUATION ALARM	VEHICLE HORN OR AIR HORN (THREE LONG BLASTS)
------------------	--

8.2.2 EMERGENCY PLAN: FIREFIGHTING PLAN

The CSO will consult with the Bien Hoa Airbase's emergency responders regarding response to fire incidents associated with site work before initiating site activities.

In the event of a large fire (beyond the immediate control of a small onsite fire extinguisher) the following five steps will be followed:

1. Site alarm will be sounded;
2. Work will stop;
3. Personnel will immediately evacuate and assemble at a predetermined upwind site location;

4. Emergency responders will be called; and
5. Personnel will not re-enter the fire area until it is cleared by emergency responders and the CSO.

In the event of a small fire (within the immediate control of a small on-site fire extinguisher) and depending on facility-specific requirements the following three steps will be followed:

1. Site alarm will be sounded;
2. Trained personnel will use an on-site fire extinguisher to put out the fire only if it can be performed safely; and
3. Work in the immediate area will stop until fire is resolved and area cleared by the CSO.

If fire becomes too large for a hand held extinguisher, emergency responders will be notified and procedure for a large fire (above) will be followed.

8.2.3 EMERGENCY PLAN: POSTING OF EMERGENCY TELEPHONE NUMBERS

An Emergency Contact List is provided in Table 6 of this Site-Wide HASP. An Emergency Hospital and Route map with written instructions will be posted in the operations trailer on the site. The CSO and CM will enter the location into a Global Positioning System (GPS) or mobile phone for audible directions to the emergency hospital facility. The CSO must check the emergency hospital route before start of fieldwork. NOTE: Due to driving restrictions for A&E II Contractor personnel, a hired car service or emergency response vehicle will be used for transport to the closest hospital facility (Dong Nai International Hospital) (Figure 3). The contractor SHASP will include specific procedures for transportation of injured workers to the emergency treatment facility.

EMERGENCY HOSPITAL ROUTE MAP

Emergency Hospital:

NAME DONG NAI INTERNATIONAL HOSPITAL

Bệnh viện Quốc tế Hoàn Mỹ Đồng Nai

1048A Phạm Văn Thuận, Tân Mai, Thành phố Biên Hòa, Đồng Nai, Vietnam

PHONE +84 251 3955 955

FIGURE 3: VICINITY MAP OF DONG NAI INTERNATIONAL HOSPITAL AND EMERGENCY HOSPITAL ROUTE



NOTE: USE THE NEAREST GATE TO EXIT THE AIRBASE.

Due to restrictions on the use of rented vehicles and A&E II Contractor staff driving in Vietnam, a car and driver or emergency medical transportation will be used to transport injured workers to the hospital. Contractors will state their arrangements for transportation to emergency facilities in the SHASP. **The CSO shall ride with a driver along the route to the emergency hospital before start of fieldwork.**

8.2.4 EMERGENCY PLAN: SEVERE WEATHER

Safety procedures are required for cases of inclement weather for outside work locations or other adverse environmental conditions (i.e., strong winds, rain, lightning, typhoon, tornado, earthquake, and tsunami). The CSO or designated on-site personnel shall be responsible for checking the weather conditions at a minimum of twice a day.

The presence of strong winds requires stoppage of affected work activities at elevated work locations (e.g., towers, roofs, ladders, scaffolds, platforms) and stoppage of use of equipment whose safe operation can be affected by high winds or lightning strike (i.e., drill rigs, man lifts, scissor lifts, cranes).

The presence of heavy rain during monsoon season (May through October/November) requires stoppage of affected work activities where the heavy rain can create safety hazards due to limited visibility, wet work surfaces, slippery equipment controls, increased electrical hazards, etc.

The presence of thunder requires stoppage of affected work activities where lightning presents an increased safety hazard of electrocution. A determination shall be made as to the proximity to the operation being performed. To determine the distance, once lightning is seen, count the number of seconds until you hear the thunder. Divide number of seconds by five (5) to get the distance the lightning is away from you. If lightning is 10-miles away or less, take shelter and remain there until 30 minutes after seeing the last lightning flash or hearing the last thunder.

The occurrence of a typhoon, cyclone, or earthquake requires stoppage of affected work activities and evacuation of personnel from confined spaces, waterfront areas, and buildings or structures of questionable stability.

In case of work stoppage due to inclement weather conditions or other adverse environmental conditions, work will not resume until an “All Clear” signal has been communicated by the CSO to affected personnel. In case of work stoppage due to lightning, an “All Clear” will not be given until 30 minutes after last show of lightning or sound of thunder.

In the case of severe weather conditions, emergency evacuation procedures will be established where high winds, strong storms, cyclones, typhoons, and floods are a potential occurrence. The CSO and A&E II Contractor HSO monitor the local weather conditions continuously and advises the SCPM when severe storm warnings are issued. When a severe weather warning is issued, the CSO and SCPM take actions to secure the worksite. In the event of impending severe weather conditions, personnel are advised of the hazard, and an evacuation order is issued by the CSO or A&E II Contractor HSO. All site personnel immediately evacuate the work area to a designated location (i.e., operations trailer, hotel, vehicle). The CSO and the A&E II Contractor HSO notifies the A&E II Contractor COP and advises that all site personnel are evacuating the area. The CSO and A&E II Contractor HSO maintain contact with site personnel and provides the SCPM with periodic updates as to the whereabouts of site personnel. Site personnel are to remain outside the evacuated area at a designated location until notified by the CSO and A&E II Contractor HSO that it is safe to return to the work area. After severe weather conditions have passed, the SCPM, CSO, and A&E II Contractor HSO will mobilize to the worksite, inspect the condition and security of the site, and make any necessary response actions to correct unacceptable conditions.

8.2.5 EMERGENCY PLAN: SPILL PREVENTION AND CONTROL PLAN

In areas where drums and containers are stored, measures to be taken to contain and isolate the entire volume of the material in storage will be provided in Emergency Plan: Spill Prevention and Control Plan. Materials stored could include fuel, decontamination fluids, lubricants, and other waste and unused chemical products as required on the site.

Storage areas will be diked around the containers and designed to hold the entire volume of the material stored, with added volume in the event of rainfall. Drums and containers must be placed in the diked area in such a manner that, if the container is breached, the contents will spill into the diked area and not outside the perimeter.

Cleanup methods for each stored material will be determined based on the chemical information on the SDS for the compound. Compatible absorbent materials shall be stored nearby to assist in preventing the spread of the spill.

Containers shall be segregated according to the chemical classification on the SDS. For instance, flammables will be stored with flammables and segregated from oxidizers by the distances recommended on the SDS.

As with all incidents, a spill will be reported to the CSO and HSO as soon as it occurs or is discovered.

8.2.6 MEDICAL EMERGENCY PROCEDURES PLAN

In the event of a medical emergency, the following procedures will be implemented. The exposed or injured person will be removed from immediate danger, first aid and/or CPR will be administered by trained site personnel (a minimum of two trained and certified first aid/CPR personnel are required to be present on site at all times). Individuals who are required to work alone or in remote areas shall be trained in first aid and shall be provided with an effective means of communication to call for assistance in the event of an emergency.

Emergency medical assistance will be called and will be informed of the following:

- Name and location of person reporting;
- Location of accident or incident;
- Specific directions to the emergency location, as needed;
- Phone number from which the person is calling;
- Number of persons needing help;
- What is currently being done for the victim (for life-threatening injuries, request instructions from emergency services dispatcher);
- Name and affiliation of injured party;
- Description of injuries;
- Details of any chemical involved;
- Summary of the accident, including suspected causes and time of occurrence; and
- Temporary control measures taken to minimize further risk.

Nonessential personnel will be evacuated from the work area until the CSO determines that it is safe for work to resume.

A medical emergency involving chemical exposure will require communication between the CSO, A&E II Contractor HSO, and emergency hospital personnel regarding chemicals involved. The CSO will designate an individual to accompany or follow the victim to the emergency hospital to assist with any needs that arise and to report back regarding the victim's status. Follow-up reporting to the Vietnam Ministry of Health and responsible medical facilities will be required in the event of chemical exposure. Refer to Guidelines for Occupational Health and Safety Management, No. 19/2016/TT-BYT for reporting forms and requirements.

8.2.7 FIRST AID AND CARDIOPULMONARY RESUSCITATION AVAILABILITY PROGRAM

A list of designated qualified first aid/CPR personnel will be posted by the first aid station/kit in the Project Contractor office or maintained by the CSO. Copies of certificates will be maintained on site, and retraining will be completed as required by the agency providing the certification. At least two certified employees per shift are required on the site at all times. Appendix J – List of Designated First Aid Responders, presents the Project list of designated first aid responders that will be maintained as the Project progresses.

First aid kits are required on the work site, with contents meeting the requirements of American National Standards Institute (ANSI) Z308.1 or comparable local standard. There will be a minimum of one first aid kit for every 25 (or fewer) employees on the site. The contents of the kit will be supplemented based on the work tasks and the site hazard evaluations. As supplies are used for treatment, they will be replaced immediately. First aid kit inspections will be conducted at least monthly.

Refer to Guidelines for Occupational Health and Safety Management, No. 19/2016/TT-BYT for first aid personnel, emergency response team personnel, first aid kit requirements, and on-site medical treatment facility requirements.

8.2.8 BLOODBORNE PATHOGENS PROGRAM

Designated first aid responders are required to complete BBP training as required in the OSHA BBP standard (29 CFR 1910.1030). BBP training is provided to personnel who have potential exposure to blood or other potentially infectious materials.

8.2.9 EMERGENCY DECONTAMINATION PROVISIONS PLAN

Refuges established on the Project site will be equipped with adequate supplies for emergency, abbreviated decontamination. Drums and containers will be used to store first aid kits and personnel decontamination supplies, including water for washing, moistened towelettes for hands and face, and plastic bags for holding reusable PPE until full decontamination can be performed. A supply of clean PPE will be included in the drums in the event that modesty clothing worn underneath coveralls has been contaminated or damaged. When emptied, the drums will be used for holding wastes generated during the abbreviated decontamination procedure.

8.3 SITE SANITATION / HOUSEKEEPING PLAN

This section of the Site-Wide HASP reviews site sanitation plans.

8.3.1 HOUSEKEEPING

General housekeeping procedures include:

- Work areas and means of access must be maintained orderly and safe;
- Personnel and equipment will be provided to comply with housekeeping requirements;
- Daily inspections will be made of work areas for adequate housekeeping and findings recorded on daily inspection reports;
- Stairways, passageways, and access ways must be kept free of materials, supplies, and obstructions at all times;

- All work areas will have sufficient light to ensure worker safety;
- Loose or light material must not be placed on roofs or floors that are not closed in, unless properly secured;
- Tools, material, extension cords, or debris must not cause tripping or other hazards;
- Tools, material, and debris that could be displaced or fall must be secured;
- Debris must be cleared from work areas and access ways in and around the exterior of buildings and structures;
- Storage areas must be kept free from combustible material accumulation;
- Liquids, particularly combustible or flammable liquids, must not be allowed to accumulate on floors, walls, etc.; and
- All spills of combustible or flammable liquids must be immediately cleaned up.

8.3.2 DRINKING WATER

An adequate supply of potable water shall be provided for personnel. Drinking water will be provided to workers in portable drinking water dispensers with lids and a tap. Dispensers will be clearly marked “Drinking Water” and will not be used for other purposes. Individual disposable cups will be used for large containers of water. Use of a common cup or dipping from the container is prohibited. Unused disposable cups will be stored in a sanitary container and a waste receptacle will be available for used cups and empty disposable bottles.

8.3.3 NON-POTABLE WATER

Outlets for non-potable water, such as water for firefighting purposes, shall be identified by A&E Bien Hoa Contractor as “Caution – Water Unsafe for Drinking, Washing, or Cooking” to clearly indicate that the water is unsafe and is not to be used for drinking, washing, or cooking purposes. Tanks containing non-potable water shall be marked by A&E Bien Hoa Contractor as “Non-Potable” to indicate that the water is non-potable. A&E Bien Hoa Contractor personnel will be instructed to avoid the use of non-potable water for purposes other than firefighting or dust control.

8.3.4 TOILETS

Toilets available for Project Contractors will be designated by A&E Bien Hoa Contractor personnel. Portable toilets will be provided on site by a vendor when permanent toilets are not available. The vendor will be responsible for properly emptying, cleaning, maintaining, and repairing all units supplied throughout the duration of all site activities. Toilets shall be kept in a sanitary condition at all times. The number of units required will be based on the number of personnel on site as follows, per Annex I of Circular No. 19/2016/TT-BYT “Guidelines for Occupational Health and Safety Management.”

TABLE 8: HYGENIC WORKS IN WORKPLACES

HYGENIC UTILITIES	PER SHIFT	NUMBER OF EMPLOYEES
1. Urinals	11-20 persons/urinal	<300
	21-35 persons/urinal	>300
2. Urinals*	11-20 persons/urinal	<300
	21-35 persons/urinal	>300
3. Bathrooms	1-20 persons/bathroom	1 - 300
	21-30 persons/bathroom	301-600
	30 persons/bathroom	>600
4. Menstruation rooms	1-3 female/room	1-300
	30 female/room	>300
5. Handwash taps	15-20 persons/tap	<300
	35 persons/tap	>300
6. Wardrobes	1 person/drawer or small cabinet or hook	Apply to businesses and workplaces where workers contact with dangerous, hazardous and poisonous factors that may cause occupational diseases

*Note: This information is repeated in the Circular as shown here.

8.3.5 WASHING FACILITIES

Washing facilities available for Project Contractors will be identified by the CSO. If necessary, the CSO will ensure provision of running water, soap, and individual means of drying in designated washing facilities; however, moist towelettes may be used where it is not feasible to provide running water. Personnel shall be required to wash their hands and face before breaks and lunch or use individual disposable sanitizing cloths where water is not available. Good personal hygiene practices are to be followed at all times. Food, beverages, tobacco products, or cosmetics are not allowed, in potentially contaminated areas. Eating, drinking, chewing gum or tobacco, and smoking are allowed only in designated clean areas.

8.3.6 WASTE DISPOSAL

Garbage and refuse disposal shall be arranged for by Project Contractors at Project sites. In the event that wastebaskets or trashcans are not made available by the facility, containers shall be provided for the collection of trash and other non-hazardous waste. Containers used for garbage shall be equipped with covers. Garbage and other waste shall be disposed of at least daily. Specific facility requirements for waste recycling and disposal shall be met.

Significantly soiled contaminated waste materials (including PPE and disposable field equipment) will be properly stored in appropriate containers and sampled for characterization. The potentially contaminated waste material will be handled as investigation-derived waste (IDW) until it is characterized as non-hazardous or hazardous. Decontamination procedures will minimize potentially contaminated waste materials stream. IDW management and handling procedures are detailed in the Site-Wide Sampling and Analysis Plan/Quality Assurance Plan.

8.4 MEDICAL SUPPORT AGREEMENT AND FIRST AID AVAILABILITY PROGRAM

Prior to the commencement of work activities on the site, the CSO will meet with the proposed medical treatment facility, Dong Nai International Hospital, to ensure the appropriate treatment is available, and the hospital is aware of the work to be performed. Contractors will ensure that facilities for personnel decontamination are made available in the event of an injury, to include full body flush (or shower) and eyewash stations. Decontamination may be required before an injured worker can be treated.

Cellular telephones will be used for site and emergency communications. The CSO and A&E II Contractor HSO will maintain an “Emergency Contact List” (see Table 6). The CSO is responsible for determining the route to the emergency hospital before the start of field operations and will check the route with a driver. The Emergency Hospital and Route map will be provided and posted on the site in several locations. The CSO will establish emergency communication procedures before site work and will communicate this information to site personnel during site orientation briefings and safety meetings.

8.5 BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

The Bloodborne Pathogens Exposure Control Plan was developed in accordance with the BBP standard as outlined in 29 CFR 1910.1030. The purpose of this exposure control plan is to minimize employee occupational exposure to blood and other infectious body fluids. Please see Appendix G for specific details of the plan.

8.6 SITE LAYOUT PLAN FOR TEMPORARY SITE FACILITIES

Due to the multi-phase nature of the site work, site layout is expected to change as work areas are expanded or reduced.

Temporary site construction may include the following:

- Site operations/office trailers;
- Storage areas for materials, tools, and equipment;
- Storage areas for vehicle and equipment fuel;
- Storage areas for hazardous chemicals (paints, adhesives, lubricants, etc.);
- Personnel and heavy equipment/truck decontamination areas;
- First aid stations;
- Sanitation facilities; and
- Any other temporary facilities necessary for the safe conduct of constructions activities.

Temporary construction, trailers, and portable toilet facilities shall be properly anchored to withstand winds and must meet applicable local building standards.

Fences will be used to designate various work areas and shall be placed and erected with the approval of Bien Hoa Airbase command. Adequate ingress/egress will be provided for use during emergencies. For designation of contaminated, decontamination, and clean zones, colored silt fencing may be used to clearly identify each zone.

If nighttime operations are to be conducted, adequate portable lighting is to be provided by the contractor. Locations of such fixtures are to be included on the site layout plan and moved or changed as needed.

Site maps indicating all temporary construction will clearly indicate the locations of all features and fixtures and shall be updated as they are moved or removed from the site.

8.7 ACCESS AND HAUL ROAD PLAN

Prior to commencement of site activities, the contractor shall provide a copy of the proposed Access and Haul Road Plan to USAID, A&E II Contractor, and the Bien Hoa Airbase facility for review. Such roadways shall be designed in accordance with local engineering criteria, and construction shall not begin on access or haul roads until final approval is granted by USAID.

The plans shall address:

- Road layout on the site;
- Widths, curve data (horizontal and vertical), and sight distances;
- Signs, road markings, and traffic control (where needed);
- Access control locations and methods;
- Roadway surfacing;
- Dust control measures; and
- Hazards adjacent to roads.

When roadways are adjacent to work areas, adequate barriers are required to prevent vehicles colliding with site workers. Where roads are adjacent to steep drop-off, waterways, or prohibited areas, adequate barriers are required. Barriers will be constructed with the permission of the Bien Hoa Airbase leadership.

8.8 PERSONAL PROTECTIVE AND SAFETY EQUIPMENT, HEARING CONSERVATION, RESPIRATORY PROTECTION PLAN

The use of personal protective and safety equipment (PPE) is a control measure that is to be used only after a hazard evaluation identifies hazards associated with a particular job or activity, and it is determined that the hazards cannot be eliminated and/or controlled to an acceptable level through engineering design or administrative actions. Process and engineering controls shall be utilized before PPE to protect employees.

Selection of PPE is based on:

- Site activities to be conducted;
- Areas of the site where activities will be conducted;
- Weather conditions;
- Physical hazards in the work area; and
- Chemical hazards in the work area.

Each contractor on the site will be responsible for providing the appropriate PPE for each of their employees working on the site and for providing the Personal Protection and Safety Equipment Plan as required for their specific activities. Each contractor will also be responsible for ensuring various sizes of PPE are available to fit all personnel regardless of sex, gender, or disability. The A&E II

Contractor HSO will provide the minimum PPE requirements to the Project Contractors, who will provide examples of the specific choice of PPE in their PPE Plan. The CSO and A&E II Contractor HSO will review the selection of PPE materials and the PPE Plan for compliance with the Site-Wide HASP. USAID will review and approve the PPE plan prior to commencement of any work activities on the site. For the duration of this Project, the minimum basic PPE requirements are as follows:

- Eye protection – goggles or safety glasses with side shields and/or full-face shield where required;
- Hearing protection – in-ear disposable earplugs, changed at least every day or when soiled;
- Head protection – hard hat as needed or USAID-required;
- Protective footwear – hard-toed boots, ankle high, with over boots or boot covers for wet conditions;
- High-visibility vests;
- Respiratory protection – full- or half-face respirators with appropriate cartridges or disposable dust masks worn with full-face shield where required;
- Hand protection – leather work gloves or, where required, chemical protective outer and inner gloves protected by leather work gloves;
- Personal flotation devices to be worn in areas where work is conducted adjacent to waterways; and
- Chemical protective disposable coveralls.

Specific chemical protective boots, gloves, and coveralls may be recommended by the A&E Bien Hoa Contractor HSO based on the level of contamination in each work area. Recommended procedures for donning and doffing PPE are included in Appendix K – Personal Protective Equipment Donning Procedures and Personnel Decontamination Process. The use of PPE has implications for heat stress which is discussed in Section 9.12.

8.8.1 RESPIRATORY PROTECTION

A written respiratory protection program will be required as part of the contractor specific HASP, designed to suit each work site and work activity. The program will include requirements for:

- Medical evaluations of employees required to use respirators;
- Fit testing procedures;
- Procedures for proper use of respiratory protection;
- Procedures for cleaning, decontaminating, disinfecting, maintenance, repair, storage, and cartridge changeout;
- Employee training;
- Respiratory hazards potentially present;
- Use and care of respiratory protection;
- Donning and doffing;
- Respirator maintenance, cleaning, decontamination, disinfection, and cartridge changeout;
- Emergency procedures should the atmosphere change;
- Voluntary use guidelines; and

- Periodic evaluation of effectiveness of program.

Each contractor will be responsible for writing their respiratory protection program and submitting it to the A&E II Contractor HSO for review of compliance with the Site-Wide HASP. Project Contractor's USAID CO and COR will provide final approval of the contract-specific respiratory protection programs.

8.8.2 HEARING CONSERVATION PROGRAM

A hearing conservation program is required to provide guidance to staff regarding when and what type of hearing protection for each activity. Each contractor is responsible for ensuring compliance with hearing conservation controls and protection at the Project site. The CSO is responsible for identifying noise control areas or operations and implementing the program on the Project site. Site workers are responsible for wearing appropriate hearing protection devices and following hearing conservation procedures in a noise control area.

8.8.2.1 ACTION LEVELS

The action level for noise is an 8-hour total weight average (TWA) of 85 decibels measured on the A weighted scale (dBA). When site workers are exposed to sound that equals or exceeds this action level, contractors must implement specific hearing conservation program elements, including audiometric testing for exposed employees, training, and providing suitable hearing protection. Whenever possible, administrative or engineering controls will be used to reduce the sound level. If such controls are not feasible or fail to reduce worker noise exposures to below the action level, hearing protection will be provided to employees to reduce employee noise exposures to below the action level.

8.8.2.2 MONITORING

In most instances, high noise levels at the Project site will be caused by heavy equipment, such as drill rigs and excavators, or sources associated with the Project site, such as aircraft and vehicles. When noise exposures at a work site are suspected to equal or exceed an 8-hour TWA of 85 dBA resulting from noise sources not previously measured, the CSO will conduct an evaluation to characterize the noise sources and exposure levels.

8.8.2.2.1 Noise Level Measurements

A portable sound-level meter will be used to survey the Project site work areas and to estimate noise exposure when the noise levels are relatively constant. Monitoring for occupational noise exposure will be conducted for each representative task or job position that the CSO or HSO deems necessary. All noise measurements will be taken in the hearing zone of the individual. The hearing zone is an area within a radius not to exceed 12 inches from the ear closest or in most direct proximity to the noise source.

Noise level readings shall be documented as follows:

- Date and time of reading;
- Area of site being monitored;
- Activities conducted during the monitoring; and
- Determination of the need for hearing protection.

The HSO will communicate recommended hearing conservation measures to the contractor, who will implement protective measures as required.

8.8.2.2.2 Estimating Noise Levels

In some cases, such as short-term activities, the CSO may forego actual noise level measurements and use a simple rule-of-thumb test to estimate if noise levels are in excess of 85 dBA. The test requires the CSO to determine how loud it is necessary to speak to be heard at arm's length from another person. If the CSO must raise the voice to be heard, average noise levels likely exceed 85 dBA.

8.8.2.3 HEARING PROTECTION

Contractors will provide hearing protection to all personnel who may experience 8-hour TWA noise exposures of 85 dBA or greater. Hearing protection must provide sufficient attenuation to limit worker noise exposure to an 8-hour TWA of less than 85 dBA. Hearing protection will be replaced as necessary, and the CSO will supervise the correct use of hearing protection by every worker affected. CSO will provide training in the use, care, and maintenance of hearing protection.

8.9 HEALTH HAZARD CONTROL PROGRAM

A Health Hazard Control Program is required to manage the multiple types of hazards on each job site. The six major groups of hazards are presented in the following Sections:

8.9.1 CHEMICAL HAZARDS

Specific chemical hazards have been delineated in the AHA, included in Appendix D, which identifies the chemicals, controls to prevent exposure, and emergency procedures should accidental exposure occur. This information is provided for use by all Project Contractors in the design of their SHASP.

8.9.2 BIOLOGICAL HAZARDS

Biological hazards, or “biohazards,” include plants, animals or their products, and parasitic or infectious agents that may present potential risks to participant health. The following sections discuss procedures for working with biohazards, preventive guidelines, and first aid procedures for the most common hazards field staff are likely to encounter at the Bien Hoa Airbase Area.

8.9.2.1 INSECTS AND ARACHNIDS

Stinging or biting insects or arachnids in the area of Bien Hoa Airbase Area include mosquitoes, centipedes, bees, wasps, ticks, and various spiders. Standard Operating Procedures (SOPs) for reducing the chance of insect bites or stings and for treating bites or stings are listed below.

8.9.2.1.1 Preventive Measures

- Participants should keep as much skin area covered as possible by wearing long-sleeved shirts, long pants, and a hat. Pant legs should be tucked into socks or boots and shirts into pants. In addition, participants should wear light colored clothing.
- Insect repellent containing 20-30% DEET or 20% Picaridin should be used on exposed skin, and permethrin should be sprayed on or soaked into clothing. Application of DEET or permethrin on skin should be repeated if perspiring or if working in rainy conditions.
- Avoid areas of standing water where mosquitoes generally breed and inhabit.
- Tall grasses and brush that could harbor mosquitoes, ticks, spiders, and centipedes should be avoided.

- Several times during the day and at the end of the day, each participant should perform a check for evidence of imbedded ticks or previous bites. Particular attention should be paid to the scalp, neck, ankles, back of the legs, and waist.
- When opening well covers, vaults, or other closed items, participants should watch for hornet or wasp nests, spiders, and centipedes. Participants should never reach into spaces where they cannot clearly see their hands and arms.
- Participants should watch carefully for stinging insects around open beverages or food.
- Participants with known allergic response to insect stings must inform the Contractor Safety Officer (CSO) at the beginning of each field effort and must carry an antidote kit if so advised by their physician.
- A person suspected of being stung or bitten by a centipede, spider, or a scorpion should receive immediate medical attention. The sting of the giant Vietnamese centipede is particularly painful, and the venom of several spiders and scorpions can cause various illnesses if not treated properly and immediately.

8.9.2.1.2 Bee or Wasp Stings

If stung by a bee or wasp:

- Carefully remove the stinger (if present).
- Wash thoroughly with soap and water.
- Apply cold pack.
- Use antidote kit if known to be allergic. Call for emergency assistance if symptoms appear.
- Monitor for allergic reaction:
 - Extreme swelling
 - Redness
 - Pain
 - Face, neck, or tongue swelling
 - Difficulty breathing

8.9.2.1.3 Spider Bites

Many varieties of spiders are present in Vietnam, including the Giant Golden Orb, Yellow Sac, Grass Cross, Jumping, and Tarantula. While their bites are painful and may require first aid and monitoring, none are considered extremely hazardous.

- Wash the bite area with soap and water.
- Apply cold pack.
- Monitor for allergic reaction:
 - Extreme swelling
 - Redness
 - Pain
 - Face, neck, or tongue swelling
 - Difficulty breathing

Request advanced medical care if symptoms persist.

8.9.2.1.4 Centipede Stings

The Vietnamese Giant Centipede is a poisonous, aggressive arachnid, which grows up to 20 centimeters in length. One death has been reported in the Pacific as a result of a centipede sting to the head. Although not normally a medical emergency, their sting is extremely painful and immediate treatment is required.

- Wash the area with soap and water.
- Apply hot water or hot compress to help deactivate the poison.
- Follow hot pack with ice/cold pack.
- Monitor for allergic reaction:
 - Extreme swelling
 - Redness
 - Pain
 - Face, neck or tongue swelling
 - Difficulty breathing

Seek immediate advanced medical care for the pain or for secondary infection.

8.9.2.1.5 Mosquitoes

Mosquitoes in Vietnam are known to carry a variety of diseases, including:

Zika Virus

- Causes severe birth defects and diseases in infants born to pregnant women infected with the virus. Pregnant participants should avoid travel to Vietnam.
- No known treatment or immunization.

Dengue

- Peak transmission during the rainy season.
- Flu-like symptoms, high fever, pain behind the eyes, muscle, joint, and bone pain, severe headache, and red rash.
- No known treatment or immunization.

Chikungunya

- Carriers typically found in and around urban and suburban dwellings.
- Peak transmission during the rainy season.
- Sudden onset high fever, severe muscle and joint pain, headache, fatigue, nausea, vomiting, and rash. Joint pain can last for several months.
- No known treatment or immunization.

Malaria

- Not active in the Bien Hoa Airbase Area at this time, but present in most rural areas in Vietnam.

- Some strains are resistant to conventional drug treatment.
- Requires pretreatment with antimalarial drugs before, during, and after visiting the area.

Japanese Encephalitis – Mosquito-Borne

- Transmitted by evening-biting mosquitoes that have fed on infected wildlife.
- High fever, severe headache, vomiting, diarrhea, fatigue, and weakness. Some neurological symptoms.
- 20-30% fatality rate.
- No antiviral treatment available.
- Immunization available.

8.9.2.2 SNAKES

Of approximately 140 species of snakes identified in Vietnam, at least 37 are venomous and potentially harmful to humans, including:

1. *Azemiops feae* – Fea's Viper
2. *Bungarus candidus* – Malayan Krait, Common Krait, Blue Krait, Javan Krait
3. *Bungarus fasciatus* – Banded Krait, Golden Banded Snake
4. *Bungarus flaviceps* – Red-headed Krait, Yellow-Headed Krait, Kinabalu Krait
5. *Bungarus slowinskii* – Red River Krait
6. *Calliophis intestinalis* – Banded Long-glanded Coral Snake, Brown Long-glanded Coral Snake
7. *Calliophis maculiceps* – Small-spotted Coral Snake
8. *Calloselasma rhodostoma* – Malayan Pit Viper
9. *Daboia siamensis* – Eastern Russell's Viper, Daboia, Siamese Russell's Viper
10. *Deinagkistrodon acutus* – Sharp-nosed Pit Viper, Hundred-pacer
11. *Naja atra* – Chinese Cobra, Taiwan Cobra, Formosan Cobra
12. *Naja kaouthia* – Monocellate Cobra, Thailand Cobra, Monacled Cobra
13. *Naja siamensis* – Thai Spitting Cobra
14. *Ophiophagus hannah* – King Cobra, Hamadryad, Jungle Cobra
15. *Ovophis monticola* – Mountain Pit Viper, Blotched Pit Viper
16. *Ovophis tonkinensis* – Tonkin Pit Viper
17. *Protobothrops cornutus* – Horned Pit Viper, Fan-Si-Pan Horned Pit Viper
18. *Protobothrops jerdonii* – Jerdon's Pit Viper, Bourret's Pit Viper
19. *Protobothrops mucrosquamatus* – Chinese Habu, Taiwanese Pit Viper
20. *Rhabdophis angeli* – Angel's Keelback
21. *Rhabdophis callichroma* –
22. *Rhabdophis chrysargos* – Speckle-bellied Keelback

23. *Rhabdophis nigrocinctus* – Green Keelback, Banded Keelback
24. *Rhabdophis nuchalis* – Hubei Keelback
25. *Rhabdophis subminiatus* – Red-necked Keelback, Heller's Keelback
26. *Sinomicrurus kelloggi* – Kellog's Coral Snake
27. *Sinomicrurus macclellandi* – Macclelland's Coral Snake
28. *Triceratolepidophis sieversorum* – Three Horned-scaled Pitviper
29. *Trimeresurus albolabris* – White-lipped Green Pit Viper, White-lipped Pit Viper, White-lipped Tree Viper
30. *Trimeresurus gumprechtii* – Gumprecht's Green Pit Viper
31. *Trimeresurus macrops* – Dark Green Pit Viper, Large-eyed Pit Viper
32. *Trimeresurus popeiorum* – Pope's Pit Viper, Pope's Green Pit Viper
33. *Trimeresurus stejnegeri* – Chinese Bamboo Pit Viper, Chinese Green Tree Viper
34. *Trimeresurus truongsongensis* – Quang Binh Pitviper
35. *Trimeresurus vogeli* – Vogel's Green Pit Viper, Vogel's Pitviper
36. *Tropidolaemus philippinensis* – South Philippine Temple Pit Viper
37. *Tropidolaemus wagleri* – Wagler's Pit Viper, Temple Pit Viper

8.9.2.2.1 Preventive Measures

During site reconnaissance activities:

- Assume that every snake you see is poisonous. If you see a snake, avoid it.
- Do not walk through tall vegetation where you cannot see your feet or the path you are walking.
- Do not reach down into vegetation or any place where you cannot see your hands.
- Be watchful of overhanging vegetation and do not brush against it. Many vipers live in trees and will drop onto anyone standing or walking under overhanging limbs or vines.
- If you are bitten by any kind of snake, request emergency medical assistance IMMEDIATELY.
- If you are bitten, do not attempt to catch the snake. Request assistance from another person on the site to identify the species, IF POSSIBLE.
- If you encounter a snake, note the location on site maps for future reference by anyone performing site activities.

8.9.2.2.2 First Aid for Snake Bites

Anyone who has been bitten by a snake must be transported immediately to the nearest hospital facility while first aid measures are administered:

- Move the victim away from the area where the bite occurred. If the snake is still attached, use a stick or other tool – NOT hands – to make it detach.
- Remove tight clothing or jewelry from near the bite since severe swelling can occur.
- Reassure the victim.

- Position victim so the bite is at or below heart level.
- Completely immobilize the victim. If bitten on an extremity, immobilize the limb with a splint.
- Clean the wound but don't flush with water. Apply a clean dry dressing to the bite to keep it covered.
- Pain near the bite site may be severe, but do not administer anything by mouth.
- Vomiting may occur so monitor the victim and roll them to their left side to prevent choking.
- Closely monitor airway and breathing and administer CPR if needed.
- DO NOT:
 - Apply a tourniquet.
 - Cut or excise the area around the bite.
 - Use suction.
 - Apply poultices, ointments, or folk remedies to the bite.
 - Apply ice or heat to the wound site.
 - Administer medication, alcohol, or caffeine.

Treating medical personnel may prescribe acetaminophen (Paracetamol or Tylenol) for pain, which can be extreme.

8.9.2.3 DOGS AND OTHER MAMMALS

Dogs, other house pets, and bats are considered potential carriers of rabies, whether domesticated house pets or stray/feral animals. The population of stray/street dogs in Vietnam has grown in recent years, and encounters with them are likely on the site. Many of the dogs are feral and have always lived on streets or in open areas. Some are also stray house pets that have been released into the area. None of the dogs should be considered approachable, as many are not human-friendly. In addition, because they are not properly cared for by veterinarians, they are infested with various parasites and rabies.

Parasites can be transmitted by simply touching an infected animal. Rabies can be transmitted by transmission of saliva from the infected animal by biting or licking, or by being scratched by the animal's claws or nails.

8.9.2.3.1 Preventive Measures

During site reconnaissance activities:

- Do not approach or touch any animals that approach you. Contact with the animals should be avoided.
- Report the presence of the animal to the CSO whether or not symptoms of rabies are present.
- Note the location of any animals on site maps for future reference by anyone performing site activities.
- Do not feed or offer water to any animals on site.
- If a dead animal is found on the site, do not touch it, as it could be infested with parasites.
- Avoid animal droppings.

8.9.2.3.2 First Aid for Animal Bites or Scratches

Anyone who has been bitten or scratched by an animal on site must seek immediate medical attention. Do not attempt to capture the animal. Report the incident to Vietnamese military official present at the Airbase.

- Wash the area thoroughly with soap and water.
- Apply antibiotic cream and cover with a clean bandage.
- Seek advanced medical care at the nearest hospital facility.

8.9.3 MANUAL MATERIAL HANDLING HAZARDS

Material handling devices must be used for handling heavy or bulky items whenever possible rather than manual material handling. Whenever handling heavy or bulky items, the material handling needs should be evaluated in terms of weight, size, distance, and path of movement. The following hierarchy for selection of material handling means must be used:

- Elimination of material handling needs by engineering;
- Movement of material by mechanical device (i.e., lift truck);
- Movement by manual means with handling aid (i.e., dolly, cart); and
- Movement using safe lifting techniques.

Personnel must be trained in safe lifting procedures including:

- Size up the load first;
- Get help if the load is bulky, heavy, or of unwieldy length;
- Be sure of footing;
- Lift with your legs while keeping your back straight;
- Keep your balance; do not twist under strain or jerk the load; and
- Keep the load close to your body.

When two or more persons are carrying long material, such as a portable ladder, all persons must carry the material on the same shoulder and lift or lower the material in unison.

8.9.4 AIR CONTAMINANT HAZARDS

Air contaminants are of concern during excavation, earthmoving, and transportation activities during dry months. Specific hazards are delineated in the AHA, included in Appendix D. The AHA includes chemicals, controls to prevent exposure, and emergency procedures should accidental exposure occur. While dioxin itself is not a volatile chemical, it is present in the soil and dust at the site.

If visible dust is generated during site activities, Project Contractors responsible for these activities must implement response actions including engineering controls (wetting of soil to prevent dust), safe work practices (enhanced precautions to avoid contact with contaminated soils and dust), upgrade or downgrade in PPE, work stoppage, emergency evacuation, and additional evaluation by the CSO. Response actions may also include collecting and analyzing samples to monitor the dust and air conditions.

8.10 PPE REQUIREMENT PROGRAM

As stated in Section 9.8 Personal Protective and Safety Equipment, PPE will be required for intrusive field operations based on the following criteria:

- Site activities to be conducted;
- Areas of the site where activities will be conducted;
- Weather conditions;
- Physical hazards in the work area; and
- Chemical hazards in the work area.

The A&E Bien Hoa Contractor ECS and HSO will establish minimum required appropriate PPE for work activities and assign the level of protection. PPE levels of protection are discussed below in Section 9-10.1. CSOs are required to review the minimum PPE requirements and determine if additional requirements are needed for their Project Contractor work activities. Project Contractors must include in their SHASP a donning and doffing procedure to suit the level of protection, type of PPE used, and decontamination procedures to be followed. A suggested sequence for donning and doffing PPE is provided in Appendix K. The use of PPE has implications for heat stress which is discussed in Section 9.12.

8.10.1 LEVELS OF PROTECTION

The individual components of clothing and equipment must be assembled into a full protective ensemble that both protects the worker from site-specific hazards and minimizes the hazards and drawbacks of the PPE ensemble itself.

Personal protection equipment is divided into four categories based on the degree of protection afforded. The four levels of protection (A, B, C, and D) are based on the widely used USEPA Levels, which are described in Appendix B of the Hazwoper standard (29 CFR 1910.120 and 8 CCR 5192). Level A provides the highest level of protection. Combinations of PPE other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

The situations requiring the four levels of protections and the PPE for each level of protection are listed below. An asterisk (*) behind a listed item indicates that its use is optional for that level of protection.

8.10.1.1 LEVEL A PROTECTION

Level A should be selected when the greatest level of skin, respiratory, and eye protection is required. Level A protection should be used when:

- A. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either:
 - The measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or
 - The site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin.
- B. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or

- C. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

The following constitute Level A equipment; it may be used as appropriate.

- Positive-pressure, full face-piece, self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator (SAR) with escape SCBA, approved by National Institute of Occupational Safety and Health NIOSH;
- Totally-encapsulating chemical-protective suit;
- Coveralls*;
- Long underwear*;
- Gloves, outer, chemical-resistant;
- Gloves, inner, chemical-resistant;
- Boots, chemical-resistant, steel toe and shank;
- Hard hat (under suit)*; and
- Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit.)

8.10.1.2 LEVEL B PROTECTION

Level B should be used when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed. Level B protection should be used when:

- A. The type and atmospheric concentration of substances have been identified and require the highest level of respiratory protection, but less skin protection; and/or
- B. The atmosphere contains less than 19.5% oxygen; or
- C. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

The following constitute Level B equipment; it may be used as appropriate.

- Positive-pressure, fullface-piece SCBA, or positive-pressure SAR with escape SCBA (NIOSH approved);
- Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls);
- Coveralls*;
- Gloves, outer, chemical-resistant;
- Gloves, inner, chemical-resistant;
- Boots, outer, chemical-resistant steel toe and shank;
- Boot-covers, outer, chemical-resistant (disposable)*;
- Hard hat*; and
- Face shield*.

8.10.1.3 LEVEL C PROTECTION

Level C should be used when the concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators (APRs) are met. Level C protection should be used when:

- A. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
- B. The types of air contaminants have been identified, concentrations measured, and an APR is available that can remove the contaminants; and
- C. All criteria for the use of APRs are met.

The following constitute Level C equipment; it may be used as appropriate.

- Full-face or half-mask, APRs (NIOSH approved);
- Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls);
- Coveralls*;
- Gloves, outer, chemical-resistant;
- Gloves, inner, chemical-resistant;
- Boots (outer), chemical-resistant steel toe and shank*;
- Boot-covers, outer, chemical-resistant (disposable)*;
- Hard hat*;
- Escape mask*;
- Face shield*.

8.10.1.4 LEVEL D PROTECTION

Level D should be used when a work uniform affording minimal protection is needed or for nuisance contamination only. Level D protection should be used when:

- A. The atmosphere contains no known hazard; and
- B. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

The following constitute Level D equipment; it may be used as appropriate.

- Coveralls;
- Gloves*;
- Boots/shoes, chemical-resistant steel toe and shank;
- Boots, outer, chemical-resistant (disposable)*;
- Safety glasses or chemical splash goggles*;
- Hard hat*;
- Escape mask*;
- Face shield*.

8.11 HAZARD COMMUNICATION PROGRAM

A Hazard Communication Program will be required from all contractors working on the Bien Hoa Airbase Area Site. The A&E II Contractor HSO and ECS will request from each CSO a hazardous substance inventory list and copies of SDSs for hazardous substances present, stored, or used by facility personnel and contractors in Project work areas. The Hazard Communication Program must include procedures to establish, clearly designate, and communicate the potential hazards at the Project work areas using signage, fencing, barricades, warning tape, and/or construction cones. At a minimum, signs will be posted at the approved entry points and along the perimeter of each work area. Site personnel will be informed of the hazardous substances they will be working with through Site-Wide HASP review and attendance at daily safety meetings. Project hazard communication procedures shall be referred to for guidance and requirements if hazardous chemical exposure is possible at the work site. Refer to Appendix H for details of the Program.

8.12 HEAT STRESS MONITORING AND PREVENTION PLAN

Heat stress monitoring shall be conducted by all employers during all site operations at the Bien Hoa Airbase Area. Personnel must be made aware that heat stress can occur during periods of elevated ambient temperatures, moderate to heavy workloads, and when impermeable protective clothing is in use. Personnel will be informed about the various forms of heat stress (e.g., heat cramps, heat exhaustion, heat stroke), the symptoms of exposure, treatment for exposure, and prevention measures.

Initial phases of work activities must be closely monitored by the CSO, because some workers may not be acclimatized to hot conditions. The CSO will try to identify personnel who are more susceptible to heat exposure and ensure that they are consuming enough fluids, taking adequate rest breaks, and monitoring themselves for signs of heat-related illness.

Workers are responsible for observing each other and themselves for development of heat stress symptoms. Personnel will be encouraged to drink a minimum of four liters of water or electrolyte solution per person per day - even if not thirsty - to prevent dehydration. Adequate shaded areas and cool-down facilities will be provided to protect personnel from direct sun exposure. Sufficient breaks will be provided so that personnel can remove protective clothing and cool down. Work/Rest regimens will be adjusted as required to avoid heat stress.

8.12.1 CONTRIBUTING FACTORS

Many factors contribute to heat stress, including PPE, ambient temperature and environmental conditions such as humidity, workload, and the physical and medical conditions of the employee. However, the primary factors are elevated ambient temperatures in combination with fluid loss. Because heat stress is one of the more common health concerns that may be encountered during field activities, employees must be familiar with the signs, symptoms, and various treatment methods of each form of heat stress. Heat stroke is the most serious heat-related illness. It is a threat to life and has a 20 percent mortality rate. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age directly affect the tendency to heat stroke. Table 9 lists the most serious heat conditions, their causes, signs and symptoms, and treatment.

On exceptionally hot days, supervisors and site workers should be aware of the potential for heat stress in themselves and coworkers. Warning signs and symptoms include:

- Heat exhaustion: headaches; dizziness or lightheadedness; weakness; mood changes such as irritability, confusion, or the inability to think straight; upset stomach; vomiting; decreased or dark-colored urine; and pale, clammy skin.

- Heat stroke: dry, pale skin with no sweating; hot, red skin that looks sunburned; mood changes such as irritability, confusion, or the inability to think straight.

TABLE 9: HEAT STRESS CONDITIONS

CONDITION	CAUSES	SIGNS AND SYMPTOMS	TREATMENT
Heat Cramps	Fluid loss and electrolyte imbalance from dehydration	Painful muscle cramps, especially in legs and abdomen Faintness Profuse perspiration	• Move affected worker to cool location • Provide sips of electrolyte fluids and/or water • Stretch cramped muscles • Call for medical treatment if condition worsens.
Heat Exhaustion	Blood transports to skin to dissipate excessive body heat, resulting in blood pooling in the skin with inadequate return to the heart	Weak pulse Rapid and shallow breathing General weakness Pale, clammy skin Profuse perspiration Dizziness Unconsciousness	• Move affected worker to cool location • Remove as much clothing as possible • Provide sips of cool liquid (only if conscious) • Fan the person but do not overcool or chill • Treat for shock • Call for medical transport to nearest emergency facility
Heat Stroke	Life-threatening condition from profound disturbance of body's heat-regulating mechanism	Dry, hot, and flushed skin (may sometimes be cool and moist) Constricted pupils Lack of or reduced sweating Confusion and dizziness Early loss of consciousness Rapid pulse Deep breathing at first, and then shallow breathing Muscle twitching leading to convulsions Body temperature reaching 105 or 106°F or higher	• Immediately transport affected worker to hospital. • Move affected worker to cool area • Remove as much clothing as possible • Reduce body heat promptly by dousing with water or wrapping in wet cloth • Place ice packs under arms, around neck, at ankles, and wherever blood vessels are close to skin surface • Protect affected worker during convulsions

8.12.2 HEAT STRESS PREVENTION PLAN

Heat stress prevention is critical to worker safety in the high heat and humidity of Vietnam. The following Sections present the requirements for heat stress prevention:

8.12.2.1 TRAINING

Training is an important component of heat stress prevention. All employees will receive training on the policies and procedures outlined to prevent heat-related illness prior to being assigned to work under hot weather conditions that create a danger to employee safety. Employees are instructed to recognize and treat heat-related illnesses during annual health and safety refresher courses and in the site-specific training.

8.12.2.2 PREVENTION MEASURES

When working in hot environments, specific steps must be taken to lessen the chances of heat-related illnesses. These include the following:

- Ensuring that potable water is available in the volume required to ensure worker safety: a minimum of one liter of water for each employee, for each hour of the work shift;
- Taking positive steps to ensure all employees have access to and drink plenty of fluids;
- Ensuring that frequent breaks in shaded areas are scheduled so overheating does not occur;
- Providing frequent reminders to employees to drink frequently, and providing water breaks;
- Designating a responsible individual to monitor water supply every 30 minutes, and encouraging employees to report low supplies or dirty water;
- Placing water containers as close as possible to the workers, not away from them;
- Providing disposable/single use drinking cups to employees, or making provisions to issue employees their own cups each day;
- Revising work schedules, when necessary, to take advantage of the cooler parts of the day (such as working from 5:00 a.m. to 11:00 a.m. and 6:00 p.m. to nightfall);
- Setting up an adequate number of; umbrellas, canopies or other portable devices, at the start of the shift, in close proximity (i.e., no more than 50-100 yards) to the work activity;
- Wearing light, loose-fitting, breathable clothing, hats with wide brims, and wetted cloth positioned in such a way as to protect and shade the neck of workers from the sun;
- Avoid eating large meals before working in hot environments;
- Avoid beverages with caffeine or alcohol; and
- Conducting short tailgate meeting each morning (in the employees' language) to remind workers about the importance of the above-mentioned procedures, rest breaks, adequate hydration and the location of shade.

8.12.2.3 WORK / REST SCHEDULE

When PPE must be worn (especially respirators and coveralls made of low-permeability materials), suggested guidelines relating to ambient temperature and maximum wearing time are as shown in Table 10.

TABLE 10: SCREENING CRITERIA FOR TLV AND ACTION LIMIT FOR HEAT STRESS EXPOSURE

ALLOCATION OF WORK IN A CYCLE OF WORK AND RECOVERY	TLV®(WGBT VALUES IN °C)				ACTION LIMIT (WGBT VALUES IN °C)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
X								
75-100%	31.0	28.0	--	--	28.0	25.0	--	--
50-75%	31.0	29.0	27.5	--	28.5	26.0	24.0	--
25-50%	32.0	30.0	29	28.0	29.5	27.0	25.5	24.5
0-25%	32.5	31.5	30.5	30.0	30.0	29.0	28.0	27.0

Source:

ACGIH “2018 TLVs® and BEIs® Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices”, 2018.

WetBulb Globe Temperature (WGBT) Values are expressed to the nearest 0.5°C

8.12.2.4 PHYSICAL CONDITION MONITORING

To monitor the level of heat stress in an employee exhibiting one or more of the warning signs or symptoms, the following must be measured:

- Heart Rate: Count the radial (wrist) pulse during a 30 second period prior to the start of work (to establish the base rate) and as early as possible in each rest period; if heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next period, shorten the following work cycle by one-third.
- Body Temperature: Use a tympanic thermometer to measure body temperature at the beginning and end of the work period. If temperature exceeds 99.6 degrees Fahrenheit (°F) (37.6 degrees Celsius [°C]), shorten the next work cycle by one-third without changing the rest period. If temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third. Do not permit a worker to wear impermeable PPE when temperature exceeds 100.6°F (38.1°C).

8.13 TRAFFIC CONTROL PLAN

General Traffic Control Plan elements and procedures are reviewed below. Project Contractors are required to include a Traffic Control Plan in their SHASPs for their contract-specific activities. Traffic control at the site is paramount as it is expected that there will be multiple Project Contractor and Airbase activities occurring simultaneously at the site. A written Traffic Control Plan is required whenever a hazard exists to employees because of traffic or haulage conditions at work sites that encroach upon public streets or highways. The traffic control selected for each situation must be based on type of highway, traffic conditions, duration of operation, physical constraints, and the nearness of the work space to traffic. The plan must be in conformance with the “Manual of Traffic Controls for Construction and Maintenance Work Zones – 1996”, published by the California State Department of Transportation. Project Contractor’s Traffic Control Plans at a minimum must require the following:

- Employees (on foot) must wear high visibility safety vests (orange, strong yellow-green, or fluorescent versions of these colors). During rainy weather, employees exposed to the hazard of vehicular traffic may wear orange, strong yellow-green, or yellow rainwear.

- During hours of darkness, employees (on foot) must wear reflectorized warning garments with a minimum of one horizontal stripe around the torso that is visible at a minimum of 1,000 feet.
- Employees (on foot) must be aware of traffic patterns to avoid vehicles and moving equipment.
- Employees (on foot) must maintain eye contact with nearby equipment operators when in the vicinity of moving vehicles.
- Use traffic signs, barricades, flashers, delineators, traffic cones, caution tape, or flagmen, as needed, around work areas with vehicle or equipment traffic.
- Flaggers must be utilized at locations where barricades and warning signs cannot control the moving traffic. When flaggers are used, they must be placed in relation to the equipment or operation so as to give effective warning.
- The CPM will establish vehicle and equipment traffic patterns to be used. Traffic haul routes will be identified during daily safety meetings and will take into account times and locations of concern for vehicle, heavy equipment, and pedestrian traffic exposures in the work area.
- Vehicle and heavy equipment traffic control patterns, other control measures, and times of operations will be communicated to Project and Airbase personnel.

8.14 FIRE PREVENTION PLAN

General Fire Prevention Plan elements and procedures are reviewed below. An addendum to the Site-Wide HASP will be added to suit facility requirements and procedures as site conditions change. Project Contractors and site worker response to fires shall be modified to suit the requirements of the Bien Hoa Airbase Emergency Response Plans.

The Project Contractor Fire Prevention Plan for the work site will be developed to include:

- Major workplace fire hazards;
- Potential ignition sources;
- Types and locations of fire suppression equipment;
- Assignments of responsibilities of maintaining the equipment;
- Personnel responsible for controlling the fuel source hazards; and
- Housekeeping procedures, including the removal of waste materials.

Employees and emergency first responders will be briefed on the fire hazards, the material and processes to which they are exposed, and the emergency evacuation procedures. As site conditions change, employees will be briefed with the updated information.

8.14.1 FIRE PREVENTION PLAN INFORMATION

The following information will be required in a Fire Prevention Plan:

Fire Hazards

- Combustible Materials
- Wood, including construction materials
- Paper

- Brush and trees removed during site clearing
- Flammable materials
- Fuel for vehicles and heavy equipment
- Compressed gases
- Lubricants
- Paint
- Adhesives
- Trash
- Oxidizers
- Oxygen for welding
- Bleach
- Acids
- Peroxide

Potential Ignition Sources

- Operation of fuel-operated vehicles and equipment
- Hot work or work that involves burning, welding, cutting, brazing, soldering, grinding, using fire or spark-producing tools, or other work that produces a source of ignition
- Lightning
- Electrical arcing
- Static electricity build-up

Fire Suppression / Control Equipment

- Multiple multipurpose ABC fire extinguishers may be maintained at the site.
- An onsite water source will be identified should it be needed for fire control.
- Fire suppression and Control measure shall be in compliance with Bien Hoa Airbase emergency response procedures.

Personnel Responsible for Fuel Source Hazard Control

- The CSO and A&E Bien Hoa Contractor HSO are responsible for contacting the Bien Hoa Airbase point of contact and local municipal fire service to advise them of site activities, solicit their support, and to offer an onsite orientation to the fire-safety aspects of the Project work.
- The CSO, A&E Bien Hoa Contractor CM, and HSO are responsible for fuel source hazard control.
- Fire Prevention Safe Work Practices
- Smoking is allowed only in designated smoking areas as permitted by Bien Hoa Airbase personnel.
- Hot work permit required for any spark-producing operations or open flame. Fire watch is required during hot work and 60 minutes after.

- Fires and open flame devices shall not be left unattended.
- Sources of ignition shall be prohibited within 20 meters of operations with a potential fire hazard.
- Fire hazard areas shall be conspicuously and legibly posted: “No Smoking, Matches or Open Flame.”
- Smoking is prohibited in areas where flammable, combustible, or oxidizing materials are stored.
- If permitted by Bien Hoa Airbase personnel, portable multipurpose fire extinguishers may be maintained by the facility on site, kept fully charged, inspected monthly, and serviced annually.

Response to Fire Incident

The CSO will consult with the Bien Hoa Airbase Emergency Responders and local municipal fire department before initiating site activities regarding response to Project site fire incidents.

In the event of a large fire (beyond the immediate control of a small onsite fire extinguisher):

- Site alarm will be sounded;
- Work will stop;
- Personnel will immediately evacuate and assemble at a predetermined upwind site location;
- Emergency responders will be called; and
- Personnel will not re-enter the fire area until it is cleared by emergency responders and the CSO.

In the event of a small fire (within the immediate control of a small on-site fire extinguisher) and depending on facility-specific requirements:

- Site alarm will be sounded;
- Trained personnel will use an on-site fire extinguisher to put out the fire only if it can be performed safely;
- Work in the immediate area will stop until fire is resolved and area cleared by the CSO; and
- If fire becomes too large for a handheld extinguisher, emergency responders will be notified and procedure for a large fire (above) will be followed.

Housekeeping Procedures

The following standard housekeeping rules related to fire prevention must be implemented:

- Project sites must be kept free from combustible material accumulation;
- Trash and other combustible matter must be kept away from areas where combustible or flammable liquids are stored, handled, or processed;
- Combustible or flammable liquids must not be allowed to accumulate on floors, walls, etc.; and
- All spills of combustible or flammable liquids must be immediately and properly cleaned up and reported to the CSO and A&E II Contractor HSO.

Fire Extinguisher Training

If Bien Hoa Airbase requirements permit or mandate, the CSO shall instruct site personnel on the basics of fire extinguisher use, including:

- Fire classifications;
- Extinguisher types;
- Inspection, servicing, and proper use; and
- The PASS system for fire extinguisher use defined below.
 - “P” Pull the pin
 - “A” Aim the nozzle at the base of the flames
 - “S” Squeeze the trigger
 - “S” Sweep at the base of the flames

8.15 ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM

An AEGCP is required to protect Project staff and equipment from electrical hazards. All receptacle outlets (125-volt, 15-, 20-, 30-ampere and greater) that provide electrical power during construction, remodeling, maintenance, repair, or demolition shall have GFCI protection for personnel. GFCI protection shall be provided on all circuits serving portable electric hand tools or semi-portable electric power tools (such as block/brick saws, table saws, air compressors, welding machines, and drill presses).

The GFCI device shall be calibrated to trip within the threshold values of 5 milliamperes (mA) +/- 1 mA (as specified in UL Standard 943). GFCI devices shall be tested before initial use and before use after modification.

Receptacle outlets that are not part of the permanent wiring of the building or structure shall be GFCI protected by one of the following means:

- A receptacle outlet with integral GFCI protection;
- A standard receptacle outlet connected downstream of a receptacle outlet with integral GFCI protection; or
- Receptacles protected by a GFCI-type circuit breaker.

Receptacle outlets that are part of the permanent wiring of the building or structure and are used for temporary electric power (including portable generators), shall use a portable GFCI if the receptacle outlets are not already GFCI protected. The portable GFCI shall be as near as practicable to the receptacle outlet.

Electric tool circuits that are hard-wired directly to an electrical source of power shall be protected by a GFCI-type circuit breaker.

Exception: In areas of the site where conditions of maintenance and supervision ensure that only qualified personnel are involved, an AEGCP shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power was interrupted or having a design that is not compatible with GFCI protection. See Appendix I for details of the AEGCP.

GFCIs may be sensitive to some equipment (such as concrete vibrators), or unavailable for the voltage and current rating. In these instances, an AEGCP is acceptable in lieu of GFCIs if the exception is documented on an AHA and contains the following:

- The conditions, or need, for the exception;

- Implementation of the requirements of the AEGCP; and
- The request for the exception, the AHA, and the AEGCP must be submitted and accepted by the CSO prior to implementing the program. In addition, the CSO must submit these to the A&E II HSO for review prior to implementing the program.

8.16 HAZARDOUS ENERGY CONTROL PROGRAM & PROCEDURES

The Project program for control of hazardous energy sources (lockout/tagout) covers servicing and maintaining machines and equipment where the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This program covers controlling all hazardous energies, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal, and other energy sources.

The following situations are exempt from the requirements of this lockout/tagout program:

- Cord- and plug-connected electrical equipment under sole control of the employee performing the service or maintenance; and
- Installation of power by a utilities service.

This lockout/tagout program includes:

- Definitions associated with lockout/tagout;
- Survey of equipment;
- Selection of locks, tags, and blocks;
- Energy control procedures;
- Periodic inspections; and
- Employee training.

8.16.1 DEFINITIONS

Blocking or disconnecting: The physical blocking or disconnecting of de-energized mechanical, pneumatic, hydraulic, or steam equipment to prevent trapping, crushing, or otherwise injuring an employee; includes brackets and stands for raised equipment and metal disks that are placed in a pipe to ensure that no air, steam, or other substance will pass through that point.

Capable of being locked out: An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized: Connected to an energy source or containing residual or stored energy.

Energy isolating device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment; includes blank flanges and bolted slip blinds.

Servicing and/or maintaining: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

8.16.2 EQUIPMENT SURVEY

A survey of the site must be conducted to identify all energy sources either by physical inspection alone or in combination with a study of drawings and equipment manuals, when applicable.

8.16.2.1 IDENTIFY AND LABEL THE ENERGY DISCONNECTING MEANS

Locate and mark the disconnecting means, indicating their function. Categorize the identification details as to equipment supplied and energy type and magnitude (ex. Line #1, Press #4, Electrical 480 volts).

Place a sign or sticker—"LOCKOUT HERE"—at the disconnecting means to help direct workers to correct lockout devices. After surveying the operation, additional and more practical means may be installed. In complicated operations or systems, schematics of only the disconnecting means may need to be drawn up.

8.16.2.2 METHODS OF LOCKING OUT CONTROLS

There are many different ways to lock out a piece of equipment including the following situations:

- Commonly, the main disconnect switch has one opening where a lock can be placed.
- If more than one employee works on the equipment, a lockout adaptor suitable for the installation of several locks must be used, enabling all workers to lock out the machine with their individual locks.
- If the switches are in a metal box, the box itself must be locked out.
- If a fuse was removed in order to de-energize the equipment, the fuse box must be locked.

- If the controls are in a metal-covered box, a common hasp can be welded or riveted to the door, along with a lock staple. Then the switch can be "opened" and the door closed and padlocked. Fuse boxes can also be locked in this way.
- Machines activated by compressed air or steam will have valves that control movement. These valves will need not only to be locked out, but also bled to release any back pressure.

8.16.3 SELECTION OF LOCKS, TAGS, AND BLOCKS

Locks, tags, and blocks must be selected and purchased prior to beginning any Project work that may require lockout/tagout of equipment or machinery.

8.16.3.1 LOCKS

Each worker must have their own lock and the only key to that lock. The lock must be substantial and durable, and must have the name of the employee on it. In addition, locks can be color-coded to indicate different shifts or types of crafts. When more than one worker is servicing a piece of equipment that must be locked out, a lockout adaptor must be used which allows all the workers to place their locks on the disconnecting means. After the work is completed, each worker removes their lock and the machine is then returned to service.

8.16.3.2 TAGS

Do not use tags alone unless the requirements in section 9.16.4 are met. Tags are used in addition to locks and must state the:

- Reason for the lockout;
- Name of the employee who is working on the equipment and how that person may be reached; and
- Date and time the tag was put in place.

Tagout devices shall be capable of enduring at least 50 pounds of pull, and shall be a non-reusable type. Tagout devices shall be constructed so exposure to weather conditions (or corrosive environment, when applicable) will not cause the tag to deteriorate or the message to become illegible.

8.16.3.3 BLOCKS

Suitable blocks are another important safety device for making a piece of equipment safe to be repaired or serviced. Blocks must be placed under raised dies, lifts, or any equipment that might inadvertently move by sliding, falling, or rolling.

Blocks, special brackets, or special stands such as those commonly used under raised vehicles, must be available and always used. Another form of blocking is the placement of a blind. A blind is a disk of metal placed in a pipe to ensure that no air, steam, or other substance will pass through that point if the system is accidentally activated.

Before installing blinds or blocks, bleed down steam, air, or hydraulic lines to void any pressure. Coiled springs, spring-loaded devices, or suspended loads must also be released so that their stored energy will not result in inadvertent movement.

8.16.4 WRITTEN STANDARD OPERATING PROCEDURE

If an energy isolating device is capable of being locked out, lockout shall be used. If an energy isolating device is not capable of being locked out, a tagout system may be used.

When tagout only is used, Project personnel must demonstrate that the level of safety for the tagout system is equivalent to the level of safety obtained by using a lockout system. Additional means may be necessary such as removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

Equipment design and performance limitations may dictate that effective alternative worker protection be provided when the established lockout procedure is not feasible. If machinery must be capable of movement in order to perform a maintenance task, such as a cleaning operation, workers can use extension tools—extended swabs, brushes, scrapers—to protect themselves from injury. Lockout usually requires coordination between production and maintenance employees and may extend over two shifts, which adds to the number of employees involved.

Lockout/Tagout Permits must be signed by the CPM before a lockout is begun. A signed permit is also required if maintenance work is being performed by a subcontractor who may be familiar with the particular piece of equipment being serviced, but who will not know about the site's overall operation. The Lockout/Tagout Permit is site-specific and equipment-specific; the permit must include the equipment to be locked out, the job description, and a checklist of possible hazardous energy sources and the applicable control measures.

Safe work practices and procedures for lockout/tagout are discussed below.

Preparation for lockout

Employees authorized to perform lockout shall:

- Be knowledgeable as to which switch, valve, or other energy isolating devices apply to the equipment being locked out (more than one energy source [electrical, mechanical, or others] may be involved);
- Check with the CPM if there are any questionable identification of sources;
- Receive job authorization prior to performing lockout; and
- Be issued a suitable lock (or locks); the lock must have the individual employee's name and other identification on it and the employee must have the only key to the lock.

Equipment shut-down

To properly shut-down equipment for servicing or maintenance, the following procedures must be followed:

- Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
- The authorized employee shall identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
- If the equipment is operating, shut it down by the normal stopping procedure (such as: depress stop button, open toggle switch). The machine operator must be informed before the power is turned off. Sudden loss of power could cause an accident.

De-energization and lockout

Prior to servicing or maintaining energized equipment, the following procedures must be followed:

- Operate the switch, valve, or other energy isolating devices so that the energy source(s) (e.g. electrical, mechanical, hydraulic) is disconnected or isolated from the equipment.
- All energy sources that could activate the machine must be locked out.
- Each person who will be working on the machinery must put a lock on the machine's lockout device(s). Each lock must remain on the machine until the work is completed. Only the worker who placed the lock should remove his/her lock.
- Attach tags, which give the reason for placing the tag (and lock), the name of the person placing the tag, how he/she may be contacted, and the date and time the tag was placed/locked out. The lock or tag must not be removed without proper authority.
- Stored energy, such as that in capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, and air, gas, steam or water pressure, must be dissipated or restrained by methods such as grounding, repositioning, blocking, or bleeding down.
 - Steam, air, and hydraulic lines must be bled, drained, and cleaned out. There should be no pressure in these lines or in reservoir tanks.
 - Any mechanism under load or pressure, such as springs, must be released and blocked.
 - Any raised equipment that could move by sliding, falling, or rolling must be blocked.

Clearance

- The main valve or main electrical disconnect must be tested to be sure that the power to the machine is off.
- After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.
- Electrical circuits must be checked by qualified persons with proper and calibrated electrical testing equipment. An electrical failure could energize the equipment, even if the switch is in the off position. Stored energy in electrical capacitors must be safely discharged.
- **CAUTION:** Return disconnects and operating controls to the off or neutral position after each test.

Testing equipment during lockout

In many maintenance and repair operations, machinery may need to be tested and energized before additional maintenance work can be performed. These procedures must be followed:

- Clear all personnel to safety.
- Clear away tools and materials from equipment.
- Remove lockout devices and re-energize systems.
- Proceed with tryout or test.
- Neutralize all energy sources once again; purge all systems, and lockout prior to continuing work.

Restoring equipment to service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

- Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
- Check the work area to ensure that all employees have been safely positioned or removed from the area.
- Verify that the controls are in neutral.
- Repair or replace defective guards before removing lockouts.
- Remove the lockout devices; the lockout device must only be removed by the person who applied the device.
- Reenergize the machine or equipment. Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.
- Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for used.

8.16.5 PERIODIC INSPECTIONS

The CSO will conduct periodic compliance inspections of the energy control procedures at least once for activities with known lockout and tagout needs that are in operation for 6 months or longer. For activities that are in operation for one year or more, the CSO and A&E II Contractor HSO will conduct annual compliance inspections that are scheduled at random.

The compliance inspection shall include:

- Review of procedures in use to ensure that the correct procedures are employed and the requirements of this lockout/tagout program are being followed.
- Review of the authorized employee's responsibilities under the energy control program.
- Discussion of the limitations of tagout devices, when used.

The CSO and A&E II Contractor HSO will document the compliance inspections and identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

8.16.6 TRAINING

Site-specific lockout/tagout training must be conducted prior to beginning work if lockout/tagout is anticipated. Appropriate Project personnel and subcontractors must receive lockout/tagout training and follow the procedures established in this HASP. Training for lockout must cover the following topics:

- Types of energy sources anticipated;
- Methods of energy isolation and control;
- Purpose and use of energy control procedures; and
- Limitations of tagout.

Retraining is required whenever there is a:

- Change in job assignment;
- Change in machines, equipment, or processes that provide a new hazard; or

- Change in energy control procedures.

8.17 EXCAVATION/TRENCHING PLAN

This excavation safety program addresses:

- Utility clearance surveys;
- Perimeter guarding of excavations;
- Competent Person supervision and inspections;
- Personnel entry into a trench or excavation;
- Personnel working near a trench or excavation;
- Excavation procedures;
- Soil classifications;
- Excavation protective systems; and
- Excavations greater than 20 feet deep.

This safety program is applicable to all employees, contractors, subcontractors, and site visitors working on the Project. The CSO and A&E Bien Hoa Contractor HSO shall ensure that all activities conducted in or near excavations or trenches are conducted in accordance with the requirements outlined in this excavation safety plan. The CSO and A&E Bien Hoa Contractor HSO are responsible for on-site enforcement of this program.

Each Project Contractor performing excavation and trenching to a depth of 4 feet (1.25 meters) or more is responsible for an Excavation and Trenching Plan which includes descriptions of the activities to be performed, safety procedures to be followed, and methods to prevent injury as a result of excavation collapse.

The following sections describe the information that each contractor shall include in their plan.

8.17.1 DEFINITIONS

Benching (Benching system): A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Competent Person: A person who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Excavation: Any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Hazardous Atmosphere: An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Registered Professional Engineer: A person who is registered as a professional engineer in Vietnam.

Shield (Shield system): A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either

premanufactured or job-built. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring (Shoring system): A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (Sloping system): A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Stable rock: Natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Trench: A narrow excavation (in relation to its length) that is usually deeper than it is wide but less than 15 feet wide.

Type A Soil: Cohesive soil with an unconfined, compressive strength of 1.5 ton per square foot (tsf) or greater.

Type B Soil: Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf.

Type C Soil: Cohesive soil with an unconfined compressive strength of 0.5 tsf or less.

Underground Utilities: Any buried service which could be encountered during excavation activities, including (but not limited to): water; sewer; storm drainage; electric; telephone; natural gas; steam; and liquid petroleum fuel.

8.17.2 UTILITY CLEARANCE SURVEYS

8.17.2.1 UNDERGROUND UTILITIES

The contractor shall identify all underground utilities, such as sewer, telephone, fuel, gas, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, prior to beginning any excavation work. The contractor shall check site utility plans, interview Bien Hoa Airbase personnel regarding utility locations, and confirm work locations with Bien Hoa Airbase personnel before work activity begins. The contractor shall walk the site with the A&E Bien Hoa Contractor CM and note observations indicating underground features (e.g., valve boxes, standpipes, saw cut concrete, or settled areas). A geophysical survey for utility clearance may be required at job sites as determined by Bien Hoa Airbase personnel and the A&E Bien Hoa Contractor.

Contractor is responsible for having all underground utilities accurately located by Bien Hoa Airbase personnel or by a local underground utilities locator service. Contractor shall notify the owners of underground utilities at least 48 hours in advance of excavation activities.

The contractor shall provide marking protocols to A&E Bien Hoa Contractor, including:

- Types of marking to be used;
- Spray paint;
- Stakes and flagging;
- Color scheme for various utilities; and

- Perimeter of excavation.

Excavation outside of the perimeter is not permitted until/unless utilities have been identified and marked. While any excavation is open, underground utilities must be protected, supported, or removed as necessary to protect employees.

8.17.3 OVERHEAD UTILITIES

The contractor shall identify and mark all overhead utilities prior to the beginning of excavation work or movement of heavy equipment across the site. Equipment with overhead Projections shall not operate within a 10-foot (3-meter) radius of overhead power lines. Overhead power lines greater than 50,000 volts require additional distance as shown in Table 11 below.

TABLE 11: GENERAL CLEARANCES REQUIRED FROM ENERGIZED OVERHEAD HIGH VOLTAGE CONDUCTORS

NOMINAL VOLTAGE (PHASE TO PHASE)	CLEARANCE (FEET) MINIMUM REQUIRED
600 to 50,000	6
over 50,000 to 345,000	10
over 345,000 to 750,000	16
over 750,000 to 1,000,000	20

8.17.4 PERIMETER GUARDING OF EXCAVATIONS

Excavations shall be properly marked and guarded to prevent personnel from falling into an open hole. Open trenches shall be barricaded, taped off, or secured in an equivalent manner during non-work periods.

8.17.5 COMPETENT PERSON SUPERVISION AND INSPECTIONS

A “Competent Person” (defined in Section 4.4) must be designated for each excavation site. The designated Competent Person must be able to identify hazards and have the authorization to take prompt corrective measures to eliminate them. The responsibilities of the designated Competent Person described in the sub-sections below will include on-site supervision, inspections, and other duties.

8.17.5.1 SUPERVISION

The designated Competent Person must provide on-site supervision during excavation activities. The Competent Person must examine the excavation prior to work in the excavation and document using the “Daily Excavation Safety Checklist” in Appendix A.

8.17.5.2 DAILY INSPECTIONS

The Competent Person shall document all inspections using the “Daily Excavation Safety Checklist” in Appendix A. The “Soil Classification Checklist” shall be used whenever the soil classification for the excavation is re-evaluated; whenever any properties, factors, or conditions that affect the soil classification change in any way.

The Competent Person must make daily inspections of excavations, the adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. The Competent Person shall conduct an inspection prior to the start of work and as needed throughout the shift.

Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

Where the Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

8.17.5.3 OTHER DUTIES

The Competent Person, who must also be qualified in structural design, shall design all structural ramps used for access or egress for equipment and personnel.

If water is controlled or prevented from accumulating in an excavation by the use of water removal equipment, the Competent Person shall monitor water removal equipment and operations to ensure proper operation.

8.17.6 PERSONNEL ENTRY INTO A TRENCH OR EXCAVATION

Safety requirements that must be in place prior to personnel entry into a trench or excavation include access control, protective systems, potentially hazardous atmospheres, quick egress, and water accumulation.

8.17.6.1 ACCESS CONTROL

Access to trenching areas must be controlled and limited to authorized personnel. Prior to entering a trench or excavation, employees must notify the Competent Person or the CSO and nearby equipment operators whose activities could affect the trench or excavation.

8.17.6.2 PROTECTIVE SYSTEMS

Employees shall not enter a trench or excavation unless protective systems are in place. Protective systems include shoring, shielding, sloping, benching, and other systems. Protective systems are not required when:

- Excavations are made entirely in stable rock;
- Excavations are less than 4 feet (1.5 meters) in depth and examination of the ground by a Competent Person provides no indication of a potential cave-in; or
- Personnel will not enter the trench or excavation.

8.17.6.3 POTENTIALLY HAZARDOUS ATMOSPHERES

If the CSO determines that there is a possibility of a hazardous atmosphere in a trench or excavation, portable real-time air monitoring equipment must be available, properly calibrated, and operated by a trained individual to ensure a safe atmosphere before personnel enter the excavation or trench. All air monitoring activities and instrument calibration will be documented in an air monitoring log, which will be provided daily to the CSO and A&E II Contractor HSO.

“Hazardous atmosphere” is defined as:

- Containing less than 19.5% oxygen;
- Presence of a flammable atmosphere (Lower Explosive Limit (LEL) over 10%); or
- Presence of other known potential contaminants.

If any atmospheric hazards exist, the excavation or trench shall not be entered by any site personnel. If air monitoring instrumentation is not available, the atmosphere in the excavation or trench shall be assumed to be hazardous and no entry will be permitted.

8.17.6.4 QUICK EGRESS

Ramps, stairways, or ladders must be provided in excavations 4 feet (1.5 meters) deep or greater to allow quick egress. Ramps or ladders must be placed within 25 feet (7.6 meters) of any work area, must be secured from shifting, and ladders must extend at least 3 feet (1 meter) above the top of the trench or excavation.

8.17.6.5 WATER ACCUMULATION

Entry is not allowed into excavations where water has accumulated or is accumulating unless adequate precautions have been taken to protect employees against hazards posed by water accumulation. The precautions could include special support or shield systems to protect from cave-in, water removal to control the level of accumulating water, or use of safety harness and lifeline.

If water is controlled or prevented from accumulating in an excavation by the use of water removal equipment, the Competent Person shall monitor water removal equipment and operations to ensure proper operation.

8.17.7 PERSONNEL WORKING NEAR TRENCHES OR EXCAVATIONS

- Employees shall wear safety vests marked with or made of reflectorized or high-visibility material whenever working in heavy equipment areas.
- No employee shall be permitted underneath loads handled by lifting or digging equipment.
- Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.
- Walkways or bridges with standard guardrails shall be provided where employees are required or permitted to cross over excavations deeper than 6 feet (2 meters) and wider than 30 inches (1 meter).

8.17.8 EXCAVATION PROCEDURES

- Where necessary, protective systems must be in place to protect employees from cave-ins. Protective systems include shoring, shielding, sloping and benching, and other systems. Protective systems are not required when excavations are made entirely in stable rock or are less than 4 feet (1.5 meters) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.
- Sufficient ramps, stairways, or ladders must be provided in excavations 4 feet (1.5 meters) deep or greater to allow quick egress. Ramps or ladders may be placed no more than 25 feet (7.6 meters) from a work area, must be secured from shifting, and ladders must extend at least 3 feet (1 meter) above the top of the trench or excavation. Structural ramps must be designed by a competent person.
- Mobile equipment warning systems are required when equipment operators do not have a clear and direct view of the edge of the excavation.
- Material removed from an excavation or trench must be placed far enough from the edge (at least 3 feet or 1 meter) to prevent it from sliding into the excavation or trench or from stressing the trench or excavation walls.

- Surface encumbrances near an excavation (e.g., trees, boulders, poles) must be removed before personnel enter the excavation.
- If possible, trenches or excavations must be covered or filled in when unattended. Otherwise, strong barriers must be placed around the trench or excavation and lighting must be provided at night if the trench or excavation is near a walkway or roadway.
- Trenches and excavations must be assessed by a qualified, competent person, even in the absence of working personnel, whenever heavy equipment will be operating nearby in order to ensure that the trench or excavation will support the weight of the equipment and will not cause the accidental overturning of machinery.
- When fissures or tension cracks are apparent anywhere in an excavation, all work must stop until the problem is corrected.
- Worker protection must be provided for protection from loose rock or soil on the excavation faces.
- If trenches or excavations are near walkways or roadways, guards or warning barriers must be placed to alert pedestrians and drivers of the presence of the trench or excavation.
- Water accumulation in or adjacent to excavations shall be prevented through the use of diversion ditches or dikes.
- No existing walls or other structures shall be used as retaining walls to hold part of an excavation or backfill unless it will safely withstand all expected loads.
- Bracings or other supports are required for excavations adjacent to streets, runways, or other sources of vibration of super-imposed loads.
- Bracings or other support systems are required if sidewalks, pavements and other structures are undermined to protect employees from the possible collapse of such structures.

8.17.9 SOIL CLASSIFICATIONS

Each soil and rock deposit shall be classified by a Competent Person as stable rock, Type A soil, Type B soil, and Type C soil. Soil classification shall be made based on the results of at least one visual test and one manual test to identify the properties, factors, and conditions affecting the classification of the soil. Soil classification must be documented using the “Soil Classification Checklist” in Appendix A. Such analyses shall be conducted by a Competent Person using approved methods of soil classification and testing.

If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, a competent person shall evaluate the changes. The deposit shall be reclassified as necessary to reflect the changed circumstances.

8.17.10 EXCAVATION PROTECTION SYSTEMS

Excavation protective systems shall be required when workers are to enter a trench or excavation 4 feet (1.5 meters) or more in depth. Protective systems must be designed in compliance with Bien Hoa Airbase or local regulatory requirements for protective systems. Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

Protective systems include sloping, benching, and shoring and shielding.

8.17.10.1 SLOPING

Sloping is a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads. Bien Hoa Airbase or local regulatory requirements shall be referenced for detailed information on sloping protective systems requirements.

In general, maximum allowable sloping when used as an excavation protection system in excavations less than 20 feet deep shall be as follows (Table 12).

TABLE 12: MAXIMUM ALLOWABLE SLOPING

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPE (HORIZONTAL:VERTICAL)
Stable Rock	Vertical (90°)
Type A Soil	¾:1 (53°) [½:1 (63°) for short-term excavations – less than 24 hours and less than 12 feet deep]
Type B Soil	1:1 (45°)
Type C Soil	1½:1 (34°)

8.17.10.2 BENCHING

Benching is a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels. Bien Hoa Airbase or local regulatory requirements shall be referenced for detailed information on benching protective systems requirements.

8.17.10.3 SHORING AND SHIELDING

Shoring and shielding are excavation protective systems that include structures such as a trench box, metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins. Bien Hoa Airbase or local regulatory requirements shall be referenced for detailed information on shoring and shielding protective systems requirements.

8.17.11 EXCAVATIONS GREATER THAN 20 FEET (6 METERS) DEEP

A Registered Professional Engineer is required to design the sloping, benching, or other protective systems for excavations greater than 20 feet (6 meters) deep. The Competent Person will be responsible for ensuring that necessary Registered Professional Engineer support is obtained.

8.17.12 TRAINING

Training for excavation sites includes excavation-specific training and site safety meetings.

8.17.12.1 EXCAVATION SAFETY TRAINING

Employee training in excavation safety procedures shall be provided in order to allow employees to acquire understanding, knowledge, and skills necessary for safe performance of duties assigned in the program. Excavation safety training shall be required for those individuals who will be designated as the Competent Person for trenching and excavation operations. Excavation safety training shall include:

- Bien Hoa Airbase or local regulatory requirements for trenching and excavation

- Excavation safety hazards
- Soil classifications
- Protective systems for excavation safety
- Duties and authority/responsibility of the Competent Person

8.17.12.2 SAFETY MEETINGS

A site orientation meeting shall be conducted and documented by the CSO for site personnel before site work begins and shall involve a review of the USAID-approved Project Contractor SHASP. New site personnel arriving after the initial site orientation briefing shall also receive orientation prior to fieldwork. The CSO or a designee shall attend the orientation training to answer questions and offer support.

Daily safety meetings (tailgate meetings) shall be conducted and documented by the contractor safety representative at the start of each workday to emphasize safety for all employees. Daily meetings shall be documented in the “Daily Tailgate Safety Meeting Form” in Appendix A.

8.18 SHASP FOR HAZARDOUS, TOXIC OR RADIOACTIVE WASTE (HTRW) WORK

Site operations at the Bien Hoa Airbase Area addressed in this Site-Wide HASP will be conducted in areas known to be contaminated with varying levels of dioxin and arsenic. The Project requires development and implementation of an activity-specific SHASP that shall be incorporated into the Site-Wide HASP as an annex. The minimum requirements of the SHASP are shown in Table 13.

Each Project Contractor at the site will be required to submit their SHASP for review of compliance with the Site-Wide HASP by the A&E II Contractor ECS, HSO, and COP. The USAID CO and COR will provide final approval of the SHASP PRIOR TO commencement of work activities. Sufficient time should be allowed for the review and approval process.

TABLE 13: OSHA SAFETY AND HEALTH PROGRAM CROSS-REFERENCE

OSHA REFERENCE	REQUIREMENT	HASP SECTION
29 CFR 1910.120(b)(1)(ii)	An organizational structure	Section 4 – Responsibilities and Lines of Authorities
29 CFR 1910.120(b)(1)(ii)(B)	A comprehensive workplan	TBD
29 CFR 1910.120(b)(1)(ii)(C)	A site-specific safety and health plan	Contractor SHASP
29 CFR 1910.120(b)(1)(ii)(D)	The safety and health training program	Section 6 – Training
29 CFR 1910.120(b)(1)(ii)(E)	The medical surveillance program	Section 9.18.1 – Medical Surveillance Program
29 CFR 1910.120(b)(1)(ii)(F)	The employer’s SOPs for safety and health	Section 3 – Safety and Health Policy Statement
29 CFR 1910.120(b)(1)(ii)(G)	Any necessary interface between general program and site-specific activities	Section 3 – Safety and Health Policy Statement
29 CFR 1910.120(b)(1)(iii)	Site excavation	Section 9.17 – Excavation/Trenching Plan
29 CFR 1910.120(b)(1)(iv)	Contractors and subcontractors	Section 2.2 – Contractor Information; Section 3.1 Project Safety and Health

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OSHA REFERENCE	REQUIREMENT	HASP SECTION
		Policy Statement; Section 4 Responsibilities and Lines of Authorities
29 CFR 1910.120(b)(1)(v)	Program availability	Section 3.3 – Site-Wide HASP Description
29 CFR 1910.120(b)(2)(i)(A) – (D)	Organizational structure	Section 4 – Responsibilities and Lines of Authorities
29 CFR 1910.120(b)(3)	Comprehensive workplan	Section 2.3 – Scope; Site-Wide Sampling and Analysis Plan/Quality Assurance Plan
29 CFR 1910.120(b)(3)(i)	Anticipated cleanup activities	TBD
29 CFR 1910.120(b)(3)(ii)	Work tasks and objectives	Section 2.3 – Scope; Site-Wide Sampling and Analysis Plan/Quality Assurance Plan
29 CFR 1910.120(b)(3)(iii)	Personnel implementation requirements	Section 4 – Responsibilities and Lines of Authorities
29 CFR 1910.120(b)(3)(iv)	Personnel training implementation	Section 6 – Training
29 CFR 1910.120(b)(3)(v)	PPE program implementation	Section 9.8 – Personal Protective and Safety Equipment
29 CFR 1910.120(b)(3)(vi)	Medical surveillance program implementation	Section 9.18.1 – Medical Surveillance Program
29 CFR 1910.120(b)(4)(i)	Safety and health hazards	Appendix D
29 CFR 1910.120(b)(4)(ii)(A)	Risk or hazard analysis	Section 10 – Risk Management Process
29 CFR 1910.120(b)(4)(ii)(B)	Employee training	Section 6 – Training
29 CFR 1910.120(b)(4)(ii)(C)	PPE	Section 9.8 – Personal Protective and Safety Equipment
29 CFR 1910.120(b)(4)(ii)(D)	Medical surveillance	Section 9.18.1 – Medical Surveillance Program
29 CFR 1910.120(b)(4)(ii)(E)	Air monitoring, personnel monitoring and environmental sampling	9.9 – Health Hazard Control Program
29 CFR 1910.120(b)(4)(ii)(F)	Site control measures	9.19 – Site Control Measures
29 CFR 1910.120(b)(4)(ii)(G)	Decontamination procedures	9.19 – Site Control Measures
29 CFR 1910.120(b)(4)(ii)(H)	Emergency response plan	9.2 – Emergency Plans
29 CFR 1910.120(b)(4)(ii)(I)	Confined space entry procedures	N/A
29 CFR 1910.120(b)(4)(ii)(J)	Spill containment program	TBD
29 CFR 1910.120(b)(4)(iii)	Pre-entry briefing	Section 6.2 – Site Orientation Briefing
29 CFR 1910.120(b)(4)(iv)	Effectiveness of site safety and health plan	Section 7 – Safety and Health Inspections

8.18.1 MEDICAL SURVEILLANCE PROGRAM

A medical surveillance program will be required for all personnel working at the site while activities are conducted that could lead to dioxin exposure. Site activities with the potential for dioxin exposure include intrusive activities as well as activities related to remedial treatment operations. The following activities are examples of site activities that could lead to dioxin or other chemical exposure:

- Sampling – soil, sediments, groundwater, and surface water;
- Excavation and on-site transportation – dust generation;
- Brush and tree removal;
- Equipment decontamination;
- Placement of contaminated soil in storage structures;
- Operation and maintenance of remedial treatment system(s); and
- Any other activities that disturb the existing ground surface or increase the risk of exposure to dioxin.

Medical monitoring will include blood serum dioxin monitoring as well as general medical surveillance monitoring for other chemicals. Medical monitoring will be performed at two different levels of effort and intensity:

Level 1 - Workers who will wear PPE while conducting site activities under any of the following conditions:

- When exposure is at or above the permissible exposure limit (PEL)
- When a respirator is worn;
- When a worker will perform site activities with a risk of exposure to a chemical without a PEL (e.g., dioxin)
- When employee is injured, ill, or develops symptoms of exposure; or
- When employee is a member of a hazardous materials response team.

Level 2 – Workers who will not wear PPE but will work at the site for more than 90 days (8 hours per day)_per year while intrusive and/or remedial treatment operation activities are being conducted including:

- Office personnel working on site;
- Occasional site workers such as subcontractors or vendors who do not enter any disturbed areas; or
- Personnel as designated by USAID or GVN.

The medical surveillance program is intended to monitor the employees' health over the course of this Project to ensure that protective measures at the site are appropriate and are being utilized properly by the employees.

Before participation in the medical surveillance program, medical surveillance program orientation training must be provided to all participants including Level 1 and Level 2 workers. Medical surveillance orientation training must also be provided to workers that will be on site during intrusive and/or remedial treatment operation activities but not doing intrusive work for less than 30 days (8 hours per day) per year. Visitors to the site will not be required to receive the medical surveillance program orientation training.

Project Contractors shall include a description of their specific medical surveillance program which meets or exceeds the requirements of this section of the Site-Wide HASP. This will include the requirements of the examinations, frequency of testing, physician's statement of employee fitness to work, medical surveillance program orientation training, and assurance of confidentiality.

8.18.1.1 EXAMINATION REQUIREMENTS

The requirements of the medical examinations shall be determined by the attending physician/nurse practitioner for both levels of surveillance.

For Level 1, the medical examinations must include, at a minimum:

- Medical and work history;
- Hazardous substance handling history;
- Blood testing;
 - Complete Blood Count (CBC)/Sequential Multi-channel Analysis (SMA) blood analysis for organ function and blood quality monitoring;
 - Serum dioxin analysis;
- Other biological systems testing as determined by the attending physician; and
- Cardiopulmonary function testing to determine ability to wear respiratory protection and PPE.

For Level 2, the medical examinations must include, at a minimum:

- Medical and work history; and
- Blood testing - Serum dioxin analysis.

8.18.1.2 FREQUENCY OF EXAMINATIONS

The following schedule of examinations is required:

- Prior to assignment at the site when intrusive activities have begun (baseline physical and testing);
- When an employee working on the site, changes from one contractor (or contract) to another contractor (or contract); an employee changing between contracts must demonstrate they were not exposed to dioxin while performing work for the previous contractor (contract);
- At least once every 12 months;
- At termination of employment at the site;
- As soon as possible if employee develops signs or symptoms of exposure;
- After any worksite injury;
- After exposure during an emergency; or
- At more frequent times if determined necessary by the examining occupational health physician.

The requirements listed above are the minimum required frequency of examinations. Some site activities may have higher risks for exposure and warrant more frequent examinations. Project Contractors shall determine the appropriate frequency of examinations for their contract activities and include it in their contract-specific medical surveillance program.

8.18.1.3 PHYSICIAN'S STATEMENT OF EMPLOYEE FITNESS

The examining occupational health physician will review the results of the medical examination and laboratory analysis and shall provide the employer, CSO, and the A&E Bien Hoa Contractor HSO

and/or ECS with a written opinion for each employee examined under Level 1. The opinion shall include only the following information:

- Whether the employee has any medical condition that would increase the risk of health impairment due to:
 - Hazardous waste handling or exposure;
 - Conditions experienced in an emergency;
 - Use of a respirator for a regular work shift; or
 - Use of impermeable PPE for a regular work shift.
- Whether the employee is above the Project dioxin blood serum action limit;
- Any recommended limitations for work assignments; and
- Statement that the employee has been informed of the result of testing and of any conditions which require further investigation.

Specific results of testing or diagnoses shall not be disclosed to anyone but the employee. The dioxin blood serum results will be anonymously compiled and maintained by USAID throughout the duration of the Project. Identifying information related to the dioxin blood serum results will only be shared with the examining occupational health physician and employee.

Since there is no requirement for the use of PPE or respiratory protection, employees examined under Level 2 shall not be required to produce a written opinion from the attending physician/nurse practitioner. However, the examining occupational health physician will review the analysis and provide results as stated above.

8.18.1.4 ASSURANCE OF CONFIDENTIALITY

With the exception of the examining occupational health physician's written statement, no employee medical records will be retained on the site. The physician's written statement shall be maintained on site, in a secured file or in electronic format, with the original stored off site in the employer's offices.

8.18.2 BLOOD SERUM DIOXIN MONITORING

Project personnel involved with site activities that could lead to dioxin exposure or those designated by USAID or GVN shall be part of the medical surveillance program that includes a blood serum dioxin monitoring program as discussed in Section 9.18.1. Participants of the medical surveillance program will receive a program orientation briefing before participation and the start of site activities. The blood serum dioxin monitoring program will begin with baseline monitoring prior to the commencement of intrusive activities at the site, such as sampling, brush clearing, excavation, and haul road construction (or later on, remedial treatment). When baseline blood serum samples are collected, Project personnel will be required to complete the Health and Lifestyle Questionnaire presented in Appendix L – Dioxin Monitoring Information. This questionnaire will be shared with the attending physician to interpret baseline results and determine the potential for previous dioxin exposure.

8.18.2.1 RESPONSIBILITY

Project Contractors at the work site are responsible for making the testing available to their employees who will be working at the site during intrusive and/or remedial treatment operation activities. Project Contractors shall submit a written plan for compliance with this requirement, to include the following:

- Medical surveillance program orientation training;
- List of employees to be tested;
- Identification of employees work duties and classification as Level 1 or Level 2;
- Date(s) of sample extraction;
- Name of physician/medical facility performing the sample extraction;
- Name of the laboratory performing the serum extraction and preservation;
- Method and date of shipment to the laboratory;
- Name of examining Occupational Health physician who will interpret results and provide employee consultations; and
- Frequency of sampling and analysis.

Employees will be assigned a unique identification number for tracking their results. This number shall be provided to the attending physician, the analytical laboratory, CSO, and the A&E II Contractor HSO. The associated names will be retained only by the attending physician and the employer. The anonymous dioxin blood serum results must be reported to the CSO and A&E II Contractor HSO in electronic and tabulated format to be shared with USAID. USAID will compile and maintain the anonymous dioxin blood serum results for the duration of the Project.

8.18.2.2 DIOXIN OR PCDD/F INFORMATION

The term “dioxin” or PCDD/F refers to a group of polychlorodibenzodioxins (PCDDs) and polychlorodibenzofurans (PCDFs). PCDDs are comprised of 75 “congeners,” and PCDFs are comprised of 135 congeners. A “congener” is a variant or configuration of a common chemical structure. Seventeen of the dioxin and furan congeners are considered to be toxic and those are the ones with chlorines in the 2, 3, 7, or 8 positions of their structure with 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCDD) considered to be the most toxic. Because of this, the concentrations of dioxins/furans are often reported in terms of TCDD toxicity equivalents (TEQ), which are calculated using toxicity equivalence factors (TEFs), and are measures of how toxic each congener is relative to 2,3,7,8-TCDD.

The primary source of dioxin at the Bien Hoa Airbase Area is dioxin-contaminated soils and sediments from past handling, storage, and disposal of Agent Orange and other herbicide compounds. The primary dioxin congener associated with Agent Orange is 2,3,7,8-TCDD. Dioxin causes health effects in humans including chloracne, birth defects, weakened immune systems, kidney defects, increased miscarriage rates, altered hormone levels, reduced sperm production, and cancer.

Dioxin is present at the Bien Hoa Airbase Area in soil, sediment, and surface water. Although not water soluble or volatile, dioxin will attach to soil which becomes airborne as respirable dust, and in surface water as suspended solids. Dioxin, whether from Agent Orange or other sources, is also found in food sources, primarily fish, seafood, meat, and dairy products.

In humans, dioxin is stored in body fat, blood, and breast milk. Because dioxins adhere more readily to fats, serum dioxin testing is performed to assess the level of PCDD/F in blood lipids. On average, serum dioxin levels will decrease by half after seven years with no additional exposure.

8.18.2.3 ACTION LIMITS FOR SERUM DIOXIN LEVELS

Action limits for serum dioxin levels can be based on two types of values, either a reference-based value or a health-based value. A reference-based value is the serum concentration that is expected to be present in the general population who are not exposed to a particular source of dioxins. A health-

based value is the serum concentration associated with exposure to a safe dose that is protective of a particular health effect.

8.18.2.3.1 Reference-based Values

For serum dioxin levels, one source of reference-based values is the National Health and Nutrition Examination Survey (NHANES) study (Centers for Disease Control and Prevention [CDC] 2019). For the NHANES study, serum dioxin samples were collected from individuals in the general U.S. population for six (6) different 2-year sampling periods, 1999/2000, 2001/2002, 2003/2004, 2005/2006, 2007/2008, and 2009/2010. For the first three sampling periods, individual samples were analyzed and for the last three, the samples for eight (8) individuals from the same age/gender/ethnicity category were pooled and analyzed. In general, the 95th percentile calculated using the data from any of these sampling periods represent the upper bound of serum dioxin levels in the general population for the time period that was sampled.

The CDC (2019) report presents 95th percentiles for only the individual congeners for the 1999/2000, 2001/2001, and 2003/2004 sampling periods and not for the TEQ values. Also, for the periods that analyzed pooled samples, 2005/2006, 2007/2008, and 2009/2010, the CDC (2019) only presents the weighted average and unadjusted standard deviations for the individual congeners and not the 95th percentiles. The 95th percentiles are not calculated for the pooled samples due to the complexity of the statistical methods involved. However, other researchers have published the 95th percentile TEQ values for adults older than 20 years of age for the 1999/2000, 2001/2002, and 2003/2004 sampling periods (Lakind et al. 2009) and for the 2005/2006 and 2007/2008 sampling periods (Bichteler et al. 2017) using the same data that are summarized in the CDC (2019) report. The TEQ serum lipid concentrations for the 1999/2000, 2001/2002, and 2003/2004 sampling periods are 27.9, 44.5, and 30.6 picograms per gram (pg/g) lipid, respectively, and for the 2005/2006 and 2007/2008 sampling periods are 40.2 and 39.9, respectively.

8.18.2.3.2 Health-based Values

Health-based values for human serum have been derived by Aylward et al. (2008) based on the Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives (JECFA) tolerable daily intake (TDI) of 2.3 picograms per kilograms per day (pg/kg-day) in TEQ, which is based on adverse effects on the reproductive tracts of prenatally-exposed male rats (Faqi, Dalsenter et al. 1998, Ohsako, Miyabara et al. 2001, JECFA 2002). Aylward et al. (2008) derived human serum values based on this TDI that ranged from 40-70 TEQ pg/g lipid, depending on the assumptions used to extrapolate the maternal concentrations for the rats in the studies to human equivalent concentrations. This internal dose level, maternal rat serum concentration, was used to estimate the human serum concentrations by accounting for species differences without using modeling to convert an external dose to an internal dose.

The previous health-based action limit of 30 TEQ pg/g lipid used for the Danang Sitewide HASP FY 2017 Update (CDM, 2016) is based on a calculation by the American Chemistry Council (ACC) (2003) to be protective of a WHO dioxin tolerable daily intake of four (4) TEQ pg/kg-day. This action limit was derived from the intake of 4 pg/kg-day using a pharmacokinetic model that used conservative assumptions regarding the percent body fat (25%) and the absorption rate of TCDD of 60% and assumed a steady state external intake of 4 TEQ pg/kg-day. The pharmacokinetic model was used to convert an external dose to an internal dose to derive the 30 TEQ pg/g lipid value.

8.18.2.3.3 Project Values

As part of the blood serum dioxin monitoring program, the health-based action limit previously used in Danang of 30 pg/g TEQ lipid from the 2003 ACC report (Table I 4) will be the Project dioxin blood

serum action limit. If this value is exceeded, then the congener-specific concentrations (reported along with the TEQ value) will then be compared to the 2007/2008 NHANES survey 95th percentiles for the individual congeners to identify which congeners are the source of the elevated TEQ (Table 15). As stated previously, the primary dioxin congener associated with Agent Orange exposure is 2,3,7,8-TCDD, and, if the serum concentration of this congener is elevated, this may indicate a site-related exposure. The TEQ value of 30 pg/g lipid from the 2003 ACC report was used because it is the most conservative of the available reference-based and health-based dioxin blood serum action limits.

TABLE 14: HEALTH-BASED ACTION LIMIT

PCDD/F	PROJECT ACTION LIMIT
TEQ	30.0 pg/g TEQ lipid

Note: TEQ Action Limit value based on 2003 ACC report.

The congener-specific 95th percentile values from the NHANES studies are expected to be representative of the general U.S. population and are consistent with values measured in Vietnamese men over the age of 55 living in Kim Bang near Hanoi (Manh et al. 2014). Manh et al. (2014) evaluated differences in men over the age of 55 years living near the former U.S. airbase in Phu Cat and similar men living in a background location in Kim Bang near Hanoi. In 2010 and 2011, samples were collected from 97 men in Phu Cat and 85 men in Kim Bang and were analyzed for the 17 2,3,7,8 PCDD/F congeners along with dioxin like PCB congeners. The men in the area of Phu Cat were expected to have been exposed to the PCDD/Fs associated with the use of Agent Orange, White, and Blue herbicides at the airbase from 1961 to 1971.

For the men in the background location of Kim Bang, the 50th and 75th percentiles for the PCDD/F TEQ were 8.9 and 11.6 ppt, respectively. The 50th and 75th percentile values from the 2007/2008 NHANES study, which is the data source of the 95th percentile of 39.9 ppt, were 12.8 and 20.7 ppt, respectively. For 2,3,7,8-TCDD serum levels, the men from Kim Bang had 50th and 75th percentiles of 1.5 and 2.0, respectively. Comparatively, both of the 50th and 75th percentiles for TCDD from the 2003/2004 NHANES study were less the limit of detection of 3.8 ppt. In general, the Manh et al. (2014) Kim Bang percentiles for both TEQ and TCDD are lower than the similar percentiles for the NHANES study representing the general U.S. population indicating that background levels in Vietnam are not expected to be higher than those in the U.S.

The use of the 30 TEQ pg/g lipid as the dioxin action limit is conservative compared to the more technically appropriate levels of 40 – 70 TEQ pg/g lipid derived by Aylward et al. (2008). The upper end of the range of background concentrations for some of the older age categories of the general U.S. population may exceed this Project dioxin action limit. For example, the 95th percentile total TEQ concentration for the general U.S. population older than 20 years based on the NHANES 2007/2008 is 39.9 TEQ pg/g lipid, which indicates there is a 5% chance that a person with only background exposures to dioxin in the U.S. will have total serum dioxin concentrations higher than TEQ 39.9 pg/g lipid (Bichteler et al. 2017). This would mean that there is a chance that personnel from the United States or Vietnam may have total baseline TEQ concentrations that exceed the 30 TEQ pg/g lipid action limit without having any exposures to dioxins from the site.

TABLE 15: SUMMARY OF 95TH PERCENTILE PCDD/F CONGENER SERUM LIPID CONCENTRATION

PCDD/F CONGENER	95TH PERCENTILE – AGES >20 YEARS FOR THE GENERAL U.S. POPULATION
TCDD	5.30 (4.50; 6.10)
PeCDD	11.3 (10.1; 12.7)
HxCDD, 123478	<11.9
HxCDD, 123678	70.8 (60.7; 82.2)

PCDD/F CONGENER	95TH PERCENTILE – AGES >20 YEARS FOR THE GENERAL U.S. POPULATION
HxCDD, 123789-	<12.3
HpCDD	95.0 (76.1; 126)
OCDD	784 (665; 978)
TCDF	<6.00
PeCDF, 12378	<7.10
PeCDF, 23478	13.0 (11.4; 14.7)
HxCDF, 123478-	9.50 (8.00; 10.5)
HxCDF, 123678-	9.00 (8.00; 10.1)
HxCDF, 123789-	<8.30
HxCDF, 234678-	<8.20
HpCDF, 1234678-	18.0 (16.0; 20.9)
HpCDF, 1234789-	<8.60
OCDF	<12.0

Notes:

- Values for individual congeners taken from CDC (2019), Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables.
- () contains 95% confidence interval for the 95th Percentile.
- < indicates the congener was detected and the value is the limit of detection.

Sources:

1. CDC. 2019. Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables. January.

2. Manh HD, Kido T, Okamoto R, Xianliang S, Anh le T, Supratman S, Maruzeni S, Nishijo M, Nakagawa H, Honma S, Nakano T, Takasuga T, Nhu DD, Hung NN, Son le K. 2014. Serum dioxin levels in Vietnamese men more than 40 years after herbicide spraying. *Environ Sci Technol.* 48(6):3496-503.

8.18.2.4 BASELINE BLOOD SERUM DIOXIN LEVELS

The TEQ and congener values of the blood serum dioxin results will be reviewed every time samples are analyzed. If baseline blood serum dioxin levels are above the 30 pg/g TEQ action limit, the examining occupational health physician will be consulted for recommended further action, which could include:

- Further blood testing and analysis to assess general health condition;
 - Determination of symptoms;
 - Liver and kidney function screening; or
 - Dermal assessment;
- Employee consultation with the examining occupational health physician to understand the sampling results and related health risks;
- Sampling and analysis to confirm serum dioxin level;
- Additional or more frequent health monitoring over an extended period;
- Recommendation that the employee be restricted from performing tasks with potential dioxin exposure; or
- Recommendation that the employee not work on the site.

8.18.2.5 INCREASE IN BLOOD SERUM DIOXIN LEVELS

The total TEQ and individual congener concentrations of the blood serum dioxin results will be reviewed every time samples are analyzed. If a periodic (annual, closeout, or post-incident) serum dioxin analysis indicates an increase in total serum dioxin levels (all congeners) or exceedance of the 30 TEQ pg/g action limit, then the congener-specific concentrations will be compared to the 95th percentiles for the individual congeners to identify which congeners are the source of the elevated levels. If the 2,3,7,8-TCDD congener is substantially elevated, this may indicate a site-related exposure, and the A&E II Contractor must lead a review with the CSOs of the implementation and compliance by Project personnel of the Site-Wide HASP. The A&E II Contractor will provide recommend changes to USAID for consideration. The attending occupational health physician will also be consulted for recommended further action, which could include:

- Further blood testing and analysis to assess general health condition;
 - Determination of symptoms;
 - Liver and kidney function screening; or
 - Dermal assessment;
- Employee consultation with the attending occupational health physician to understand the sampling results and related health risks;
- Sampling and analysis to confirm serum dioxin level;
- Additional or more frequent health monitoring over an extended period;
- Recommendation that the employee be assigned to another task;
- Recommendation that the employee be restricted from performing tasks with potential dioxin exposure; or
- Recommendation that the employee not work on the site.

In addition, the employee's work habits will be assessed to ensure:

- PPE was used properly and consistently throughout Project assignment;
- Decontamination was performed before departure from the site;
- Worker did not enter the Project site unprotected in areas where PPE was required; and
- Other work habits did not contribute to the elevation of serum dioxin level.

If the worker is deemed fit to continue working at the site, retraining will be given in areas where compliance was weak. The worker will also be closely observed for the first three (3) days on site after retraining. If the worker is not deemed fit to continue with current tasks, an alternate assignment may be considered.

8.18.2.6 SAMPLE PROCESSING AND PRESERVATION

The laboratory requirements for serum extraction and preservation are included in Appendix L.

8.18.3 CONTRACTOR AND SUBCONTRACTOR HEALTH AND SAFETY PLAN REQUIREMENTS

All Project Contractor operations shall be conducted in compliance with this Site-Wide HASP. The SHASP shall address the occupational safety and health hazards associated with the Project Contractor's specific site operations. Changes and modifications to the SHASP are permitted to suit changes in operations or changing site conditions. The changes shall be made in writing with the knowledge of the A&E II Contractor ECS, HSO, and COP and the approval of the USAID CO/COR.

Project Contractors should follow the basic format of this Site-Wide HASP, substituting the Project- and work-specific information for all sections. For non-intrusive activities, such as site reconnaissance activities which do not require entrance into contaminated areas, a Short Form SHASP form is included in Appendix M – Short-Form Supplemental Health and Safety Plan Format (Non-Intrusive Site Activities).

8.19 SITE CONTROL MEASURES

Work zones shall be established on the site to limit the spread of contamination to off-site or clean areas. The exact boundaries and locations will be established based on activities being conducted and equipment/materials being used. The following zones will be established and clearly designated in the work area using fencing, barricades, warning tape, and/or construction cones. Signs will be posted at the approved entry points and along the perimeter of each zone.

8.19.1 CLEAN ZONE

The Clean Zone (CZ) will include:

- Operations trailers;
- Sanitation facilities (toilets, showers);
- Storage of clean materials;
- Parking for employee vehicles; and
- Eating area and designated smoking area (if allowed by GVN).

Contaminated materials, equipment, vehicles, and personnel will be prohibited from this area except in extreme emergencies.

Boundaries of the CZ will be clearly marked with signage and barricades directed toward both the CZ and the Contamination Reduction Zone (CRZ). Entry into the CRZ will be allowed only after personnel and equipment decontamination (decon) is complete.

8.19.2 CONTAMINATION REDUCTION ZONE

This zone includes all decon activities to be conducted prior to departure of personnel or equipment from contaminated areas of the site into the CZ. The CRZ will be subdivided into two areas: personnel decon and personal hygiene and equipment decon. The area will be clearly delineated in the field with signage and barricades to prevent entry by unprotected personnel. The CRZ will be located in an area downwind and down slope from the CZ to prevent spread of airborne and waterborne contaminants generated during decon. The CRZ will also be located upwind and up slope from the Exclusion Zone (EZ).

8.19.2.1 PERSONNEL DECON AND PERSONAL HYGIENE AREA

This area will be separated from the equipment decon area by a distance of at least 33 feet (10 meters). The area will include the following:

- Impermeable ground cover (plastic drop cloths or sheeting) if the CRZ is not placed on an impervious surface;
- Instrumentation and hand tool drop area;
- Gross decon area for boots, gloves, and PPE;

- Boot decon tubs and scrub brushes;
- Glove decon basins;
- Respiratory protection decon tubs/basins reserved exclusively for respiratory protection;
- Hand tool decon basins or tubs reserved exclusively for that purpose;
- Instrumentation decon materials as recommended by the manufacturer;
- Absorbent pads, toweling;
- Hand and face wash basins, soap, antibacterial wipes, hand sanitizing gel all reserved exclusively for that purpose;
- Benches and stools for employees to use during decon;
- Shaded cool-down area;
- Shower facilities, if possible; and
- Drums for holding contaminated PPE, expired respirator cartridges, decon materials; and decon fluids.

A small area near the limit of the CRZ at the CZ will be reserved for cooling down, administration of first aid, and water consumption. This area may be utilized by workers who have undergone decon but have not removed their impermeable PPE completely. This will allow for rehydration and cooling to prevent heat-related illnesses. In the event of injury, a worker will undergo limited decon to allow immediately administration of first aid, CPR, or advanced treatment administered by emergency responders.

Because the CRZ is an area where contamination is easily spread during cleanup, a specific decon sequence and protocol will be established which limits the spread of contamination.

The recommended cleaning soap or detergent is one without phosphates, added perfumes, dyes, softeners, bleach, or oxidizing agents. To allow for proper rinsing of PPE, the minimum amount of cleaner should be used. For respiratory protection and instrumentation, the manufacturer's recommendations for cleaning should be followed, using the recommended type of soap and rinseate.

Reusable sampling tools will be decontaminated using the protocols included in the Site-Wide SAP/QAPP. Disposable tools will be returned to the CRZ and placed in drums with contaminated PPE.

A suggested Personnel Decontamination Procedure is included in Appendix I.

8.19.2.2 EQUIPMENT DECON AREA

This area will be established on an impermeable surface or on heavy, multiple layers of plastic sheeting. This area will be separated from the personnel decon area by at least 33 feet (10 meters) and placed to prevent wind and surface runoff from contaminating the CRZ and CZ. The perimeter of the equipment decon area will be diked or bermed, and the perimeter barrier shall be strictly monitored to prevent runoff into clean areas. If possible, contractor shall also provide curtains or enclosures to prevent overspray from reaching other areas of the site.

Anyone conducting equipment decon will be required to wear the appropriate PPE during all decon activities. When the equipment is cleaned and ready for removal from the site, decon personnel will pass through the personnel decon area and perform the appropriate sequence of PPE cleaning and removal.

The equipment decon area will include:

- Pressure washing equipment and appropriate non-flammable cleaning fluids (detergents or soaps);
- Adequate water supply to allow for cleaning and rinsing all equipment;
- Wet/dry vacuum to collect accumulated water on the impermeable surface or from a sump constructed at the lowest point of the area;
- Buckets, basins, brushes, hand tools, and other cleaning equipment to ensure complete removal of contaminants; and
- A separate area for personnel decon.

The buddy system will be strictly observed during all heavy equipment decon activities due to the elevated hazards associated with working on a wet surface.

8.19.3 EXCLUSION ZONE

The EZ or “hot” zone, is the contaminated area of the site where earthmoving, storage of contaminated soils, sampling, sample processing, and drilling activities will take place. This is the area where known and suspected hazardous chemicals are present in soil, sediment, surface water, and groundwater.

All personnel entering this area shall use the required PPE and respiratory protection as directed by their CSO. Those entering must also have completed the required training and have current medical clearance to wear PPE and respiratory protection.

Personnel entry to the EZ will be via one designated point, and heavy equipment and authorized vehicles will enter by another designated point. Both entrances will be clearly indicated with signs and barricades preventing re-entry to other zones without first passing through the CRZ.

Boundaries of and signs or barricades on the perimeter of the EZ will move as work areas are declared “clean” or no longer contaminated. The EZ must remain clearly marked throughout all work activities on the site.

All personnel entering the EZ will be required to sign in when they enter and sign out when they have completed the required decontamination.

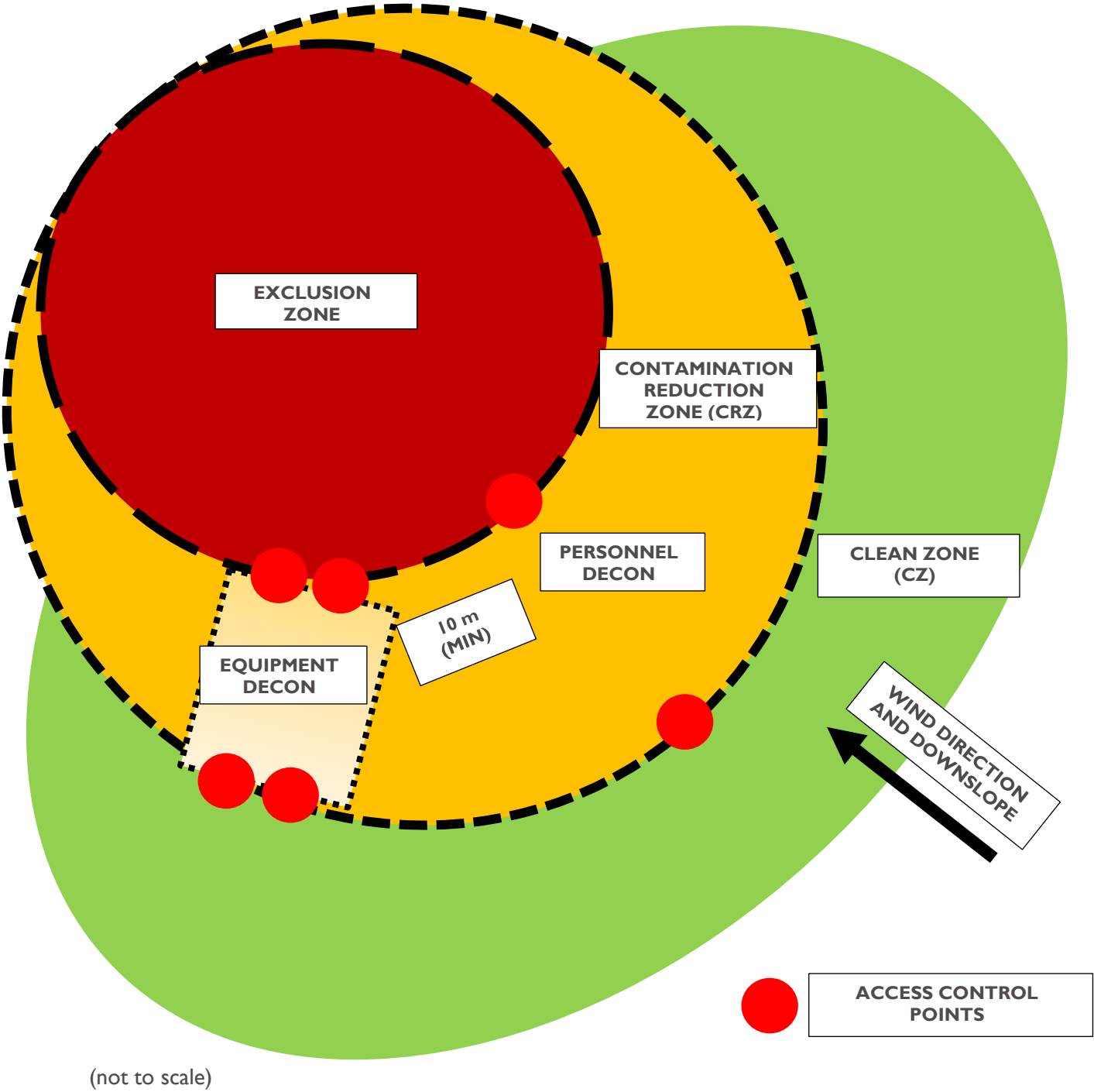
8.19.4 ACCESS CONTROL

Access to each zone will be controlled by the contractor’s designated site control personnel. Entrance to the EZ will be restricted to personnel utilizing the appropriate PPE and respiratory protection. Exit from the EZ will be via the CRZ only and exit from the CRZ will be allowed after decontamination is complete.

Any personnel, equipment, or materials entering the CRZ or EZ will not be released for reuse or entry into the CZ until decontamination is verified.

Site zones are provided in Figure 4 below.

FIGURE 4: SITE ZONES



9 RISK MANAGEMENT PROCESSES

This section contains information specified in EM 385-I-I, Appendix A, Section 3j “Risk Management Process.” General safe work practices and safety rule enforcement are described in Section 4.6. The total risk management process for the Project utilizes AHAs as the primary tool for identifying, evaluating, and controlling hazards to eliminate or reduce the associated risk. A detailed review of Project-specific hazards and safety control measures are provided in the AHAs (see Appendix D) for known major site activities of the Project.

In order to ensure that the formal processes for hazard identification, risk assessment, and control are followed, documentation will be created during the planning and implementation phases of Project work. The use of standard HASP forms will facilitate the development and review of the required documentation as presented in Section 10.1 and facilitate reporting as presented in Section 10.2

9.1 HEALTH AND SAFETY PLAN FORMS

Completed standard HASP forms are maintained on site by the CSO for the duration of the Project. HASP forms (see Appendix A) that may be used during the Project are indicated below:

- Accident Prevention Plan Review
- Activity Hazard Analysis Preparatory Phase Training Log
- Air Monitoring Log
- BBP Exposure Plan Annual Training Information
- BBP Post-Exposure Evaluation
- Calibration Log: Direct-Reading Monitoring Instrument
- Daily Excavation Safety Checklist
- Emergency Medical Notification Form
- Hazardous Substance Inventory List
- Injury/Illness Report Form
- Safety Inspection Report
- Safety Meeting Attendance Roster
- Site Control Log
- Soil Classification Checklist
- Tailgate Safety Meeting Record
- Training Attendance Roster
- Vehicle Accident Report

9.2 REPORTING OF HAZARDS AND SAFETY INSPECTIONS

Site personnel are encouraged to immediately report unsafe work conditions or unsafe work practices observed to their supervisor, CSO, and the A&E II Contractor HSO without fear of reprisal. The CSO and A&E II Contractor CM and the HSO will conduct periodic safety inspections at the site to identify and correct hazards. Inspections will include physical inspections as well as review of documentation described above. The results of inspection will be presented to the SCPM and/or COP and the project team associated with the process that was inspected.

APPENDIX A: HEALTH AND SAFETY PLAN FORMS

HEALTH AND SAFETY PLAN FORMS

- 1. SITE-WIDE HEALTH & SAFETY PLAN REVIEW**
- 2. ACTIVITY HAZARD ANALYSIS FORM**
- 3. ACTIVITY HAZARD ANALYSIS PREPARATORY PHASE TRAINING LOG**
- 4. AIR MONITORING LOG**
- 5. BBP EXPOSURE PLAN ANNUAL TRAINING INFORMATION**
- 6. BBP POST-EXPOSURE EVALUATION**
- 7. CALIBRATION LOG: DIRECT-READING MONITORING INSTRUMENT**
- 8. DAILY EXCAVATION SAFETY CHECKLIST**
- 9. EMERGENCY MEDICAL NOTIFICATION FORM**
- 10. HAZARDOUS SUBSTANCE INVENTORY LIST**
- 11. HBV VACCINATION DECLINATION**
- 12. INJURY/ILLNESS REPORT FORM**
- 13. ON-SITE VEHICLE ACCIDENT REPORT FORM**
- 14. SAFETY INSPECTION REPORT**
- 15. SAFETY MEETING ATTENDANCE ROSTER**
- 16. SITE CONTROL LOG**
- 17. SOIL CLASSIFICATION CHECKLIST**
- 18. TAILGATE SAFETY MEETING RECORD**
- 19. TRAINING ATTENDANCE RECORD**

SITE-WIDE HEALTH AND SAFETY PLAN REVIEW

Training Location	
Date:	
Conducted By:	

I have reviewed the Site-Wide Health & Safety Plan for the above-indicated site and understand the hazards and control measures required on this Project.

I agree to follow the procedures outlined in this Plan and to inform the Site Contractor Safety Officer, Site Contractor Project Manager, or my direct supervisor should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this Project.

Date	Name	Signature	Company

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task:	Overall Risk Assessment Code (RAC) (Use highest code)	M				
Project Location: Bien Hoa Airbase, Vietnam	Risk Assessment Code (RAC) Matrix					
Contract/Project Number:	Severity	Probability				
Date Prepared: Prepared by:		Frequent	Likely	Occasional	Seldom	Unlikely
Date Reviewed:	Catastrophic	E	E	H	H	M
Reviewed by:	Critical	E	H	H	M	L
Date approved:	Marginal	H	M	M	L	L
Approved by:	Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.) For general precautions related to all site activities, refer to AHAs for "General Site Work" and "Non-Intrusive Site Activities".	Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)					
	"Probability" is the likelihood of causing an incident, near miss, or accident and is identified as: Frequent, Likely, Occasional, Seldom or Unlikely.					RAC Chart
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and is identified as: Catastrophic, Critical, Marginal, or Negligible					E = Extremely High Risk
						H = High Risk
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top					M = Moderate Risk

		of AHA.	L = Low Risk
Job Steps	Hazards	Controls	RAC
1.	1.	1.	M
	2.	1.	
	3.	1.	
2.	1.	1.	

	2.	1.	
	3.	•	
3.	1.	1.	
	2.		
4.	1.		

5.	2.	1.	
6.	3.	2.	
7.	4.	3.	

ACTIVITY HAZARD ANALYSIS (AHA) (CONTINUED)

Equipment to be Used	Training Requirements and Competent or Qualified Personnel Name(s)	Inspection Requirements
1.	Training Qualified Personnel	1.
2.	Training Qualified Personnel	1.
3.	Training Qualified Personnel	1.

ACTIVITY HAZARD ANALYSIS PREPARATORY PHASE TRAINING LOG

Training Location	
Date:	
Conducted By:	

The following individuals have reviewed and have agreed to follow the Activity Hazard Analysis prepared by A&E Bien Hoa Contractor for the above-indicated site and understand the hazards and control measures required on this phase of the Project.

I agree to follow the procedures outlined in this Plan and to inform the Site Contractor Safety Officer, Site Contractor Project Manager, or my direct supervisor should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this Project.

Name	Signature	Company

AIR MONITORING LOG

Location on Site	
Date:	
Conducted By:	
Page Number:	

Time	Location	_____ ()	_____ ()	_____ ()	_____ ()	_____ ()

Legend:

VOC: volatile organic compound

PID: photoionization detector

FID: Flame ionization detector

LEL: lower explosive limit

O₂: oxygen

mg/m³: milligrams per cubic meter

ppm: parts per million

BLOODBORNE PATHOGENS EXPOSURE PLAN ANNUAL TRAINING INFORMATION

Training on the following information is required annually for all persons trained in first aid or cardiopulmonary resuscitation (CPR).

DEFINITIONS:

Bloodborne Pathogens (BBP) means pathogenic microorganisms (such as viruses) that are present in human blood and body fluids and can cause disease in humans. These pathogens include, but are not limited to, HBV, HCV, and HIV.

Other Potentially Infectious Materials (OPIMs) means the following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any other body fluid that is visibly contaminated with blood such as saliva or vomitus, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids such as emergency response.

1) Epidemiology and symptoms of bloodborne diseases

HIV

- HIV attacks the body's ability to protect itself against disease
- Initially no visible signs of having the virus
- Most people with HIV develop AIDS (acquired immune deficiency syndrome)
- There is **no** licensed and approved vaccination for HIV

HBV and HBC - Signs and symptoms include flu-like symptoms:

- Fatigue
- Jaundice (yellowing of skin and eyes)
- Severe pain in joints
- Lung disease
- Inflammation of liver
- Inflammation on and ulcers of the colon
- May be asymptomatic (i.e., no symptoms indicated)

2) Modes of transmission of BBP

Pathogens can enter your body through a cut in the skin, through your eyes or mouth, and can be transmitted sexually.

HIV

- Virus lives outside the body only a few hours
- Four modes of transfer:
 - Blood
 - Semen
 - Vaginal secretions
 - Breast milk

HBV

- Up to 100 times easier to catch than HIV
- Unlike HIV, can live outside of body for several days
- Primarily found in the blood of infected individuals.
- HBV has also been detected in other bodily fluids including urine, saliva/nasopharyngeal fluids, semen, and menstrual fluids
- Transmission of HBV is done most efficiently by percutaneous introduction (i.e., needlestick injury).
- Sexual transmission is also possible, though inefficient.
- There is no cure for HBV
- There is a vaccination for HBV

HCV

- Up to 100 times easier to catch than HIV
- Unlike HIV, can live outside of body for several days
- Ways to contract HCV
 - Long-term kidney dialysis
 - Sex with multiple partners
 - Tattooing or body piercing with shared needles or unsterilized equipment
 - Intranasal cocaine use with shared straws
- There is no cure for HCV
- There is no vaccination for HCV.

How BBP Spread on the Job

- By a sharp object that is contaminated by the virus when it cuts or punctures your skin.
- When you touch a contaminated surface and then touch your eyes, nose, mouth, or open wounds or inflamed skin.

3) Explanation of the BBP Exposure Control Program and means by which the employee can obtain a copy

- Available in the Site-Wide HASP

4) Methods for recognizing tasks and other activities that may involve exposure to blood and OPIM

- Exposure may occur when providing first aid or CPR.

5) Use and limitations of exposure prevention or reduction methods, including engineering controls, work practices, and PPE

- Do not eat, drink, smoke, apply cosmetics or lip balm, or handle contact lenses in areas where there is the possibility of exposure to BBP;
- Wash hands and exposed skin with soap and water immediately after contact with blood or OPIM; and
- Decontaminate all surfaces contaminated with blood or OPIM with a diluted bleach solution (diluted 1:10).

6) PPE types and their proper use, location, removal, handling, decontamination, disposal, and basis for selection

- Gloves and ventilation device(s) for use during CPR, such as mouthpieces or pocket masks, will be included in the standard first aid kit in the field and in the offices.

- Remove gloves contaminated with blood or OPIM in manner that prevents skin contact with the exterior surface of the gloves.
- Disposable gloves and pocket masks will not be washed or decontaminated for reuse and must be replaced.
- All waste created during administration of first aid, including PPE, shall be disposed of in a sealable waste bag for disposal.

7) HBV vaccination efficacy, safety, method of administration, benefits, and that the vaccine and vaccination will be offered free to eligible employees

- Very low risk vaccine
- Three doses over 6 months; must receive all three doses
- >79 percent effective
- Free to employees who administer first aid/CPR
- May decline vaccine (but must sign waiver); may receive vaccine later.

8) Appropriate actions in the event of an emergency involving blood or OPIM

- Wash hands and any exposed skin immediately with soap and water

9) Procedures to follow in the event of an exposure incident, including method of reporting and medical follow-up that will be made available

- Report incident using “Post-exposure Evaluation Form” and provide to CSO or direct supervisor as soon as possible after incident. The CSO is required to submit this information to the LSECS as soon as possible.
- A confidential medical evaluation and follow-up will be provided immediately to exposed employees.

10) Details of the post-exposure evaluation and follow-up

- Documentation of the exposure route and exposure incident circumstances
- Identification and documentation of the source individual (unless identification is not feasible or prohibited by law)
- Collection and testing of blood for HBV, HCV, and HIV serological status
- Post-exposure prophylaxis, when medically indicated, as recommended by the Vietnam Ministry of Health or U.S. Public Health Service
- Counseling
- Evaluation of reported illness

11) Signs and labels and/or color-coding regulated waste containers or other containers of blood or OPIM

- Plastic impermeable bag labeled “Biohazardous Waste” or with the international symbol and the word “Biohazard.”
- Bags must be tied shut and placed in closable, leak-resistant and labeled containers that can prevent leakage during all handling, storage, transport, shipping, and other activities.

I have read and understand the **Site-Wide HASP Bloodborne Pathogens Exposure Control Annual Training Information.**

Date _____

Training conducted by _____

Location _____

Employee Printed Name	Signature

BLOODBORNE PATHOGEN POST-EXPOSURE EVALUATION

I. EXPOSED PERSON

Name:	Date of Birth:
Street Address:	Telephone:
Employer:	Employer Address:
Personal Physician or Clinic:	
Have you been vaccinated against Hepatitis B virus? If yes, what year?	☐ Yes ☐ No

II. EXPOSURE SOURCE *(if legally obtainable)*

Date of Incident:	Time of Incident: ☐ am ☐ pm ☐ time unknown	
Specific Description of Incident (include estimate of volume of fluid involved):		
Type of Incident and Body Fluid Exchanged (check all that apply):		
BODY FLUID ☐ Blood ☐ Sputum or saliva ☐ Urine ☐ Feces ☐ Semen ☐ Vaginal secretions ☐ Vomitus	ACTION ☐ Needle puncture ☐ Bite that breaks the skin ☐ Impalement ☐ Splash or Splatter ☐ Mouth-to-mouth CPR ☐ Cut or wound ☐ Other	ROUTE OF ENTRY OF EXPOSED PERSON ☐ Eye ☐ Nose ☐ Mouth ☐ Open wound or break in skin

CERTIFICATION BY EXPOSED PERSON

The above information accurately describes the exposure. I request disclosure of the source person's body fluid/bloodborne pathogen(s) test results.

Exposed Person's Signature

Date Signed

ARCHITECT- ENGINEER SERVICES II FOR DIOXIN REMEDIATION AT BIEN HOA AIRBASE AREA

BLOODBORNE PATHOGEN POST-EXPOSURE EVALUATION

SIGNIFICANT EXPOSURE CERTIFICATION BY PHYSICIAN

I certify that the incident described above had the potential for the exposed person to have a significant exposure to blood or other body fluids. I have informed the exposed person about medical conditions that may require further evaluation or treatment as a result of this exposure.

A Hepatitis B vaccination is recommended for the exposed person: ☐ Yes ☐ No

The exposed person has received the Hepatitis B vaccination: ☐ Yes ☐ No

Physician's Name (print):

Physician's Signature

Date Signed

Physician's License No.:

Business Telephone No.:

Physician's Business Address:

CALIBRATION LOG: DIRECT-READING MONITORING INSTRUMENT

Location on Site:	
Conducted By:	
Instrument:	

Date:	Calibration Gas/ Concentration:
Name:	
Comments:	Readings:

Date:	Calibration Gas/ Concentration:
Name:	
Comments:	Readings:

Date:	Calibration Gas/ Concentration:
Name:	
Comments:	Readings:

Date:	Calibration Gas/ Concentration:
Name:	
Comments:	Readings:

Date:	Calibration Gas/ Concentration:
Name:	
Comments:	Readings:

Daily Excavation Safety Checklist

The Competent Person is required to make a daily inspection of excavations, adjacent areas, and excavation protective systems for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres or other hazardous conditions. Inspections must be completed prior to starting work and as needed through the shift.

GENERAL INFORMATION

Date
Location on Site
Competent Person
Excavation Depth / Width

EXCAVATION INFORMATION

Condition	Present?	Describe
Employees Entering Excavation	Yes / No	
Hazardous Atmosphere	Yes / No	
Access / Egress	Yes / No	
Traffic Control	Yes / No	
Wet Condition	Yes / No	

Condition	Present?	Describe
Employees Entering Excavation	Yes / No	
Hazardous Atmosphere	Yes / No	
Access / Egress	Yes / No	
Traffic Control	Yes / No	
Wet Condition	Yes / No	

Condition	Present?	Describe
Employees Entering Excavation	Yes / No	
Hazardous Atmosphere	Yes / No	
Access / Egress	Yes / No	
Traffic Control	Yes / No	
Wet Condition	Yes / No	

EMERGENCY MEDICAL NOTIFICATION FORM

Employee Name:	
----------------	--

EMERGENCY NOTIFICATION INFORMATION

IN CASE OF EMERGENCY NOTIFY		
CONTACT 1	Name:	
	Relationship:	
	Telephone	
CONTACT 2	Name:	
	Relationship:	
	Telephone	
ALLERGIES		
List any health-threatening allergies (i.e. medications, food, bee stings):		
MEDICATIONS		
List current medications that may affect the ability to safely operate equipment and machinery:		
OTHER INFORMATION		
List any other information that should be known in case of an emergency:		

Name (print):	
Signature:	
Date:	

HAZARDOUS SUBSTANCE INVENTORY LIST

SDS on File?	Chemical or Product Name	Manufacturer	Location and Container Type

HEPATITIS B VACCINE DECLINATION

I understand that because of my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring Hepatitis B virus (HBV) infection.

My employer, _____, has offered the HBV vaccine at no charge to me. However, I decline HBV vaccination at this time. I understand that by declining the vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. I also understand that if in the future I continue to have occupational exposure to blood or other potentially infectious materials and want to be vaccinated with the HBV vaccine, I can receive the vaccination series at no charge to myself.

Employee Name (printed)

Employee Signature

Date

Supervisor Name (printed)

Supervisor Signature

Date

Copy to be retained in the employee's secured medical surveillance file.

INJURY/ ILLNESS REPORT FORM

INFORMATION REGARDING INJURED OR ILL EMPLOYEE	
Name:	Phone:
Home Address:	Emergency Contact Person/ Phone:
Job Title:	Gender: ☐ M ☐ F
Employer:	Employer Telephone:
Supervisor Name:	Supervisor Telephone:

INFORMATION ABOUT THE INCIDENT <i>(to be completed by employee)</i>	
Date of Incident:	Time of Incident: ☐ am ☐ pm ☐ time unknown
Time you began work:	Where you Hospitalized?: ☐ Yes ☐ No Dates:
Location of Incident: Was the place of accident or exposure on the Bien Hoa Airbase Area remediation site? ☒ Yes ☐ No	
Location on the site:	
What happened? Describe the incident in detail. (use additional pages if needed.)	
What vehicle, equipment, materials, and chemicals were you using?	
What PPE were you using when the incident occurred?	
What was your job assignment at the time of the incident?	
What was your injury? Describe the parts of the body affected and how it was affected. Be specific: Sprained left wrist or Chemical burn, left hand	
Were you performing your regular job duties? ☐ Yes ☐ No If no, describe the duties you were performing that were different from your usual job.	
Did you receive training for your new duties? ☐ Yes ☐ No	
Was special safety equipment supplied? ☐ Yes ☐ No Describe the equipment:	
Were you trained to use the safety equipment? ☐ Yes ☐ No	
Did you use the safety equipment properly? ☐ Yes ☐ No If no, please state why you did not use the safety equipment you were given.	

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INJURY/ ILLNESS REPORT FORM

WITNESSES <i>(Attach additional sheets as needed for other witnesses)</i>	
1.Name:	Company:
Address:	Phone:
Eyewitness? ☐ Yes ☐ No	Was a witness statement provided? ☐ Yes ☐ No
2.Name:	Company:
Address:	Phone:
Eyewitness? ☐ Yes ☐ No	Was a witness statement provided? ☐ Yes ☐ No
3.Name:	Company:
Address:	Phone:
Eyewitness? ☐ Yes ☐ No	Was a witness statement provided? ☐ Yes ☐ No
4.Name:	Company:
Address:	Phone:
Eyewitness? ☐ Yes ☐ No	Was a witness statement provided? ☐ Yes ☐ No
5.Name:	Company:
Address:	Phone:
Eyewitness? ☐ Yes ☐ No	Was a witness statement provided? ☐ Yes ☐ No
Name and company of person who received the first report of injury:	
Date of Initial Report:	Time of Initial Report:

ARCHITECT- ENGINEER SERVICES II FOR DIOXIN REMEDIATION AT BIEN HOA AIRBASE AREA

INJURY/ ILLNESS REPORT FORM

TO BE COMPLETED BY CONTRACTOR SAFETY OFFICER

Was first aid administered on Site? ☐ Yes ☐ No

Were emergency medical personnel or an ambulance called? ☐ Yes ☐ No

Was additional medical treatment required? ☐ Yes ☐ No

If yes, provide the information below:

Name of physician or health care professional:

Telephone:

Facility name and address:

Telephone:

Was time off medically required? ☐ Yes ☐ No

If yes, how many days?

Was job reassignment medically required? ☐ Yes ☐ No

If yes, for how long?

Was physical therapy medically required? ☐ Yes ☐ No

If yes, for how long?

Will post-incident blood testing be required ☐ Yes ☐ No

If yes, date scheduled:

Has a medical professional provided a "fitness for duty" statement? ☐ Yes ☐ No

If yes, what is the recommended return to work date?

Additional comments and observations:

INJURY/ ILLNESS REPORT FORM

INJURED EMPLOYEE'S REVIEW

I have reviewed this investigation report and agree, to the best of my recollection, with its contents. I understand that the foregoing information may be used for further investigation and reporting.

Name (print):

Signature:

Date:

REPORT PREPARED BY

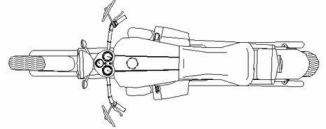
Title/ Position:

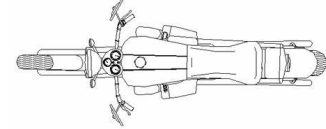
Company:

Telephone:

Date:

ON-SITE VEHICLE ACCIDENT INVESTIGATION FORM

DRIVER / VEHICLE 1 INFORMATION	Driver's Name:	Vehicle License Number:	Year:	VIN:
	Driver's License No.:	Vehicle Make:	Model:	Company vehicle?
	Company Name:		Circle Areas of Vehicle I Damage Front  Rear	
	Address:			
	Passenger Names (if any):			

DRIVER / VEHICLE 2 INFORMATION	Driver's Name:	Vehicle License Number:	Year:	VIN:
	Driver's License No.:	Vehicle Make:	Model:	Company vehicle?
	Company Name:		Circle Areas of Vehicle I Damage Front  Rear	
	Address:			
	Passenger Names (if any):			

ACCIDENT INFORMATION	Accident Location (Address/ Intersection/ Area):		Road Conditions:	
			Weather Conditions:	
	On site? ☐ Yes ☐ No		Other Site Traffic?	
	Where on Site?			
	Date of Accident:	Time of Accident	Vehicle 1 Est. Speed:	Vehicle 2 Est. Speed:
	Police Report Made? ☐ Yes ☐ No	Name and Address of Investigating Agency:		

ARCHITECT- ENGINEER SERVICES II FOR DIOXIN REMEDIATION AT BIEN HOA AIRBASE AREA

ON-SITE VEHICLE ACCIDENT INVESTIGATION FORM

INJURED PERSONS	Name:	Address:	Vehicle No.:	Age:
	Describe Injuries:			
	Name:	Address:	Vehicle No.:	Age:
	Describe Injuries:			
	Name:	Address:	Vehicle No.:	Age:
Describe Injuries:				

VEHICLE PASSENGERS	Name:	Address:	Vehicle No.:	Witness?: ☐ Yes ☐ No
	Name:	Address:	Vehicle No.:	Witness?: ☐ Yes ☐ No
	Name:	Address:	Vehicle No.:	Witness?: ☐ Yes ☐ No
	Name:	Address:	Vehicle No.:	Witness?: ☐ Yes ☐ No

OTHER WITNESSES	Name:	Telephone:	Address:
	Name:	Address:	Address:
	Name:	Address:	Address:
	Name:	Address:	Address:

ARCHITECT- ENGINEER SERVICES II FOR DIOXIN REMEDIATION AT BIEN HOA AIRBASE AREA

ON-SITE VEHICLE ACCIDENT INVESTIGATION FORM

DETAILED ACCIDENT DESCRIPTION	Fully State How Accident Occurred (Give details, attach additional sheets if necessary):
-------------------------------	--

SAFETY INSPECTION REPORT

Date:	
Time:	
Location on Site:	
Work Description:	

OBSERVATIONS

--

Safety Conditions Requiring Corrective Action(s):	
Corrective Action(s):	
Assignment:	
Completion Date:	

Project Manager:	
Safety Inspector:	
Distribution:	

**DIOXIN REMEDIATION AT BIEN HOA AIRBASE AREA PROJECT
SAFETY MEETING ATTENDANCE ROSTER**

Location on Site:	
Date:	
Topic:	

Name	Signature	Company

Conducted By:	
Signature:	
Date:	

SITE CONTROL LOG

Date // Time:	
Project Name:	Dioxin Remediation Project at Bien Hoa Airbase
Project Location:	Bien Hoa Airbase, Bien Hoa, Vietnam

[illegible]

SOIL CLASSIFICATION CHECKLIST

Date / Time

Competent Person

Soil Sample Location

Original Soil Classification (circle one)
Stable / Type A / Type B / Type C

Soil Re-classification (circle one)
Stable / Type A / Type B / Type C / No Change

This checklist is completed by the Competent Person to document visual and manual soil classification tests used to determine soil types present in an excavation. A separate analysis is performed on each layer of soil in the excavation walls or if the excavation stretches over a distance where the soil type may change. If the properties, factors, or conditions affecting the initial classification occur, the Competent Person shall evaluate the changes.

Particle Type

Condition	?	Describe
Fine grained soil (cohesive)	Yes / No	
Coarse grained soil (sand/gravel)	Yes / No	

Water Conditions

Condition	?	Describe
Dry	Yes / No	
Wet/Surface Water/Submerged	Yes / No	

Other Visual Tests

Condition	?	Describe
Previously disturbed soil	Yes / No	
Layered systems that slope into excavation	Yes / No	
Exposure to vibration	Yes / No	
Fissures/cracking/spalling	Yes / No	
Utility or underground structures	Yes / No	

Manual Soil Classification

Check applicable test(s)

Plasticity	Dry Strength	Thumb Penetration	Pocket Penetrometer	Shear Vane	Drying
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Results

TAILGATE SAFETY MEETING

Project Name: Dioxin Remediation Project at Bien Hoa Airbase	
Location: Bien Hoa Airbase, Bien Hoa, Vietnam	Date
Site Activities Planned Today	

Employee Questions or Comments
See next sheets for topics covered.

Attendees (use additional sheets as required)	
Printed Name	Signature

Attendees <i>(use additional sheets as required)</i>	
Printed Name	Signature

Meeting conducted by:

NameTitle

Signature

TAILGATE TRAINING CHECKLIST

Topic	Details	Topic Covered
Site Characteristics	Physical Hazards	
	Site Access Precautions	
	Potential Site Hazards	
	Observed Site Conditions	
	Biological Hazards	
	Other conditions	
Hazards – General Discussions	Physical hazards and injury prevention	
	Animal bites, stings, and poisonous plants	
	Heat Stress	
	Special Area Operations	
	Other hazards	
PPE	Personal protective equipment	
	Weather protective clothing	
	Other PPE Topics	
Emergency Response	Route to nearest medical facility	
	Identification of first aid providers available to assist	
	Emergency telephone numbers	
	Procedures for handling site emergency incidents	
	Incident reporting procedures	
	Incident investigation procedures	
	USAID requirements	
	Other emergency response topics	

TAILGATE TRAINING CHECKLIST

Topic	Details	Topic Covered
Special Operations and Equipment	Excavation and Trenching Safety	
	First aid kit	
	UXO Safety	
	Working around heavy equipment	
Weather Conditions	Review of local weather forecast	
	Emergency procedures for specific weather conditions	
Other Safety Topics		
Yesterday's Site Operations	Lessons Learned	

Select topics based on previous day's operations or new information provided by USAID.

**DIOXIN REMEDIATION PROJECT AT BIEN HOA AIRBASE
TRAINING ATTENDANCE RECORD**

Training Location:	
Date:	
Topic	
Method of Delivery	Online – Verbal - Translator

Date	Name	Signature	Company

Instructor Name:	
Signature:	
Date:	

NOTE: Attach copy of any written handouts.

APPENDIX B: A&E II HEALTH AND SAFETY OFFICER OVERVIEW

A&E II HEALTH AND SAFETY OFFICER OVERVIEW

Karl Tilgner – Health and Safety Officer

Mr. Tilgner has over 30 years of technical and field experience in the comprehensive practice of occupational health and safety in the construction industry.

CERTIFICATIONS AND TRAINING

40-Hour Hazwoper (1993) and current refresher training (2023)
8-Hour Hazwoper Supervisor (2006) (2008)
8-Hour OSHA HAZMAT Emergency Response Supervisor (2023)
OSHA 30-Hour Construction Safety (2010)
80-Hour Breathing Air Certification (1993)
40-Hour EM-385 (2010) (2020)
STS Safety Trained Supervisor (2010)
10-Hour OSHA construction (2005) (2008) (2018)
16-Hour Construction Quality Management for Contractors (2020)
PADI Certified Rescue Diver (1995)
16-Hour Construction Site Erosion Control Lead (2003)
24-Hour Caltrans Storm Water Pollution Prevention Plan Training (2008)
Confined Space Certified (2005) (2012)
Excavation and Trenching (2005) (2008) (2010)
Scaffold Safety (2008)
Permit Required Confined Space (2008)
Respiratory Protection (2005)

EXPERIENCE AND BACKGROUND

Mr. Tilgner has over three decades of experience in the evaluation of safety and health hazards in construction, both in the US and internationally. Mr. Tilgner has successfully conducted Health and Safety oversight on many projects for all wings of the military (Airforce, Navy, Marines, Army, Coast Guard), as well as many city, state, and federal agencies.

EMPLOYMENT HISTORY

CDM Smith – June 2001 to present.
RCI Environmental – 1999 to 2001.
OHM Remediation Services – 1993 to 1999.

APPENDIX C: LIST OF DESIGNATED COMPETENT PERSONS

LIST OF DESIGNATED COMPETENT PERSONS

Project Name:	Architect–Engineer Services II for Dioxin Remediation at Bien Hoa Airbase Area
Project Location:	Bien Hoa, Vietnam

The A&E II Contractor has designated the personnel below to perform as competent persons on this Project.

Competent Person Description	Applicability	Competent Person
General Safety and Health Provisions (29 CFR 1926 Subpart C)	Yes	Karl Tilgner
Occupational Health and Environmental Controls (29 CFR 1926 Subpart D)	Yes	Karl Tilgner
Personal Protective and Life Saving Equipment (29 CFR 1926 Subpart E)	Yes	Karl Tilgner
Fire Protection and Prevention (29 CFR 1926 Subpart F)	Yes	Karl Tilgner and GVN
Signs, Signals, and Barricades (29 CFR 1926 Subpart G)	TBD	–
Materials Handling, Storage, Use, and Disposal (29 CFR 1926 Subpart H)	TBD	–
Hand and Power Tools (29 CFR 1926 Subpart I)	Yes	Karl Tilgner
Welding and Cutting (29 CFR 1926 Subpart J)	TBD	–
Electrical (29 CFR 1926 Subpart K)	TBD	–
Scaffolds (29 CFR 1926 Subpart L)	TBD	–
Fall Protection (29 CFR 1926 Subpart M)	Yes	Karl Tilgner
Helicopters, Hoists, Elevators, and Conveyors (29 CFR 1926 Subpart N)	TBD	–
Motor Vehicles, Mechanized Equipment and Marine Operations (29 CFR 1926 Subpart O)	Yes	Bobby Bobo
Excavations (29 CFR 1926 Subpart P)	Yes	Karl Tilgner
Concrete and Masonry (29 CFR 1926 Subpart Q)	Yes	Karl Tilgner
Steel Erection (29 CFR 1926 Subpart R)	TBD	–
Underground Construction, Caissons, Cofferdams, and Compressed Air (29 CFR 1926 Subpart S)	N/A	–
Demolition (29 CFR 1926) (Subpart T)	Yes	Karl Tilgner
Blasting and Use of Explosives (29 CFR 1926 Subpart U)	N/A	–
Electric Power Transmission and Distribution (29 CFR 1926 Subpart V)	N/A	–
Rollover Protective Structures; Overhead Protection (29 CFR 1926 Subpart W)	Yes	Karl Tilgner / Bobby Bobo
Stairways and Ladders (29 CFR 1926 Subpart X)	TBD	–
Commercial Diving Operations (29 CFR 1926 Subpart Y)	N/A	–
Toxic and Hazardous Substances (29 CFR 1926 Subpart Z)	Yes	David Liu
Confined Spaces in Construction (29 CFR 1926 Subpart AA)	Yes	Karl Tilgner
Cranes & Derricks in Construction (29 CFR 1926 Subpart CC)	Yes	Bobby Bobo

N/A – Not Applicable

GVN – Government of Vietnam

APPENDIX D: ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Site Characterization Activities		Overall Risk Assessment Code (RAC) (Use highest code)					L	
Project Location: Bien Hoa Airbase, Vietnam		Risk Assessment Code (RAC) Matrix						
Contract/Task Order:		Severity	Probability					
Date Prepared: Prepared by:			Frequent	Likely	Occasional	Seldom	Unlikely	
Date Reviewed: Reviewed by:			Catastrophic	E	E	H	H	M
			Critical	E	H	H	M	L
Date approved: Approved by:		Marginal	H	M	M	L	L	
		Negligible	M	L	L	L	L	
Notes: (Field Notes, Review Comments, etc.) For general precautions related to all site activities, refer to AHAs for "General Site Work" and "Non-Intrusive Site Activities".		Step 1: Review each " Hazard " with identified safety " Controls " and determine RAC (See above)						
		"Probability" is the likelihood of causing an incident, near miss, or accident and is identified as: Frequent, Likely, Occasional, Seldom or Unlikely.					RAC Chart E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and is identified as: Catastrophic, Critical, Marginal, or Negligible						
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.						
Job Steps	Hazards	Controls					RAC	
I. Soil Sampling	I. Exposure to contaminants in soil	1. Wear appropriate PPE as determined by the CSO, to include: Outer and inner chemical protective gloves; Full body disposable protective clothing; Boot covers; and Full-face respirator with appropriate cartridges OR half-face respirator with appropriate cartridges worn under a full-face shield 2. Replace damaged PPE as soon as damage is discovered. 3. Do not touch or adjust respiratory protection unless in the decontamination zone after gloves/hands are completely decontaminated.					L	

		4. Follow the steps for the appropriate decontamination. 5. Eat, drink, or smoke only in designated clean areas AFTER decontamination and removal of PPE. 6. Contain all decontamination fluids and materials for eventual disposal or treatment. 7. For any monitoring instrumentation, cameras, or other electronic equipment used during sampling, protect all surfaces from contamination by covering with plastic bags.	
	2. Wearing PPE	1. Use the appropriate PPE and respiratory protection as determined by the CSO. 2. Acclimate to the heat gradually, increasing work shifts incrementally until a maximum of four hours of work is tolerable. 3. Drink water and electrolyte fluids at every break after decontamination. 4. Consume a minimum of four liters of fluids for every work shift. 5. Monitor yourself and teammates for signs of heat-related illness. 6. Stop work at the first signs of heat-related illness and proceed to the decontamination area for treatment. 7. Use the proper size of full body cover, boots, and gloves to prevent tripping or damage to PPE. 8. Maintain adequate supplies of PPE and respiratory protection in the appropriate sizes. 9. Collect all used PPE and respirator cartridges and hold for disposal pending results of analysis. 10. Use respirator cartridges for no more than one 8-hour work shift. When removed from the mask, crush to signify the cartridge cannot be reused. 11. Use duct tape to hold gloves to sleeves and boot covers to suit legs. 12. If needed, reinforce seams with duct tape to prevent tearing.	L

	3. Decontamination	1. Remove soiled PPE in a manner that prevents contamination of skin, clothing, and hair. 2. Place used PPE and respirator cartridges in containers for eventual disposal. 3. Decontaminate respirator as directed by manufacturer. Use antibacterial soap and potable water rinse. 4. Wear clean surgical gloves when decontaminating respiratory protection. To avoid soiling clothing due to splashing liquids, use a lab apron or another clean disposable suit. 5. Wash hands and face before leaving the decontamination zone. 6. Decontaminate non-disposable sampling tools in separate wash containers/basins. Do NOT decontaminate with respiratory protection. 7. For disposable sampling tools, collect in a container and place in decontamination zone with soiled disposable PPE. Do NOT leave at sampling site. 8. For instrumentation used during sampling, remove plastic coverings and decontaminate according to manufacturer's instructions. 9. For non-disposable sampling tools, decontaminate as directed in the Sampling Plan to prevent cross-contamination of samples. 10. Follow decontamination protocols included in HASP. 11. For sample handling protocols, refer to the Sampling Plan.	L
2. Groundwater Sampling	1. Exposure to contaminants in groundwater	Refer to steps in 1.1.1 thru 7 above. In addition: 1. Wear water repellent disposable full body cover to prevent contamination of skin and clothing. 2. Have an adequate supply of disposable paper towels to dry outside of sample containers. 3. Avoid stepping in spilled groundwater whenever possible.	L
	2. Wearing PPE	Refer to steps 1.2.1 thru 12 above. In addition: 1. Breaks should be taken more frequently if wearing water repellent full body cover due to lack of evaporation of perspiration.	L

		2. Use cooling vests underneath disposable full body cover. Clean vests as recommended by manufacturer.	
	3. Decontamination	Refer to steps 1.3.1 thru 11 above.	L
3. Surface Water Sampling	1. Exposure to contaminants in surface water	Refer to steps 1.1.1 thru 7 and 2.1.1 thru 3 above. In addition: - When working at or near the edge of a body of water (pond, lake, stream, river, etc.), wear a PFD at all times over the disposable full body cover. - In the event that a team member falls into the water, all work will stop until the member is extracted from the water and in the decontamination zone. - When working at the edge of the water, a rope will be attached to the PFD at all times to effect quick extraction. - PFDs will be decontaminated with soap and water as directed by the manufacturer and left in the decontamination area to dry. - At the conclusion of surface water, sediment and pond sampling, all PFDs used during the Project will be air-dried and held for disposal pending results of water analysis.	L
	2. Wearing PPE	Refer to steps 1.2.1 thru 12 above. In addition: - Breaks should be taken more frequently if wearing water repellent full body cover due to lack of evaporation of perspiration. - Use cooling vests underneath disposable full body cover. Clean vests as recommended by manufacturer.	L
	3. Decontamination	Refer to steps 1.3.1 thru 11 above.	L
4. Sediment and Pond Sampling	1. Exposure to contaminants in sediment and ponds	Refer to steps 1.1.1 thru 7, 2.1.1 thru 3, and 3.1.1 thru 5 above.	L
	2. Wearing PPE	Refer to steps 1.2.1 thru 12 above. In addition: Breaks should be taken more frequently if wearing water repellent full body cover due to lack of evaporation of perspiration.	L

		2. Use cooling vests underneath disposable full body cover. Clean vests as recommended by manufacturer.	
	3. Decontamination	Refer to steps 1.3.1 thru 11 above.	L
5. Vegetation Sampling	1. Exposure to contaminants accumulated on vegetation	Refer to steps 1.1.1 thru 7 and 2.1.1 thru 3 above. In addition: 1. Seal vegetation samples in bags or containers to prevent exposure to contaminants when processing samples. 2. Do not remove contaminated vegetation from the EZ unless in sealed containers which are marked to prevent reopening without the use of PPE. 3. Immediately report any signs of skin rash or irritation and begin first aid measure. 4. Thoroughly wash hands and arms BEFORE washing face or any other body part.	L
	2. Wearing PPE	Refer to steps 1.2.1 thru 12 above. In addition: 1. When performing personal decontamination, notify decon assistants that you have been handling potentially poisonous or irritant plants. 2. Request puncture-resistant and tear-resistant gloves and body cover if working with plants with thorns or thistles.	L
	3. Exposure to irritant or poisonous plants	• Do not handle any plants with bare hands. • If cutting samples, decontaminate or dispose of any instruments used for cutting. • Do not “sniff” plants to identify aromas or odors. • Be cautious when handling plants with thorns or thistles. Use heavy work glove over chemical protective gloves. • Always check for wildlife before disturbing any vegetation. • Immediately report any signs of skin rash or irritation and begin first aid measures. • Thoroughly wash hands and arms BEFORE washing face or any other body part.	L

	4. Decontamination	Refer to steps 1.3.1 thru 11 above.	L
6. Fish and Shellfish Sampling	1. Exposure to potentially contaminated or diseased aquatic wildlife specimens	Refer to steps in 1.1.1 thru 7 above. In addition: 1. Wear water repellent disposable full body cover to prevent contamination of skin and clothing. 2. Have an adequate supply of disposable paper towels to dry outside of sample containers. 3. Do not handle any specimens with bare hands. 4. Decontaminate or dispose of instruments used for cutting samples. 5. Do not “sniff” specimens to identify aromas or odors. 6. Check specimen for spines, bony protrusions, or teeth which could damage PPE and cut skin. 7. Seal all specimens in containers prior to leaving the EZ. Do not reopen containers outside of EZ. 8. Report to CSO if you are allergic to shellfish or seafood. 9. Immediately report any signs of skin rash or irritation and begin first aid measures. 10. Thoroughly wash hands and arms BEFORE washing face or any other body part.	L
	2. Wearing PPE	Refer to steps 1.2.1 thru 12 above. In addition: 1. When performing personal decontamination, notify decon assistants that you have been handling fish and shellfish 2. Request puncture-resistant and tear-resistant gloves and body cover if working with specimens with spines, bony protrusions, or teeth.	L
	3. Decontamination	Refer to steps 1.3.1 thru 11 above.	L
7. Decontamination Fluid and Investigation-Derived Waste Sampling	1. Exposure to contaminants in liquid and solid wastes	Refer to steps in 1.1.1 thru 7 above. In addition: 1. Wear water repellent disposable full body cover to prevent contamination of skin and clothing. 2. Have an adequate supply of disposable paper towels to dry outside of sample containers.	L

		3. Avoid stepping in spilled groundwater whenever possible.	
	2. Wearing PPE	Refer to steps 1.2.1 thru 1.2 above. In addition: 1. Breaks should be taken more frequently if wearing water repellent full body cover due to lack of evaporation of perspiration. 2. Use cooling vests underneath disposable full body cover. Clean vests as recommended by manufacturer.	L
	3. Decontamination	Refer to steps 1.3.1 thru 1.3 above.	L

Activity Hazard Analysis (AHA) (continued)

Equipment to be Used	Training Requirements and Competent or Qualified Personnel Name(s)	Inspection Requirements
1. Drinking water – outside of EZ 2. Sampling tools 3. Air monitoring instrumentation if required 4. Sample containers, coolers, ice 5. First aid kit 6. PPE, including cooling vests and PFDs 7. Boats or rafts with qualified operators	Training SOPs for Working On or Around Water Emergency Response for Man Overboard 40-Hour Hazwoper Training Training in sampling techniques First aid/CPR for two members of the team Qualified Personnel TBD – based on types of sampling and media to be sampled	1. PPE and respiratory protection 2. Sampling tools/equipment decontamination effectiveness 3. Sample containers and coolers 4. Buddy system 5. Proper use of PPE

APPENDIX E: SUBCONTRACTOR LIST

SUBCONTRACTOR LIST

Service Provided	Subcontractor

As the subcontractors to be used on this Project are identified, they will be added to the list. A written HASP will be required for each subcontractor which addresses each task to be performed. Work will not begin until the subcontractor's HASP has been approved by USAID.

APPENDIX F: PROJECT PERSONNEL TRAINING INFORMATION

PROJECT PERSONNEL TRAINING INFORMATION

NAME	POSITION	CERTIFICATION OR TRAINING REQUIREMENT	DATE OF LAST TRAINING	CERTIFICATE INCLUDED?
	Chief of Party	TBD (dependent on site work and use of PPE)		
	Deputy Chief of Party	TBD (dependent on site work and use of PPE)		
	Construction Manager	TBD (dependent on site work and use of PPE)		
	Environmental Compliance Specialist	TBD (dependent on site work and use of PPE)		
	Health & Safety Officer	TBD (dependent on site work and use of PPE)		
	Contractor Site Project Manager	TBD (dependent on site work and use of PPE)		
	Contractor Safety Officer	TBD (dependent on site work and use of PPE)		
	Sampling Technician	TBD (dependent on site work and use of PPE)		

APPENDIX G: BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

This Bloodborne Pathogens Exposure Control Plan was developed in accordance with the BBP standard as outlined in 29 CFR 1910.1030. The purpose of this exposure control plan is to minimize employee occupational exposure to blood and other infectious body fluids.

All medical records related to BBP exposure incidents shall be maintained with other medical records for the employee. Training records associated with this standard shall be maintained with other training records.

The CSOs and the A&E Contractor is responsible for implementation of this Plan on the work site and will review the final selection of appropriate PPE and evaluate reported exposure incidents.

The BBP standard requires that the BBP exposure control program detail the methods of implementation for the various elements of the standard. The program elements are discussed below.

APPLICABILITY AND EXPOSURE DETERMINATION

The requirements of this Plan apply to all employees on the work site who may reasonably be anticipated to have occupational exposure to blood or OPIM.

It is currently anticipated that exposure to potentially infectious material will include employees who are trained in first aid or CPR and members of the site emergency response team administering care to coworkers, guests, visitors, or other worksite personnel. All personnel who are trained in first aid or CPR must receive training on the BBP Exposure Control Plan and complete a training course addressing BBP risks, control, and exposure monitoring.

UNIVERSAL PRECAUTIONS

“Universal Precautions” is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and other BBP.

The proactive use of universal precautions shall be implemented during all first aid activities whenever contact with blood or OPIM may be reasonably anticipated. All blood or OPIM shall be considered infectious regardless of the source individual. Universal precautions should be attained by using engineering controls, work practice controls, and PPE.

ENGINEERING AND WORK PRACTICE CONTROLS

Whenever possible, engineering and work practice controls shall be implemented to eliminate or minimize employee exposures. Such controls may include, but are not limited to, the following:

- Hand-washing supplies must be available at all work sites. At a minimum, antiseptic hand cleaner with clean paper towels or antiseptic towelettes will be provided.
- Employees shall wash hands and exposed skin with soap and water or flush mucous membranes immediately or as soon as feasible after contact with blood or OPIM.
- No eating, drinking, smoking, cosmetics or lip balm application, or handling of contact lenses is allowed in areas with reasonable likelihood of occupational exposure to blood or OPIM.
- In rare cases where employees may come across waste items contaminated with blood or OPIM, care shall be taken to avoid potential contact.
- Any needles or sharp objects shall be placed in a puncture-resistant, labeled, leak-proof container. Under no conditions shall needles or contaminated sharp objects be bent, sheared,

broken, or recapped.

All waste created during first aid administration, including PPE, shall be disposed of in a sealable waste bag for disposal. All sanitary napkin and tampon disposal receptacles in restroom facilities shall be lined with plastic bags that are removed and replaced daily. Because these items do not meet the definition of regulated waste under the BBP standard and pose minimal risk of exposure, they can be disposed of in the sealed plastic bags in regular waste containers.

PERSONAL PROTECTIVE EQUIPMENT

Employers on the site shall provide first aid and CPR providers with appropriate PPE at no cost. PPE may include the following items:

- Gloves
- Ventilation devices such as mouthpieces, resuscitation bags, or pocket masks
- Face shields, eye protection, and body protection if needed to prevent exposure to OPIM

PPE shall be selected based on the potential exposure to blood or other OPIM. PPE is considered appropriate if it does not permit blood or OPIM to pass through or reach the employee's work clothes, street clothes, skin, eyes, mouth, or mucous membranes under normal conditions and for the duration of time it will be used. PPE shall be worn during any first aid response involving blood or OPIM.

Disposable gloves and pocket masks will be included in every standard first aid kit at all work sites and offices for every contractor on the site. Gloves shall be worn whenever employees will have hand contact with blood, broken skin, mucous membranes, or OPIM, and when handling or touching contaminated items or surfaces.

Disposable gloves and pocket masks will not be washed or decontaminated for reuse and must be replaced when they become contaminated, torn, or punctured, or when their ability to function as a barrier is compromised.

HOUSEKEEPING

In general, work areas are not expected to be contaminated with blood or OPIM unless in the event of a severe injury. In that case, all surfaces and equipment shall be cleaned and disinfected after contact with blood or OPIM as soon as possible with a diluted bleach solution (diluted 1:10) or other appropriate disinfectant.

If contaminated sharp objects or broken glassware are encountered, these items shall not be picked up by hand. Mechanical means of retrieval (such as use of a broom and dustpan, tongs, or forceps) shall be used. Any reusable bin, pail, can, and similar receptacles that could become contaminated must be inspected and decontaminated with a bleach solution as soon as possible when contamination is visible.

Clothing contaminated with blood or OPIM shall be bagged, labeled, and discarded as regulated waste.

REGULATED WASTE DISPOSAL

The handling, storage, treatment, and disposal of all regulated waste shall be conducted in accordance with all applicable federal and local regulations. Proper handling of regulated waste is essential to prevent unnecessary exposure to blood and OPIM. Regulated waste includes wastes in which blood or OPIM could be released by pouring, dripping, squeezing, or flaking. Regulated waste must be placed in a bag, preferably red or another bold color, labeled "Biohazardous Waste" or with the international symbol and the word "Biohazard." Bags must be tied shut and placed in closable, leak-resistant and labeled containers that prevent leakage during all handling, storage, transport, shipping, and other

activities. If the outside of the container becomes contaminated, it must be placed in a secondary container meeting the same specifications.

Nonregulated waste can be disposed of along with regular waste. This waste must be placed in a leak-proof container, closed tightly, and promptly placed into a garbage receptacle.

HEPATITIS B VACCINATION AND POST-EXPOSURE EVALUATION AND FOLLOW-UP

The A&E Contractor or Project Contractor shall make available the HBV vaccination series and post-exposure evaluation and follow-up to affected employees following an exposure incident. An exposure incident includes a specific eye, mouth, other mucous membrane, broken skin, or parenteral contact with blood or OPIM resulting from the performance of an employee's duties. The HBV vaccination and post-exposure evaluation and follow-up are discussed below.

HEPATITIS B VACCINATION

A pre-exposure HBV vaccination does not have to be offered to employees who are designated only as first aid providers and those whose primary job assignment is not rendering first aid but administering first aid only as a collateral duty to their routine work assignments. The HBV vaccination series will be made available to any unvaccinated first aid provider who has rendered assistance in any situation involving the presence of blood or OPIM, regardless of whether an actual exposure incident occurred.

POST-EXPOSURE EVALUATION AND FOLLOW-UP

A confidential medical evaluation and follow-up shall be immediately provided to exposed employees following the report of an exposure incident. The post-exposure evaluation and follow-up shall include the following:

- Documentation of the exposure route and exposure incident circumstances;
- Identification and documentation of the source individual (unless identification is not feasible or prohibited by law);
- Collection and testing of blood for HBV, HCV, and HIV serological status;
- Post-exposure prophylaxis, when medically indicated;
- Counseling; and
- Evaluation of reported illness.

The source individual's blood shall be tested as soon as feasible after consent is obtained to determine and document HBV, HCV, and HIV infection status. If the source individual is already known to be infected with HBV, HCV, or HIV, the blood testing need not take place. The test results shall be made available to the exposed employee, and any applicable laws and regulations regarding disclosure of identity and infection status of the source individual will be complied with. Details of the exposure incident investigation shall be documented on the "Post-Exposure Evaluation." Copies of the completed form shall be forwarded to the CSO and designated healthcare professional. Information provided to the healthcare professional and the healthcare professional's written opinion for follow-up is discussed below.

INFORMATION PROVIDED TO THE HEALTHCARE PROFESSIONAL

In the event of an exposure incident, the employer shall provide the following information to the healthcare professional responsible for the employee's HBV vaccination:

- A description of the exposed employee's duties as they relate to the exposure incident;
- Documentation of the routes of exposure and exposure incident circumstances;
- Results of source individual's blood testing, if available;
- All medical records relevant to the appropriate medical treatment, including vaccination status; and
- A copy of Post-Exposure Evaluation Form.

HEALTHCARE PROFESSIONAL'S WRITTEN OPINION

Employees shall receive a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation. The opinion for HBV vaccination shall be limited to whether the vaccination is indicated and if the employee has received such vaccination. The employee will be informed of the results of the examination. During the evaluation, the employee will also be told about any medical conditions that may result from exposure to blood or OPIM and that may require further evaluation or treatment. All other findings or diagnoses shall remain confidential and shall not be included in the healthcare professional's written opinion.

INFORMATION AND TRAINING

All employees with the potential for occupational exposure to blood and OPIM will receive training at the time of initial assignment to tasks during which occupational exposure might occur and at least annually thereafter. Additional training will be provided when changes in tasks or procedures affect employee exposure potential. The training program shall contain or address elements listed in "Bloodborne Pathogen Exposure Control Plan Annual Training Information," included in Appendix A.

All training conducted shall be documented and the training records kept for 3 years. Training documentation shall include the dates of the training, the contents or summary of the training session, names and qualifications of persons conducting the training, and the names of those attending

APPENDIX H: HAZARD COMMUNICATION PROGRAM

HAZARD COMMUNICATION PROGRAM

A Hazard Communication Program will be required from all contractors working on the Bien Hoa Airbase Area Site. The A&E Contractor will request from each CSO a hazardous substance inventory list and copies of SDSs for hazardous substances present, stored, or used by facility personnel and contractors in Project work areas. The Hazard Communication Program must include procedures to establish, clearly designate, and communicate the potential hazards at the Project work areas using signage, fencing, barricades, warning tape, and/or construction cones. At a minimum, signs will be posted at the approved entry points and along the perimeter of each work area. Site personnel will be informed of the hazardous substances they will be working with through Site-Wide HASP review and attendance at daily safety meetings. Project hazard communication procedures shall be referred to for guidance and requirements if hazardous chemical exposure is possible at the work site.

HAZARD COMMUNICATION STANDARD

In 2012, changes to the OSHA Hazard Communication Standard (HCS) (29 CFR 1910.1200) took effect, bringing United States rules into alignment with the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals to better protect workers from hazardous chemicals produced in countries around the world.

The harmonized standard classifies chemicals according to their health and physical hazards and establishes consistent labels and SDSs for all chemicals produced globally and imported from abroad.

GENERAL HAZARD COMMUNICATION REQUIREMENTS

The goal of Hazard Communication is to ensure that the hazards of chemicals present are evaluated, and that information concerning their hazards is transmitted to employers and employees. This information is to be transmitted by means of container labeling and other forms of warning, SDSs, and employee training.

Employee hazard communication rights include the right to personally receive information regarding hazardous substances to which the employee may be exposed; the right for the employee's physician to receive such information; and the right of protection against discharge or discrimination due to employee's exercise of rights provided by the Hazardous Substance Information and Training Act.

Chemical manufacturers/importers, distributors, employers, and employees each have a role in Hazard Communication:

- Chemical manufacturers or importers assess the hazards of chemicals that they produce or import.
- Chemical distributors must transmit required information to employers.
- Employers must provide information to employees about the hazardous chemicals to which they are exposed.
- Employees must attend training and follow all Hazard Communication directives in the workplace.

For this Project's work activities, hazard communication requirements apply to any chemical that is known to be present, stored, or used at the site. Each chemical is to be assessed in such a manner that employees who may be exposed under normal conditions of use or in a foreseeable emergency are able to react in the appropriate manner.

WRITTEN HAZARD COMMUNICATION PROGRAM

Each employer at the site must develop, implement, and maintain a written Hazard Communication Program. This written program must:

- Describe labels and other forms of warning;
- Describe the signage and materials used to clearly define the work site location;
- Provide a list of hazardous chemicals known to be present and include an SDS for each;
- Include employee information regarding hazards, work practices to avoid or minimize exposure, and, where necessary, the appropriate PPE to prevent exposure;
- Provide for employee training regarding the program and all of its elements;
- Identify the hazards of non-routine tasks and how the employees will be informed of the additional hazards; and
- Identify hazards associated with chemicals contained in unlabeled containers in adjacent work areas.

At multi-employer workplaces, the written program must identify methods to provide affected employees of other employers who may be exposed with hazard communication information (e.g., SDS provision, precautionary measures, and labeling system used).

LABELS AND OTHER FORMS OF WARNING

Chemical manufacturers, importers, distributors, and employers must use labels and other forms of hazard warnings. As of June 1, 2015, the GHS requires that all labels have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification. Supplemental information can also be provided on the label as needed. The pictograms used and their meanings are shown in the table below.

CHEMICAL HAZARD LABELING INFORMATION		
<u>Health Hazard</u>		Carcinogen; Mutagenicity; Reproductive Toxicity; Respiratory Sensitizer; Target Organ Toxicity; Aspiration Toxicity
<u>Flame:</u>		Flammables; Pyrophorics; Self-Heating; Emits Flammable Gas; Self-Reactives; Organic Peroxides
<u>Exclamation Mark:</u>		Irritant (skin and eye); Skin Sensitizer; Acute Toxicity; Narcotic Effects; Respiratory Tract Irritant; Hazardous to Ozone Layer (Non-Mandatory)
<u>Gas Cylinder:</u>		Gases Under Pressure
<u>Corrosion:</u>		Skin Corrosion/Burns; Eye Damage; Corrosive to Metals

CHEMICAL HAZARD LABELING INFORMATION		
<u>Exploding Bomb:</u>		Explosives; Self-Reactives; Organic Peroxides
<u>Flame Over Circle:</u>		Oxidizers
<u>Environment (Non-Mandatory):</u>		Aquatic Toxicity
<u>Skull and Crossbones:</u>		Acute Toxicity (fatal or toxic)

Chemical manufacturers, importers, distributors, and employers:

- Ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the identity of the hazardous chemical, appropriate hazard warnings, and name and address of the chemical manufacturer, importer, or other responsible party;
- Ensure that labels and other forms of warning do not conflict with those required by the relevant federal or global transportation laws and regulations;
- May use appropriate hazard warnings, or alternatively, words, pictures, symbols, or a combination, to provide general information regarding chemical hazards as long as other specific information is immediately available;
- May use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials instead of affixing labels to individual stationary containers, such as fuel tanks, as long as the alternative method conveys the required label information;
- Are not required to label portable containers into which chemicals are transferred from labeled containers, which are intended only for the immediate use of the employee who performs the transfer;
- Must not remove or deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately remarked with the required information; and
- Must ensure that labels and other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout the work shift (can add other languages to English on label).

SAFETY DATA SHEETS

SDSs are a key tool in providing chemical hazard warnings to employees. Chemical manufacturers and importers must develop and make available an SDS for each hazardous chemical they produce or import. Employers must have an SDS in the workplace for each hazardous chemical that they use.

As of June 1, 2015, the HCS requires new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the 16 headings below:

- Section 1: Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

- Section 2: Hazard(s) identification includes all hazards regarding the chemical; required label elements.
- Section 3: Composition/information on ingredients includes information on chemical ingredients; trade secret claims.
- Section 4: First aid measures include important symptoms/ effects, acute, delayed; required treatment.
- Section 5: Firefighting measures list suitable extinguishing techniques, equipment; chemical hazards from fire.
- Section 6: Accidental release measures list emergency procedures, protective equipment, proper methods of containment and cleanup.
- Section 7: Handling and storage lists precautions for safe handling and storage, including incompatibilities.
- Section 8: Exposure controls and personal protection list the PEL; threshold limit value (TLV); appropriate engineering controls; PPE.
- Section 9: Physical and chemical properties lists the chemical's characteristics.
- Section 10: Stability and reactivity lists chemical stability and possibility of hazardous reactions.
- Section 11: Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.
- Section 12: Ecological information
- Section 13: Disposal considerations
- Section 14: Transport information
- Section 15: Regulatory information
- Section 16: Other information; includes the date of preparation or last revision.

The chemical manufacturer or importer must provide an SDS with their initial shipment and with the first shipment after an SDS is updated. The SDS must be provided with the shipped containers or be sent to the distributor or employer prior to or at the time of shipment. The SDS must be provided to distributors or employers upon request. Where employees must travel between workplaces during a work shift, the SDSs may be kept at the primary workplace facility provided that the required information can be obtained immediately in an emergency.

HAZARD COMMUNICATION TRAINING

All employees at the work site must be provided with effective hazard communication information and training on the hazards of chemicals present at the site to which they may be exposed. Training must be provided at the time of initial assignment and whenever a new physical or health hazard is introduced into the work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals.

All employees shall receive training including:

- Label elements and SDS format;
- Review of the Hazard Communication Program requirements;
- Review of operations in work areas where hazardous chemicals are present;
- Location and availability of the written Hazard Communication Program;
- Discussion of the methods and observations to detect hazardous substances in work areas;
- Description of the physical and health hazards of hazardous substances and protective measures to be used; and

- Review of the details of Hazard Communication Program and how to obtain and use hazard warning information including SDSs and labels and other forms of warning.

APPENDIX I: ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM REQUIREMENTS

ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM

PROGRAM OVERVIEW

If an AEGCP is used in place of GFCIs for ground-fault protection, the CSO shall develop a AEGCP which shall consist of: written procedures for equipment inspections, tests, test schedule and results to assure equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained to protect employees on construction sites. AEGCP must be in compliance with GVN, OSHA, NESC and National Electrical Code requirements.

These procedures shall be made available to LSECS and affected persons. An AEGCP shall be continuously implemented and enforced at the site by one or more designated competent persons.

VISUAL INSPECTIONS

Visually inspect all cord sets, attachment caps, plugs and receptacles, and any equipment connected by cord and plug before each day's use for external damage (i.e., deformed or missing pins, damaged insulation) and for indication of possible internal damage. Ensure flexible cords are being inspected and those arriving onsite between tests are identified and tested.

REMOVING EQUIPMENT

Equipment found to be damaged or defective or which fails any of the prescribed inspections or tests shall not be used until repaired or replaced.

TESTING

Perform two required tests on all electrical equipment: a continuity test and a terminal connection test. Tests are required:

- Before first use;
- Before placing back in service following any repairs;
- Before equipment is used after any incident that can be reasonably suspected to have caused damage (e.g., when a cord set is run over); AND
- At intervals not to exceed 3 months, except that cord sets and receptacles that are fixed and not exposed to damage shall be tested at intervals not to exceed 6 months.

RECORDKEEPING

All inspections and tests shall be documented to identify all equipment that passed the inspection or test, the date of inspection or test, and the individual responsible for the inspection or test.

APPENDIX J: LIST OF DESIGNATED FIRST AID RESPONDERS

LIST OF DESIGNATED FIRST AID RESPONDERS

Project Name:	
Project Location:	

The Contractor has designated personnel to act in the capacity of first aid responders for medical emergencies on this Project as indicated below.

Name	First Aid/CPR/AED Training	BBP Training

BBP – bloodborne pathogen

CPR – cardiopulmonary resuscitation

AED – automated external defibrillator

APPENDIX K: PERSONAL PROTECTIVE EQUIPMENT DONNING PROCEDURES AND PERSONNEL DECONTAMINATION PROCESS

PERSONAL PROTECTIVE EQUIPMENT (PPE) DONNING PROCEDURE

A specific donning or “dress-up” sequence shall be developed as part of each contractor’s HASP. The sequence will be a progressive, systematic process, developed to maximize the protective qualities of the PPE ensemble.

Prior to using any PPE or respiratory protection, each worker will check the PPE for signs of wear, tears, breaks in seams, functionality of the zippers or other closures, and cleanliness. PPE that is damaged or dirty shall not be used.

In general, if PPE and respiratory protection are being used on the site, the following elements will be required:

- Impermeable disposable coverall
- Outer gloves
- Inner (surgical) gloves
- Disposable boot covers
- Duct tape
- Hard hat
- Respirator with appropriate cartridges
- OPTIONAL: contractor-supplied cotton coveralls to be laundered off site after every use.

NOTE: Respiratory protection will be assigned for the exclusive use of one worker and shall not be shared.

After checking all PPE and respiratory protection for the suggested donning sequence is:

1. Disposable coverall. Check the fit and use duct tape folded in half to make a belt to hold suit in place.
2. Boot covers. Pull suit leg over the top of boot cover and tape in place with duct tape, leaving a folded end for easy removal.
3. Respirator. Ensure that cartridges are properly seated. Perform negative and positive fit checks:
 - a. Cover both cartridges and inhale. Mask should collapse against the face.
 - b. Cover exhalation port and exhale normally. Mask should inflate and no air should escape around the facepiece seal.
4. Inner gloves.
5. Outer gloves. Pull coverall sleeve up to expose wrists. Tape coverall over the top of the glove with duct tape, and fold over the end of the tape to make a tab for easy removal. If working in decon or any area handling liquids where arms will be lifted while wet, an additional outer glove should be placed over the top of the sleeve and duct tape to prevent rinseate from running underneath duct tape.
6. Hard hat. If coverall has a hood, pull it over the hard hat to hold it in place.

PERSONNEL DECONTAMINATION

Personnel leaving the Exclusion Zone (EZ) will be required to perform decontamination (decon) prior to entering the Clean Zone (CZ) for breaks or at the end of the work shift. The sequence of the steps, materials used, and methods for decontamination will vary depending on work tasks performed,

materials handled, type of personal protective equipment (PPE) and respiratory protection used, and weather conditions.

The following sequence is a basic guideline to be used by the contractor to develop a specific personnel decon procedure to include in the Supplemental Health and Safety Plan (SHASP) for amendment to this HASP. For a general site layout, refer to Figure 9-2 Site Zones. All personnel decon will be conducted in the Contamination Reduction Zone (CRZ) in an area set up exclusively for personnel decon. Activities shall be conducted under the supervision of the contractor's decon technician, who will assist in the process to ensure completion of the appropriate prescribed steps.

SEQUENCE

1. Place tools, instrumentation, and equipment in the tool drop area inside the CRZ at the hot line.
2. Using absorbent toweling or pads, wipe gross contamination off outer gloves, hard hat, respirator, disposable coverall, and boots or boot covers in that sequence. Place soiled absorbents in waste container.
3. Wash outer gloves and boots in basins or tubs using brushes or other scrubbers provided.
4. Rinse and check outer gloves and boots or boot covers. Re-wash and re-rinse if needed.
5. Remove hard hat. Wash and rinse in basin or tub using brushes or other scrubbers provided. Place hard hat on clean absorbent pads to dry.
6. Remove ankle tape and disposable boot covers, if used.
7. Remove wrist tape and outer gloves, leaving inner gloves in place.
8. Remove disposable coverall, beginning at the neck and shoulders, rolling the suit inside out and turning the sleeves inside out. Continue rolling the suit down the legs, taking care not to recontaminate clothing or boots. Step out of the suit, which should be inside out at the ankles. Step on the clean inner side of the suit to remove feet from the legs.
9. Roll the suit into a ball, taking care not to touch clothing. Place suit in a container for disposal.
10. Remove respirator. And remove and crush cartridges. Place used cartridges in container for disposal.
11. Wash and sanitize respirator, taking care to thoroughly rinse and re-check all surfaces. Place clean respirator on clean absorbent pads to dry.
12. Remove inner gloves, inside out, one inside the other. Place gloves in a container for disposal.
13. Wash hands and face with clean water and soap.
14. Re-check clothing and boots for signs of contamination. If clothing is soiled, request assistance from decon technician to inspect clothing to determine whether it is "safe" to leave the CRZ.
15. Carry clean respirator and hard hat to showers or to CZ.
16. If showers and dressing rooms with lockers are provided, workers will shower with soap and water before leaving the site. If contractor-provided inner coveralls are used, place the used coverall in the container provided for laundering. Change into regular street clothes after showering and before leaving the CRZ.
17. Store hard hat and respirator in area designated for clean storage.
18. Leave the CRZ as soon as all steps have been completed. Do not re-enter any areas to retrieve dropped equipment or tools. If they are needed, request assistance from the decon technician.

Sampling tools and sample containers will be handled and decontaminated prior to shipment from the site to the laboratory. A decon sequence will be developed to prevent spread of contamination from samples to the CZ. Sample container and tool decon will be conducted in such a way as to prevent cross-contamination of sampled media.

APPENDIX L: DIOXIN MONITORING INFORMATION



TETRA TECH FOR USAID

Architect–Engineer Services II for Dioxin Remediation at Bien Hoa Airbase Area

FINAL SUPPLEMENTAL HEALTH & SAFETY PLAN 3 MEDICAL SURVEILLANCE PROGRAM ORIENTATION

Revision 001: December 10, 2024

DISCLAIMER:

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Architect–Engineer Services II for Dioxin Remediation at Bien Hoa Airbase Area

FINAL SUPPLEMENTAL HEALTH & SAFETY PLAN 3 MEDICAL SURVEILLANCE PROGRAM ORIENTATION

Revision 02: Submitted December 10, 2024

This report was reviewed and revised for the United States Agency for International Development by Architect-Engineer Services II for Dioxin Remediation at Biên Hòa Airbase Area (A&E II) Activity under Contract No: 7200AA21D00002 / Task Order No.: 72044023F00002.

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USAID
FROM THE AMERICAN PEOPLE

DIOXIN REMEDIATION AT BIEN HOA
AIRBASE AREA PROJECT

FINAL SUPPLEMENTAL HEALTH & SAFETY PLAN 3 MEDICAL SURVEILLANCE PROGRAM ORIENTATION

APRIL 28, 2020

This publication was produced for review by the United States Agency for International Development.

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DIOXIN REMEDIATION AT BIEN HOA
AIRBASE AREA PROJECT

FINAL SUPPLEMENTAL HEALTH & SAFETY
PLAN 3 MEDICAL SURVEILLANCE
PROGRAM ORIENTATION

US AGENCY FOR INTERNATIONAL DEVELOPMENT
CONTRACT NUMBER: AID-OAA-I-15-00053
ORDER NUMBER: 72044019F00001
APRIL 28, 2020

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RECORD OF REVISIONS

Revision	Date	Pages	Revisions	Approval
000	April 28, 2020	All	Initial development/submittal	USAID CO/COR
001	December 10, 2024	Cover/Section 4	Updated Medical Surveillance Program Section 4.1	

ACRONYMS AND ABBREVIATIONS

%	percent
A&E	Architecture and Engineering
CFR	Code of Federal Regulations
CIT	Certified Instructional Trainer
CO	Contracting Officer
COP	Chief of Party
COR	Contracting Officer Representative
CSO	Contractor Safety Officer
DCOP	Deputy Chief of Party
EA	Environmental Assessment
EM 385-I-I	USACE Safety and Health Requirements Manual
GVN	Government of Vietnam
HASP	Health and Safety Plan
LSECS	Lead Safety and Environmental Compliance Specialist
PCDD/F	polychlorobenzodioxins and polychlorodibenzofurans
PEL	Permissible Exposure Limit (OSHA)
PPE	Personal Protective Equipment
ppt	Parts per trillion
SHASP	Supplemental HASP
2,3,7,8-TCDD	2,3,7,8-Tetrachlorodibenzodioxin
TCDD	2,3,7,8-Tetrachlorodibenzodioxin
TEQ	Toxicity Equivalent
U.S.	United States
USAID	U.S. Agency for International Development
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency

I SIGNATURE SHEET

**This Signature Sheet was
executed under the previous
A&E contractor.**

Dioxin Remediation at Bien Hoa Airbase Area Project

SUPPLEMENTAL HEALTH & SAFETY PLAN 3 SIGNATURE PAGE

United States Agency for International Development
Contract Number: AID--OAA-I-15-00053
Order Number: 72044019F00001

March 2020

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This Health & Safety Plan (HASP) has been prepared to meet the requirements of Government of Vietnam (GVN) Occupational Safety and Health standards, United States Occupational Safety and Health Administration (OSHA) standards found in Title 29 Code of Federal Regulations (CFR), Parts 1910 and 1926; and the United States (U.S.) Army Corps of Engineers (USACE) "Safety and Health Requirements Manual" (January 2024 edition) (EM 385-1-1).

2 BACKGROUND INFORMATION

2.1 PROJECT INFORMATION AND BACKGROUND

Client:	U.S. Agency for International Development (USAID)
Project Name:	Dioxin Remediation at Bien Hoa Airbase Area Project (Project)
A&E Bien Hoa Contractor:	Trigon Associates, Inc.
Contract Number:	AID—OOAA-I-15-00053
Order Number:	72044019F00001

This Supplemental Health and Safety Plan (SHASP) has been prepared for USAID under the Task Order 72044019F00001, Contract Number AID—OOAA-I-15-00053 by the Architecture & Engineering (A&E) Bien Hoa Contractor. The SHASP was reviewed and updated by “Architect-Engineer Services II for Dioxin Remediation at Bien Hoa Airbase Area (A&E II) Activity” under Contract No. 7200AA21D00002, Task Order (TO) No: 72044023F00002 in November 2024. This SHASP complies with the Project health and safety procedures established in the Site-Wide HASP. This SHASP presents additional details of the Bien Hoa Medical Surveillance Program and includes training materials for the Medical Surveillance Program Orientation. The purpose of this document is to provide guidance and reference for the Project Contractors in the development of their own contract-specific medical surveillance programs and describe in detail the Bien Hoa Medical Surveillance Program. This document is not meant to replace the Site-Wide HASP but is an addition to the Site-Wide HASP as an annex. The Site-Wide HASP and this SHASP are meant to be used in conjunction.

The Project location is the Bien Hoa Airbase Area which includes the Bien Hoa Airbase and associated off-Airbase locations. The Bien Hoa Airbase is an active Air Defence Air Force Command airbase located in Bien Hoa City, Dong Nai Province, approximately 30 kilometers northeast of Ho Chi Minh City. The Bien Hoa Airbase property is located within the Tan Phong Ward and is adjacent to the Trung Dung, Quang Vinh, and Buu Long Wards, which are densely populated residential neighborhoods.

The Bien Hoa Airbase Area is one of three major dioxin contamination hotspots in Vietnam identified through studies completed in the 1990s. Bien Hoa, along with Phu Cat and Danang Airport, were used by the United States (U.S.) military for the import, storage, and loading of Agent Orange between 1961 and 1971. In 2016, USAID, in close collaboration with the GVN, completed the "Environmental Assessment of Dioxin Contamination at Bien Hoa Airbase". The overall objective of the Environmental Assessment (EA) was to inform potential future actions at the Bien Hoa Airbase Area to address dioxin-related contamination. The EA serves as the primary resource documenting characterization of dioxin contamination on and around the Bien Hoa Airbase Area (GVN/USAID 2016).

2.2 CONTAMINANT OF CONCERN

Dioxins are a group of toxic chemical compounds with similar chemical structures that are persistent organic pollutants – meaning dioxins are toxic over many decades and do not break down easily. The term “dioxin” or PCDD/F refers to a group of polychlorodibenzodioxins (PCDDs) and polychlorodibenzofurans (PCDFs). PCDDs are comprised of 75 “congeners,” and PCDFs are comprised of 135 congeners. A “congener” is a variant or configuration of a common chemical

structure. PCDDs and PCDFs are not commercial chemical products but are trace level byproducts of combustion and several industrial chemical processes (including paper and pulp bleaching and production of historical herbicides).

Seventeen of the dioxin and furan congeners are considered to be toxic and those are the ones with chlorines in the 2, 3, 7, or 8 positions of their structure with 2,3,7,8-TCDD (TCDD) considered to be the most toxic. Because of this, the concentrations of dioxins/furans are often reported in terms of TCDD toxicity equivalents (TEQ), which are calculated using toxicity equivalence factors, and are measures of how toxic each congener is relative to TCDD.

The primary source of TCDD at the Bien Hoa Airbase Area is dioxin-contaminated soils and sediments from past handling, storage, and disposal of Agent Orange and other herbicide compounds. The primary dioxin congener associated with Agent Orange is TCDD. TCDD was not intentionally added to Agent Orange but was a byproduct produced during manufacturing. TCDD causes health effects in humans including chloracne, birth defects, weakened immune systems, kidney defects, increased miscarriage rates, altered hormone levels, reduced sperm production, and cancer. In humans, dioxin is stored in body fat, blood, and breast milk. On average, serum dioxin levels will decrease by half after seven years with no additional exposure.

3 POTENTIAL EXPOSURE

Dioxin is present at the Bien Hoa Airbase Area in soil, sediment, and surface water. Although not water soluble or volatile, dioxin will attach to soil which becomes airborne as respirable dust, and in surface water as suspended solids. Dioxin, whether from Agent Orange or other sources, is also found in food sources; primarily fish, seafood, meat, and dairy products. The primary exposure potential is anticipated to be from inhalation or direct contact with contaminated soil, sediment or groundwater. The hazards are minimized by limiting dust-generating activities and by protecting against skin contact with contaminated soil, sediment and water.

3.1 EXPOSURE ROUTES

There are three major site exposure routes for TCDD at the Bien Hoa Airbase Area: 1) dermal (skin) contact, 2) inhalation, and 3) ingestion. The three exposure routes have various exposure pathways. In addition, there are two main off-site exposure pathways of 1) ingestion of contaminated food and 2) inhalation of background sources of combustion. These exposure routes and pathways are discussed below. In addition, the *(Revised) Draft Technical Memorandum Site Conceptual Model and Data Gap Analysis* presents the site conceptual model for the Bien Hoa Airbase Area and provides a detailed description of exposure routes (USAID 2020).

3.1.1 DERMAL (SKIN) CONTACT

Dermal contact can result in dermal absorption which is the transport of a chemical from the skin or eyes into the body. At the Bien Hoa Airbase Area, dermal exposure to dioxin contaminated materials can occur via direct skin contact with contaminated soils, sediments, suspended sediments in surface water, and groundwater or exposure through the eyes. Dermal exposure to dioxin contaminated media is the most likely exposure pathway at the Bien Hoa Airbase Area due to the high frequency

that contaminated materials will be handled during excavation, treatment, and environmental sampling. However, the hazards are limited by wearing appropriate personal protective equipment (PPE) that protects against skin contact with contaminated soil, sediment, and water and eye exposure and utilizing other mitigation measures. The minimum PPE requirements are detailed in *Section 9.10 PPE Requirement Program* of the Site-Wide HASP. Mitigation measure will vary based upon the activity and more detail is provided in *Section 9 Plans and Programs Required by the Safety Manual* of the Site-Wide HASP.

3.1.2 INHALATION

Inhalation exposure occurs through breathing contaminated air, respirable dust, fumes, mists, vapors, aerosols, or particulates. Inhalation is generally the most serious route of exposure because the inhaled contaminant can be deposited in the lungs and/or directly absorbed into the bloodstream. Although not volatile, dioxin will attach to soil which becomes airborne as respirable dust. At the Bien Hoa Airbase, air contaminants are of concern during dust generating activities including excavation, earthmoving, and transport of contaminated soil as well as during treatment (thermal treatment facility emissions). The hazards can be minimized by wearing appropriate PPE during dust generating activities and treatment activities, implementing engineering controls to reduce dust generation, monitoring dust and air concentrations, and filtering the thermal treatment facility emissions.

3.1.3 INGESTION

Ingestion exposure occurs through the consumption of contaminated food, water, other liquids, soil and sediment or mouthing of contaminated objects. Ingestion is the least likely on-site exposure route for Project workers at the Bien Hoa Airbase Area. Accidental ingestion of contaminated soil, sediment, groundwater, or surface water should not occur on the site if appropriate PPE is worn during site activities. In addition, the use of lakes and ponds on the Airbase for aquaculture purposes was banned in 2010 (GVN/USAID 2016). However, there is the potential for respirable dust, soil, sediment, and surface water to be ingested if appropriate PPE is not worn during site activities. While ingestion is not a major exposure pathway on the Bien Hoa Airbase, the ingestion of contaminated food off the Airbase is the most significant exposure pathway. Off-site exposure routes are discussed below.

3.1.4 OFF-SITE EXPOSURE ROUTES

The two major offsite exposure pathways are the ingestion of contaminated food sources and the inhalation of background sources of combustion. Dioxin is a persistent organic pollutant that does not break down easily and is absorbed and stored in fat and tissue. The lipophilic properties of dioxin cause bioaccumulation in the food chain and exposure to those who consume contaminated food sources. More than 90 percent (%) of dioxin exposure in humans worldwide is through food. Various studies of food sources in the Bien Hoa Area have confirmed elevated levels of dioxin in food, especially high fat foods like fish, pork, beef, chicken, and chicken eggs (Hatfield and VRTC 2009, Hatfield and Office 33 2011; GVN/USAID 2016; Nguyen et al. 2018). In addition, dioxins are formed as a result of background sources of combustion like burning trash containing plastics or chemicals, cigarette smoke, and vehicle exhaust which can be inhaled as airborne particulate.

3.2 SYMPTOMS OF EXPOSURE

Symptoms of dioxin exposure vary based on the exposure route and concentration, duration, and frequency of exposure. Short-term dermal (direct eye or skin contact) exposure of high concentrations of dioxin can cause various eye and skin irritations including the following listed in order of severity and exposure level:

- Skin and eye irritation,
- Allergic dermatitis (red, itchy rash),
- Chloracne (severe skin disease with lesions that resemble acne and blackheads and occur mainly on the face and upper body), and
- Porphyria (skin itching and tenderness, swelling, nervous system disorders).

Short-term exposure of high concentrations of dioxin usually via ingestion may also cause the following:

- Liver damage that can be detected through changes in blood and urine, and
- Gastrointestinal disturbances.

Long-term exposure of dioxins independent of the exposure route can cause impairment to the immune system, nervous system, endocrine system and reproductive function. Studies have also shown that dioxin exposure is linked to several types of cancer.

4 MEDICAL SURVEILLANCE PROGRAM

A medical surveillance program will be required for all personnel working at the site while activities are conducted that could lead to dioxin exposure. The medical surveillance programs will include blood serum dioxin monitoring, general medical surveillance monitoring for other chemicals in accordance with 29 CFR 1910.120, and a medical surveillance orientation program. Site activities with the potential for dioxin exposure include intrusive activities as well as activities related to remedial treatment operations. Project Contractors are responsible for developing and implementing a contract-specific medical surveillance program for personnel who will be involved with site activities with the potential for dioxin exposure. This will include the requirements detailed in Section 9.18.1 and 9.18.2 of the Site-Wide HASP and the requirements detailed in this SHASP.

The purpose of the medical surveillance program is to monitor the health of employees over the course of the Project to ensure protective measures at the site are appropriate and are being utilized properly by the employees. Protective measures include the use of appropriate PPE and site control measures. The goal of the Project is to protect workers and limit or prevent their exposure to hazardous substances, such as TCDD, that could cause adverse health effect.

4.1 ACTIVITY HAZARDS AND LEVELS OF PPE

As described in *Section 4.4 Pre-Task Safety and Health Analysis* of the Site-Wide HASP, the first step in safety and health planning for a new work activity is defining the types of work and associated risks. Activity Hazard Analyses (AHAs) are tools to identify and define the work activities and associated tasks, identify

the sequence of work and specific anticipated hazards, and establish necessary control measures to eliminated or reduce each hazard to an acceptable risk level. They also establish the minimum PPE required for protection from hazardous materials.

Hazardous material PPE is divided into four categories based on the degree of protection afforded. The four levels of protection (A, B, C, and D) are based on the widely used USEPA Levels, which are described in Appendix B of the Hazwoper standard (29 CFR 1910.120 and 8 CCR 5192). Level A provides the highest level of protection, and Level D the least. Combinations of PPE other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

4.2 LEVELS OF MONITORING

Medical monitoring will be performed at three different levels of effort and intensity based on a workers' site activities and the frequency and duration of those activities. The three levels of medical monitoring are described below.

Level 1 – Workers who will wear **Level C PPE or more stringent** while conducting site activities under any of the following conditions:

- a. When exposure is at or above the permissible exposure limit (PEL)
- b. When a respirator is worn;
- c. When a worker performs site activities with a risk of exposure to a chemical without a PEL (e.g., dioxin)
- d. When employee is injured, ill, or develops symptoms of exposure; or
- e. When employee is a member of a hazardous materials response team.

Level 2 – Workers who will wear **Level D or no hazardous material PPE but will work at the site for more than 90 days** (8 hours per day) per year while intrusive and/or remedial treatment operation activities are being conducted including:

- a. Office personnel working on site;
- b. Occasional site workers such as subcontractors or vendors who do not enter any disturbed areas or exclusion zones; or
- c. Personnel as designated by USAID or GVN.

Level 3 – Workers who will wear **Level B or more stringent PPE** while conducting site activities with the highest risk for dioxin exposure potential.

4.3 MEDICAL SURVEILLANCE PROGRAM REQUIREMENTS

4.3.1 EXAMINATION REQUIREMENTS AND FREQUENCY

The minimum required medical exams and frequencies are included in *Section 9.18.1 Medical Surveillance Program* of the Site-Wide HASP. **Tables 4-1** through **4-3** list the typical contents and frequency of periodic exams for the different medical surveillance levels. Tables 4-1 and 4-3 include additional exam elements at the bottom of the tables that may be included based on the Health and

Safety professional's or attending physician/nurse practitioner's recommendation due to the employee's work history.

The following schedule of examinations applies to all three levels of the medical surveillance and will include periodic sampling based on the employee's medical surveillance level:

- Baseline – prior to assignment at the site;
- Annual (six months for Level 3); and
- At termination of employment or reassignment to a job offsite.

In addition, employees may receive supplemental medical monitoring examinations:

- As soon as possible if employee develops signs or symptoms of exposure;
- After any worksite injury;
- After an exposure incident;
- If serum dioxin levels exceed allowable limit: or
- At more frequent times if determined necessary by the examining occupational health physician.

TABLE 4-1. LEVEL I MEDICAL SURVEILLANCE EXAMINATIONS AND FREQUENCY	
Examination	Frequency
General Medical Questionnaire – Medical and Work (Exposure) History	▪ At start of assignment/employment ▪ Annually ▪ At termination of employment or reassignment to a job offsite Work or Exposure History will be collected: ▪ Post exposure ▪ Post injury ▪ If symptoms of exposure develop ▪ If occupational health physician recommends
Physical Exam – including Visual Acuity and Audiometry	▪ At start of assignment/employment ▪ Annually
Complete Blood Count (CBC)	▪ At start of assignment/employment ▪ Annually
Sequential Multi-Channel Analysis (Comprehensive Metabolic Panel)	▪ At start of assignment/employment ▪ Annually
Cardiopulmonary Function Testing	▪ At start of assignment/employment ▪ Annually
Blood Serum Dioxin Analysis	▪ Baseline - at start of assignment/employment ▪ Annually ▪ At termination of employment or reassignment to a job offsite ▪ Post exposure ▪ Post injury ▪ If symptoms of exposure develop ▪ If occupational health physician recommends
Health and Lifestyle Questionnaire – Blood Serum Dioxin Assessment	▪ Baseline - at start of assignment/employment
Additional Exam Elements – if requested by H&S Management or Occupational Health Physician	
▪ Respirator Fit Test ▪ Blood Lead/ZPP ▪ EKG	▪ RBC Cholinesterase ▪ Urine Heavy Metal ▪ Tetanus/Diphtheria Vaccine ▪ Serum Cholinesterase ▪ Methemoglobin ▪ Cardia Stress Test

TABLE 4-2. LEVEL 2 MEDICAL SURVEILLANCE EXAMINATIONS AND FREQUENCY

Examination	Frequency
General Medical Questionnaire – Medical and Work (Exposure) History	- At start of assignment/employment - Annually - At termination of employment or reassignment to a job offsite Work or Exposure History will be collected: - Post exposure - Post injury - If symptoms of exposure develop - If occupational health physician recommends
Blood Serum Dioxin Analysis	- Baseline - at start of assignment/employment - Annually - At termination of employment or reassignment to a job offsite - Post exposure - Post injury - If symptoms of exposure develop - If occupational health physician recommends
Health and Lifestyle Questionnaire – Blood Serum Dioxin Assessment	Baseline - at start of assignment/employment

TABLE 4-3. LEVEL 3 MEDICAL SURVEILLANCE EXAMINATIONS AND FREQUENCY

Examination	Frequency
General Medical Questionnaire – Medical and Work (Exposure) History	- At start of assignment/employment - Every six months - At termination of employment or reassignment to a job offsite Work or Exposure History will be collected: - Post exposure - Post injury - If symptoms of exposure develop - If occupational health physician recommends
Physical Exam – including Visual Acuity and Audiometry	- At start of assignment/employment - Annually
Complete Blood Count (CBC)	- At start of assignment/employment - Annually
Sequential Multi-Channel Analysis (Comprehensive Metabolic Panel)	- At start of assignment/employment - Annually
Cardiopulmonary Function Testing	- At start of assignment/employment - Annually
Blood Serum Dioxin Analysis	- Baseline - at start of assignment/employment - Every six months - At termination of employment or reassignment to a job offsite - Post exposure - Post injury - If symptoms of exposure develop - If occupational health physician recommends
Health and Lifestyle Questionnaire – Blood Serum Dioxin Assessment	Baseline - at start of assignment/employment
Additional Exam Elements – if requested by H&S Management or Occupational Health Physician	
- Respirator Fit Test - Blood Lead/ZPP - EKG	- RBC Cholinesterase - Urine Heavy Metal - Tetanus/Diphtheria Vaccine - Serum Cholinesterase - Methemoglobin - Cardia Stress Test

4.3.2 MEDICAL SURVEILLANCE PROGRAM ORIENTATION TRAINING

Before participation in the medical surveillance program, medical surveillance program orientation training must be provided to all participants including Level 1, Level 2, and Level 3 workers. Medical surveillance orientation training must also be provided to occasional site workers that will be on site during intrusive and/or remedial treatment operation activities for more than 30 days but not more than 90 days (8 hours per day) per year and will remain outside of exclusion zones. Visitors to the site will not be required to receive the medical surveillance program orientation training.

Project Contractors shall include a description of their medical surveillance program orientation training in their contract-specific medical surveillance programs. The A&E Bien Hoa Contractor's medical surveillance program orientation training slide deck with narration is included in **Appendix A** as an example and reference for Project Contractors.

4.4 BLOOD SERUM DIOXIN MONITORING

At the start of employment, all three levels of the medical surveillance program will have baseline blood serum dioxin samples collected. The baseline blood serum results are extremely important as they set each employee's baseline blood serum dioxin concentration and establish a control level that has not been affected by site activities. During employment, periodic blood serum dioxin samples will be collected at varying frequencies based on an employee's medical surveillance level designation. The purpose of the periodic blood serum dioxin samples is to monitor the health of employees over the course of the Project to ensure protective measures including PPE and site controls are appropriate and being utilized properly by the employees. Exit samples will be collected from all three levels of the medical surveillance program upon termination of employment or reassignment off site.

Each Project Contractor shall develop their own contract-specific medical surveillance program that includes blood serum dioxin monitoring. The minimum requirements for blood serum dioxin monitoring are detailed in Sections 9.18.1 and 9.18.2 of the Site-Wide HASP and discussed in Section 4.2.1 of this SHASP. Project Contractors can choose to collect more frequent blood serum dioxin samples based on employees' duration of work, the possible exposure potential of the task being performed, and the concentration of dioxin at the work site. Blood serum dioxin samples should also be collected after potential exposure incidents. Each Project Contractor's Health and Safety professional or occupational health physician will determine what level of exposure would trigger a post-exposure sample.

A references list for additional background information related to dioxins in blood and blood serum analysis is included in **Appendix B**. Additional background information on dioxins is also included in the medical surveillance program orientation training slide deck and narration (**Appendix A**).

4.4.1 ASSURANCE OF CONFIDENTIALITY

No identifying employee medical records will be retained on the site. Employees will be assigned a unique identification number for tracking their results. This number shall be provided to the attending occupational health physician, the analytical laboratory, Contractor Safety Officer (CSO), and the A&E Bien Hoa Contractor Lead Safety and Environmental Compliance Specialist (LSECS). The

associated names will be retained only by the attending occupational health physician and the employer. The anonymous dioxin blood serum results must be reported to the CSO and A&E Bien Hoa Contractor LSECS on a monthly basis in electronic and tabulated format. The dioxin blood serum results will be reported in the format included in **Appendix C**. The anonymous dioxin blood serum results will be shared with USAID. USAID will compile and maintain the anonymous dioxin blood serum results for the duration of the Project.

The information detailed above providing assurance of confidentiality will be included in a Consent Form for Blood Sampling Analysis that participating parties of the blood serum dioxin monitoring will sign and date prior to having their blood drawn. The consent forms will be provided in employee's native language. An example of a consent form is included in **Appendix D**.

4.4.2 BLOOD TEST RESULTS

4.4.2.1 COMMUNICATION

Blood serum dioxin results are private medical information. The occupational health physician will provide the blood serum results in a letter directly to participants of the blood serum dioxin monitoring via their personal email addresses or via US Mail or international mail carrier to participants personal residences. The delivery method will be based on participants preferences. Although company emails are not considered a private platform, if a participant approves the use of company email as the method of conveyance of results, the occupational health physician will convey the results in that manner. An example letter presenting the results of the blood serum dioxin testing to the employee is included in **Appendix E**. A medical professional will be made available to the employee to discuss their results at any time during blood serum dioxin monitoring.

The occupational health physician will provide the Project Contractor's Health and Safety professional a clearance form for each participant of the blood monitoring program that they were under the Project action limit (30 pg/g TEQ lipid) and can begin or continue work in contaminated areas, such as exclusion zones and decontamination areas. These clearance forms should be sent to the A&E Bien Hoa Contractor LSECS to be shared with USAID.

If a participant of the blood serum dioxin monitoring exceeds the Project action limit or if their blood serum dioxin level increases by 30% or more, the occupational health physician will notify the individual participant with a detailed letter discussing their results and outlining the required additional testing. Small changes up to $\pm 20\%$ can occur without indicating an issue. The Project Contract Health and Safety professional will be notified that the participant either exceeded the Project action limit or had a marked increase in blood serum dioxin levels and required additional testing. These notification letters should be sent to the A&E Bien Hoa Contractor LSECS to be shared with USAID.

4.4.2.2 ACTIONS

If baseline blood serum dioxin results are above the Project action limit, the occupational health physician will be consulted for recommend further action, which could include:

- Identification of which dioxin congener is the source of the elevated levels by comparing the congener-specific concentrations to the 95th percentiles (if 2,3,7,8-TCDD is substantially elevated compared to other congeners, this may indicate a site-related exposure),
- Further blood testing and analysis to assess general health condition,
 - Determination of symptoms,
 - Liver and kidney function screening, or
 - Dermal assessment
- Employee consultation with the examining occupational health physician to understand the sampling results and related health risks,
- Sampling and analysis to confirm serum dioxin level,
- Additional or more frequent health monitoring over an extended period,
- Recommendation that the employee be restricted from performing tasks with potential dioxin exposure, or
- Recommendation that the employee does not begin work on the site.

If interim (including post-exposure incident) or exit blood serum dioxin sampling results exceed the Project action limit or indicate an increase of 30% or more, the occupational health physician will be consulted for recommended further action, which could include:

- Identification of which dioxin congener is the source of the elevated levels by comparing the congener-specific concentrations to the 95th percentiles,
- Further blood testing and analysis to assess general health condition,
 - Determination of symptoms,
 - Liver and kidney function screening, or
 - Dermal assessment
- Employee consultation with the attending occupational health physician to understand the sampling results and related health risks,
- Sampling and analysis to confirm serum dioxin level,
- Additional or more frequent health monitoring over an extended period,
- Recommendation that the employee be assigned to another task,
- Recommendation that the employee be restricted from performing tasks with potential dioxin exposure, or
- Recommendation that the employee stop working on the site.

In addition, the employee's work habits will be assessed to ensure:

- PPE was used properly and consistently throughout Project assignment,
- Decontamination was performed before departure from the site,

- Worker did not enter the Project site unprotected in areas where PPE was required, and
- Other work habits did not contribute to the elevation of serum dioxin level.

If the worker is deemed fit to continue working at the site, retraining will be given in areas where compliance was weak. The worker will also be closely observed for the first three (3) days on site after retraining. If the worker is not deemed fit to continue with current tasks, an alternate assignment may be considered.

5 REFERENCES

GVN/USAID (CDM International, Inc. and Hatfield Consultants). 2016. Environmental Assessment of Dioxin Contamination at Bien Hoa Airbase. May 3, 2016.

Hatfield and Office 33. 2011. Environmental and Human Health Assessment of Dioxin Contamination at Bien Hoa Airbase, Vietnam.

Hatfield and VRTC. 2009. Evaluation of Contamination at the Agent Orange Dioxin Hot Spots in Bien Hoa, Phu Cat and Vicinity, Vietnam.

Nguyen MH et al. 2018. Site-specific bioaccumulation of polychlorinated dibenzo-pdioxins and polychlorinated dibenzofurans (PCDD/PCDFs) in mothers and their infants living in vicinity of Bien Hoa Airbase, Southern Vietnam.

USAID/Trigon. 2020. Architect-Engineer Services for Dioxin Remediation at Bien Hoa Airbase Area Project (Revised) Draft Technical Memorandum Site Conceptual Model and Data Gap Analysis.

**APPENDIX A. MEDICAL SURVEILLANCE
PROGRAM ORIENTATION
TRAINING MATERIAL**

MEDICAL SURVEILLANCE PROGRAM ORIENTATION



PURPOSE OF THIS PRESENTATION

- Overview of the Medical Surveillance Program including...
 - Frequently Asked Questions
 - Health Risk Communication
 - Dioxin Hazard Communication
 - Potential Exposure
 - Medical Surveillance Program



OUTLINE

- **Frequently Asked Questions**
- Health Risk Communication
- Dioxin Hazard Communication
- Potential Exposure
- Medical Surveillance Program
- Frequently Asked Questions – Answers



FREQUENTLY ASKED QUESTIONS

- What are dioxins?
- Why are dioxin concentrations reported as TEQ concentrations?
- Is the level of harm the same for different dioxin congeners?
- Where do 'background' exposures of dioxins come from?
- What are some of the non-site related ways that I can be exposed to dioxins?
- What is the lifespan of dioxin?



FREQUENTLY ASKED QUESTIONS (Continued)

- Why is dioxin dangerous?
- What are the health effects?
- Are some groups more sensitive to the effects of dioxin exposure than others?
- Why is “serum dioxin testing” used to assess the amount of dioxins accumulated in the body?
- How are the dioxin blood serum results interpreted?
- Are there levels of dioxins which are considered as ‘acceptable’ or ‘problematic’?



OUTLINE

- Frequently Asked Questions
- **Health Risk Communication**
- Dioxin Hazard Communication
- Potential Exposure
- Medical Surveillance Program
- Frequently Asked Questions – Answers



HEALTH RISK COMMUNICATION

- Introduction to Risk
- Introduction to Health Risk Communication
- Health Risk
- How a Health Risk is Determined
- Exposure
- Toxicity

HEALTH RISK COMMUNICATION

Introduction to Risk

- Risk is an intrinsic part of life; any activity has some associated risk
- For a risk to exist there needs to be some kind of hazard or danger (e.g., chemical, explosive, mechanical)
- Risk (likelihood) of harm (effect or outcome)

HAZARD

Anything that
can cause harm (e.g., *dioxin
contamination, electricity,
ladders, etc.*)

RISK

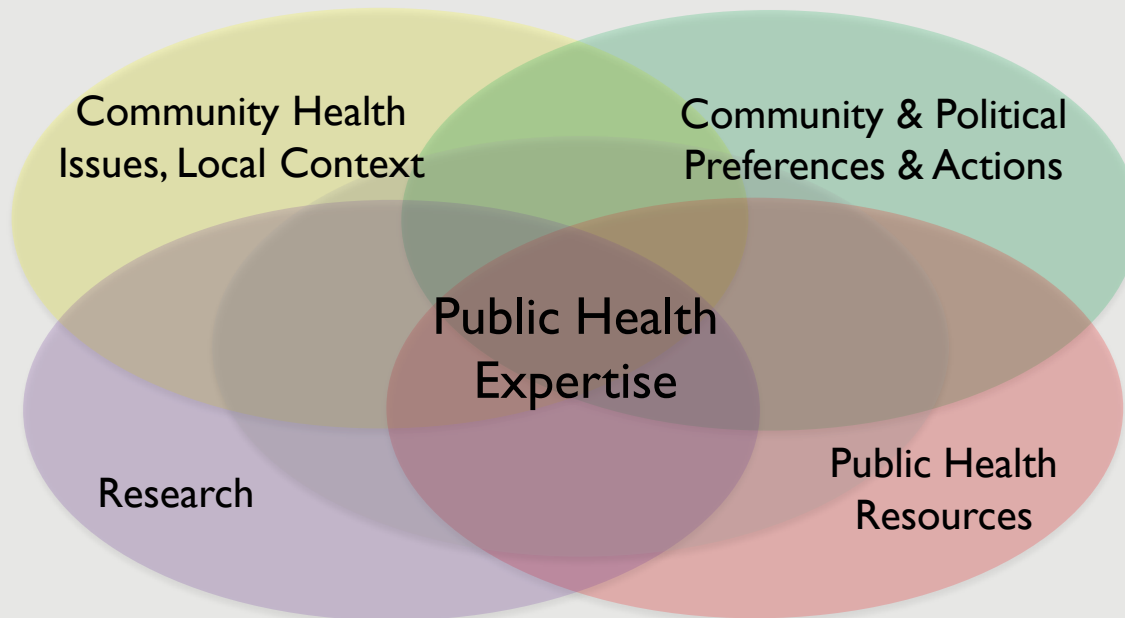
How great
the chance
that someone
will be
harmed by
the hazard



HEALTH RISK COMMUNICATION

Introduction to Health Risk Communication

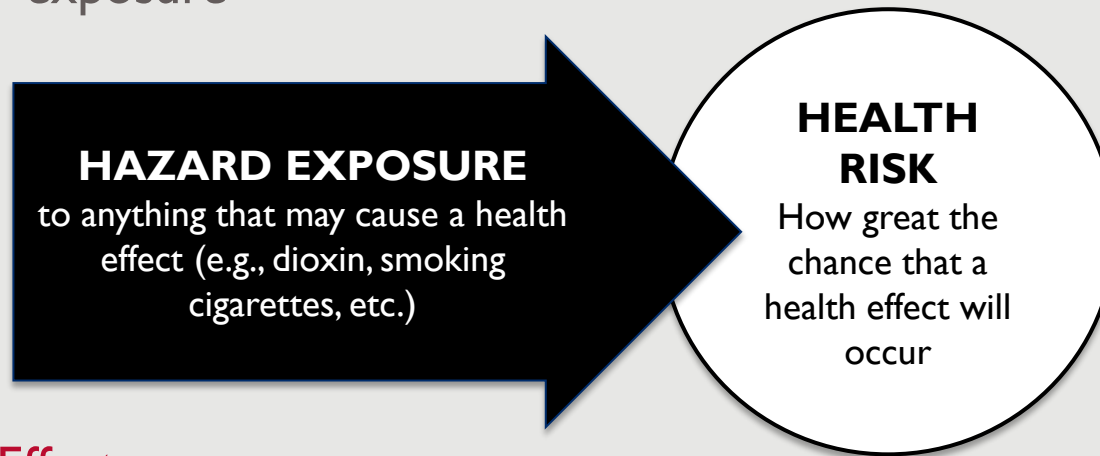
- The exchange of information, advice, and opinions between experts and people facing risks to their health
- Purpose = enable people at risk to make informed decisions to protect themselves and loved ones



HEALTH RISK COMMUNICATION

Health Risk

- Represents the probably (or possibility) that a health effect can occur after exposure



Health Effect

- These can vary in severity, duration, and reversibility (among others)
- For a disease, you may have heard the term health outcome

HEALTH RISK COMMUNICATION

How a Health Risk is Determined

- Experts study an issue and determine there is a link between a hazard and a health effect
- Hazard = smoking

Linked
to

Health Effect = lung cancer





HEALTH RISK COMMUNICATION

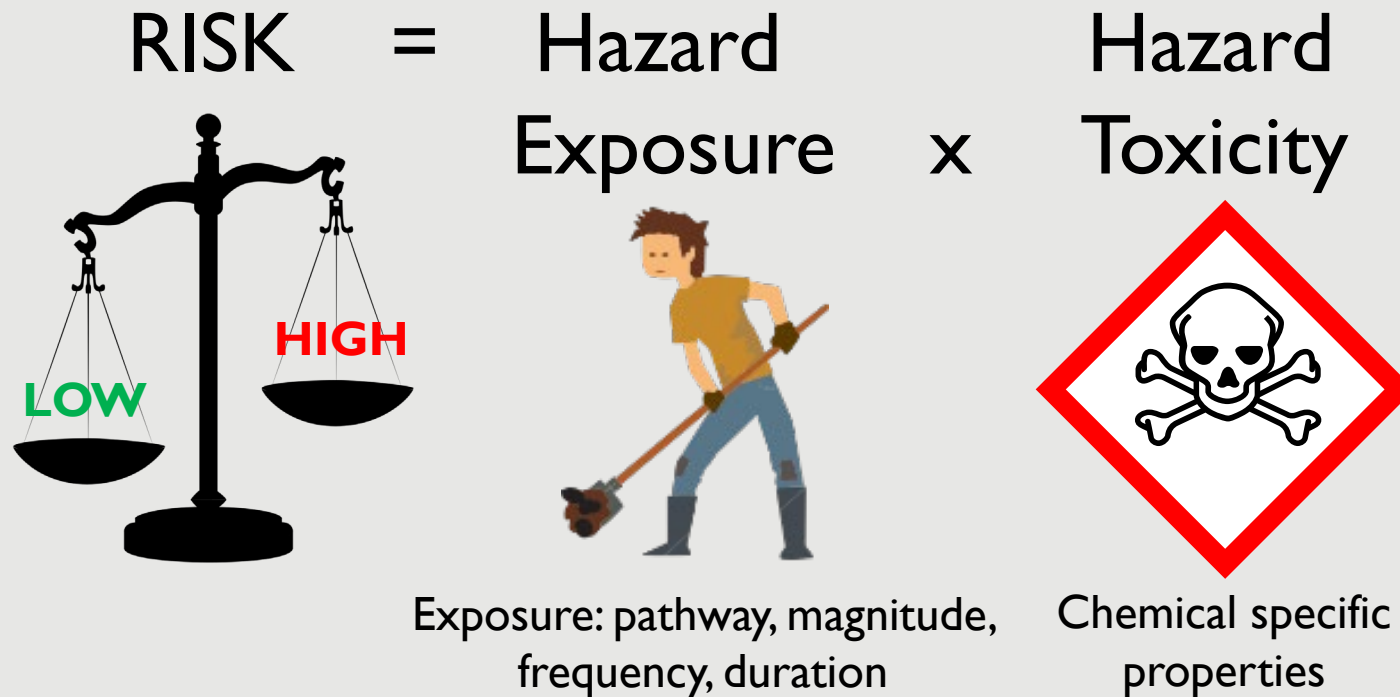
How a Health Risk is Determined

- Link can be well proven or suggestive
- Challenges:
 - Effects occur a long time after exposure (e.g., asbestos exposure and mesothelioma)
 - Other diseases or hazards have the same health effects
 - Not everyone will have the same health effect since it is influenced by nutrition, gender, age, pregnancy, preexisting conditions, etc.
 - Exposures are not well documented and/or not many cases to study
 - Easier to establish a link for a population rather than an individual

HEALTH RISK COMMUNICATION

How a Health Risk is Determined

- From: 1) Hazard Exposure and 2) Hazard Toxicity



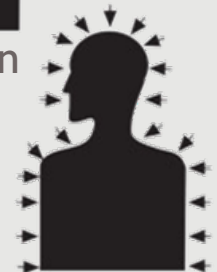
HEALTH RISK COMMUNICATION

Hazard Exposure

- Four topics to consider for exposure: 1) Pathway, 2) Magnitude, 3) Frequency, and 4) Duration

1) Pathway: how a person encounters a hazard

- Inhalation = breathing contaminated air
- Ingestion = consumption of contaminated food, water, other liquids, soils, etc.
- Direct Contact = skin contact with contaminated media, absorption through the eyes



HEALTH RISK COMMUNICATION

Hazard Exposure

- 2) **Magnitude: amount or concentration of hazard present** (e.g., high concentration of dioxin in soil)
 - Magnitude is related to **Frequency** and **Duration**
- 3) **Frequency: how often hazard exposure occurs**
 - Normally expressed in days per year
- 4) **Duration: how long hazard exposure lasts**
 - Normally expressed in hours per day



HEALTH RISK COMMUNICATION

Hazard Toxicity

- What are the adverse biological effects caused by a chemical, physical, or biological agent (hazard)?
- How poisonous or toxic is it?
- **How will it cause me harm?**





HEALTH RISK COMMUNICATION

Hazard Toxicity

- Need to determine the types of toxic effects of a hazard (e.g., damage to the liver, kidneys, lungs, reproductive system?)
- Obtained primarily through two types of studies
 - 1) **Epidemiologic Studies:** studies in groups of people who were accidentally exposed to chemicals
 - 2) **Animal Studies:** controlled laboratory experiments involving various animal species
- Toxicity can also be determined through a **Dose-Response Assessment** – looks at relationship between documented doses that have and have not caused health effects



OUTLINE

- Frequently Asked Question
- Health Risk Communication
- **Dioxin Hazard Communication**
- Potential Exposure
- Medical Surveillance Program
- Frequently Asked Questions – Answers



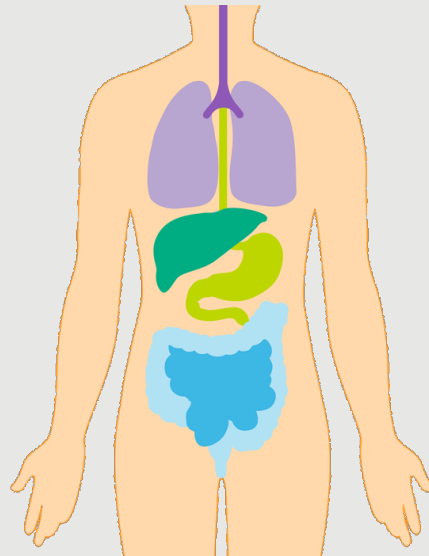
DIOXIN HAZARD COMMUNICATION

- Project Objective
- Dioxin 101
 - What is Dioxin
 - Sources
 - Properties
 - Major Site Exposure Routes
 - Off-site Exposure Routes
- Dioxin Health Risks

DIOXIN HAZARD COMMUNICATION

Project Objective

- Project Safety Goal = **Zero Injury!**
- **Prevent/limit exposure** of dioxin to levels **below** those that are likely to have health effects



DIOXIN HAZARD COMMUNICATION

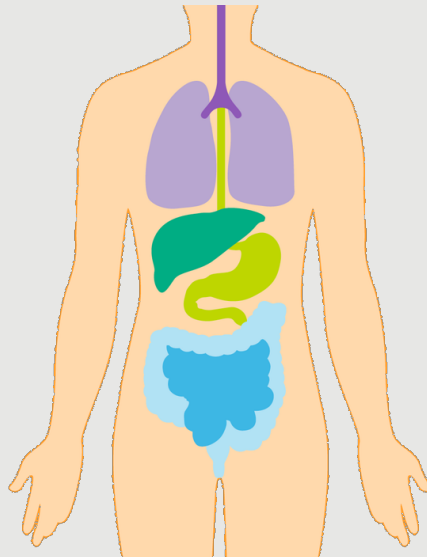
Project Objective

- Project Safety Goal = **Zero Injury!**
- **Prevent/limit exposure** of dioxin to levels **below** those that are likely to have health effects



HOW?

**Making
Risk Visible**





DIOXIN HAZARD COMMUNICATION

Dioxin 101 – What is Dioxin?

- Group of toxic chemical compounds with similar chemical structures and biological effects
- Over 400 types of dioxin-related compounds – only 30 with significant toxicity
- Three closely related families: 1) PCDDs, 2) PCDFs, and 3) Certain PCBs
- PCDDs and PCDFs are not commercial chemical products but are trace level byproducts of combustion and several industrial chemical processes (including paper and pulp bleaching, and production of herbicides)
- Most toxic PCDD congener is 2,3,7,8-TCDD
- 2,3,7,8-TCDD is primary congener associated with Agent Orange and primary type of dioxin at the Bien Hoa Airbase Area

DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

- Dioxins are everywhere in the environment
- People may be exposed to background levels by breathing air, consuming food or beverages, or skin contact with contaminated materials
- Two major sources

1) Combustion



2) Chemical Manufacturing



DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

I) Combustion

- Primary environmental source
- Dioxins are formed during combustion of organic compounds in presence of chlorinated materials
- Combustion Processes:
 - **Waste incineration:** municipal solid waste, sewage sludge, medical waste, hazardous waste, and improper burning of domestic waste products
 - **Other high temperature sources:** cement kilns
 - **Poor or uncontrolled combustion sources:** building fires, and residential wood burning
 - **Natural processes:** volcanoes and forest fires

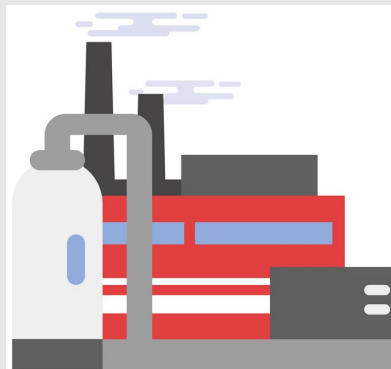


DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

2) Chemical Manufacturing

- Three types of chemical manufacturing processes
- **Bleaching of wood pulp in paper manufacturing**
- **Chlorine and chlorine derivative manufacturing**
- **Halogenated organic chemical manufacturing**



DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

2) Chemical Manufacturing

- **Bleaching of wood pulp in paper manufacturing** (bleached kraft process)
 - 2,3,7,8-TCCD and 2,3,7,8-TCDF congeners found in effluent and sludge

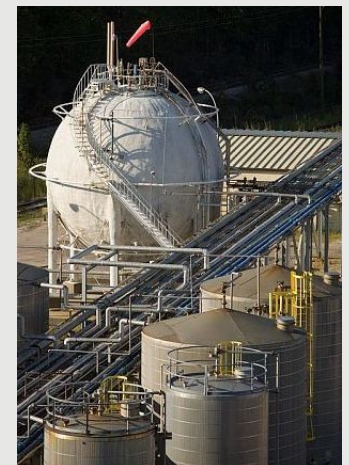


DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

2) Chemical Manufacturing

- **Chlorine and chlorine derivative manufacturing** (e.g., making bleach)
 - Former use of brine electrolytic cells with mercury and graphite electrodes in production of chlorine gas
 - Generated chlorodibenzofurans
 - Graphite electrodes were replaced with titanium metal anodes





DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

2) Chemical Manufacturing

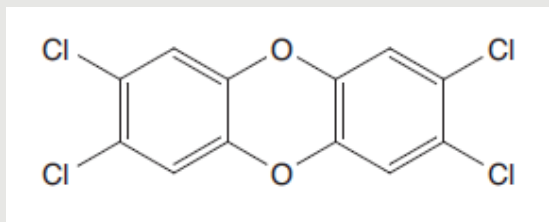
- **Halogenated organic chemical manufacturing**
 - Chlorophenols – used for various pesticide applications
 - Limited to 2,4-dichlorophenol and pentachlorophenols since the late 1980s
 - Disposals of waste strictly regulated
 - Chlorobenzenes – raw materials in production of phenol, aniline, and various pesticides
 - PCBs – anthropogenic in origin
 - Disposal of PCB-containing materials
 - **Historic production of herbicides – Agent Orange**
 - 2,3,7,8-TCDD was an unwanted by product

DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Sources

2,3,7,8-TCDD

- Primary congener associated with Agent Orange and primary type of dioxin at the Bien Hoa Airbase Area
- Not intentionally added; byproduct produced during manufacturing of herbicides that were used in Agent Orange
- 2,3,7,8-TCDD has the chemical formula of $C_{12}H_4Cl_4O_2$





DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Properties

- Group of toxic chemical compounds with similar chemical structures and biological effects
- A persistent organic pollutant that is toxic over many decades – does not break down easily
- Absorbed and stored in fat and tissue – bioaccumulates in the food chain
- Sticks to soil/sediment particles
- Not water soluble
- Not volatile

DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Project Site Exposure Routes

Primary Sources

- Past handling, storage, and disposal of Agent Orange compounds
- **Primary source** of dioxin-contaminated soils/sediments.
 - **ZI Area.** Southern portion; main storage area for herbicides in tanks and drums and initially contained the most heavily contaminated soils.
 - **Southwest Area.** West of ZI Area along boundary of the Airbase; used as an Agent Orange storage area during the Pacer Ivy Mission.
 - **Pacer Ivy Area.** Western portion of the Airbase at the end of the runway; used to store, re-drum and package approximately 11,000 containers of Agent Orange for shipping out of Vietnam in 1972.



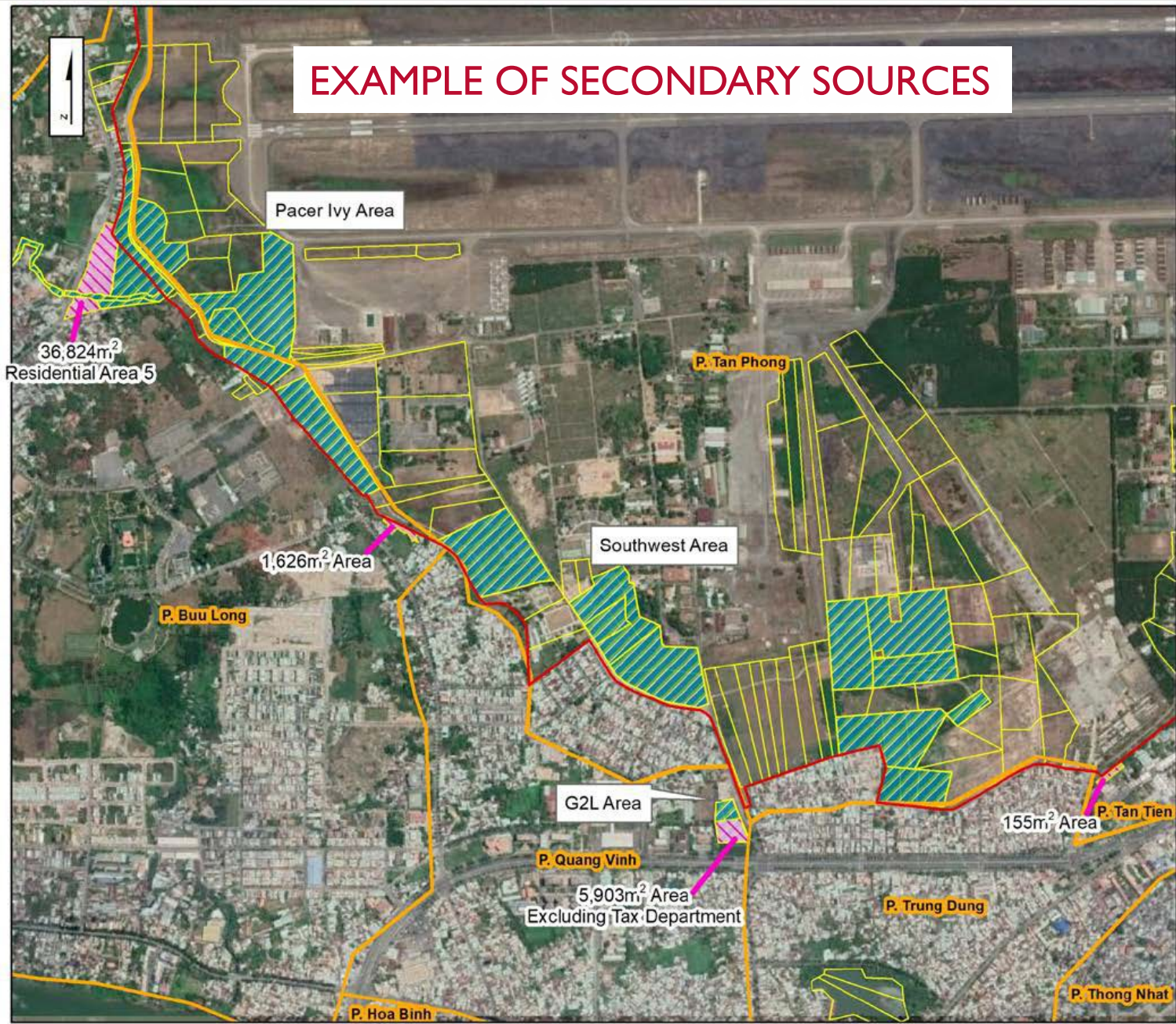
DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Project Site Exposure Routes

Secondary Sources

- Migration of dioxin contaminated soil and sediment from primary source areas have resulted in redistribution to **secondary source areas**
 - **Lakes, ponds, and drainage canals**
 - **Four off-Airbase areas** with dioxin contamination





EXAMPLE OF SECONDARY SOURCES



LEGEND

- Bien Hoa Airbase Boundary
- Ward boundary
- Sub-decision Units

Dioxin Status

- GVN/USAID EA identified on-base areas above land use-based dioxin action levels
- DONRE sampled off-base areas above land use-based dioxin action levels

 **USAID**
FROM THE AMERICAN PEOPLE

0 0.15 0.3
Miles

DATE	PROJECT NO	SCALE
OCT 2019	00049	AS SHOWN

DIOXIN HAZARD COMMUNICATION

Dioxin I0I – Personal Exposure Routes

- Three major personal exposure routes in order of likelihood of occurrence during Project activities

1) Dermal (Skin) Contact



2) Inhalation



3) Ingestion



DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Personal Exposure Routes

- I) **Dermal Contact** – Exposure to dioxin concentrations in soils, sediments, suspended sediment in surface water, and groundwater can result via direct contact of contaminated media with skin



DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Personal Exposure Routes

2) Inhalation – Dioxin concentrations in airborne particulate such as windblown soil, dust, and ash

- Dust producing activities
 - Excavation
 - Transport of contaminated soil and sediment
 - Intrusive activities (e.g., soil sampling, installing MWs, etc.)





DIOXIN HAZARD COMMUNICATION

Dioxin 101 – Personal Exposure Routes

3) Ingestion – Soil ingestion, or potentially contaminated drinking water, can result in dioxin exposure to human and ecological receptors

- No dioxin concentrations have been identified in drinking water samples collected above the USEPA MCL or GVN discharge standard.
- Contaminated areas:
 - Eating and smoking are not allowed
 - Drinking water needs to be done without contacting contaminated surfaces from hands, gloves, etc.

DIOXIN HAZARD COMMUNICATION

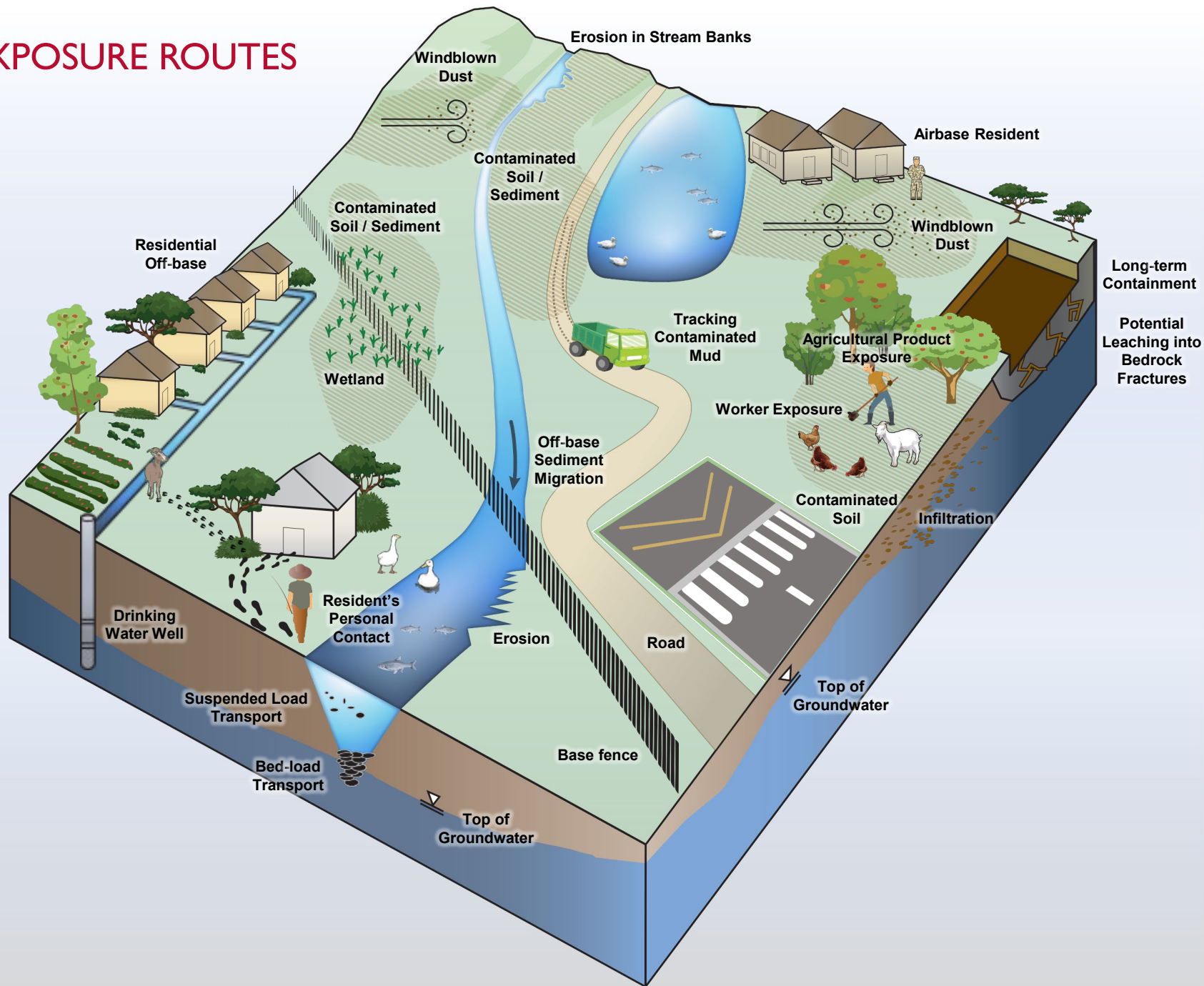
Dioxin 101 – Off-site Exposure Routes

Two major off-site exposure routes:

- 1) **Ingestion** - Dioxin exposure occurs primarily contaminated food sources
 - More than 90% of human dioxin exposure is through food
 - High fat animal products like milk products, eggs, meat, and some fish
- 2) **Background Sources of Combustion**
 - Burning trash containing plastics or chemicals
 - Cigarette smoke
 - Vehicle exhaust



EXPOSURE ROUTES





DIOXIN HAZARD COMMUNICATION

Potential Health Effects

- Overview of Toxicity of Dioxins
- Carcinogenic Effects – 2,3,7,8-TCDD
- Noncarcinogenic Effects – 2,3,7,8-TCDD



DIOXIN HAZARD COMMUNICATION

Potential Health Effects – Overview of Toxicity of Dioxins

- Only interested in 2,3,7,8-PCDD/F congeners (out of 17 congeners) because effects due to same mechanism (Ah receptor – dioxin receptor)
- Most toxic congener is 2,3,7,8-TCDD
- Toxicity of other 16 PCDD/F congeners evaluated relative to 2,3,7,8-TCDD using Toxicity Equivalency Factors (TEFs)
- TEFs represent fraction less toxic than 2,3,7,8-TCDD
- Cancer and non-cancer health effects
- Listed as both a carcinogen and causing developmental toxicity by the State of California as part of Proposition 65

DIOXIN HAZARD COMMUNICATION



Potential Health Effects – Carcinogenic Effects – 2,3,7,8-TCDD

- Classified as a human carcinogen by IARC
- USEPA classified 2,3,7,8-TCDD as a human carcinogen in 2010, however USEPA is currently re-evaluating carcinogenic effects
 - Because of pending re-evaluation there are no approved IRIS toxicological values for cancer effects
- The Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives (JECFA) concluded that 2,3,7,8-TCDD carcinogenicity is not linked to mutagenicity or DNA binding

DIOXIN HAZARD COMMUNICATION



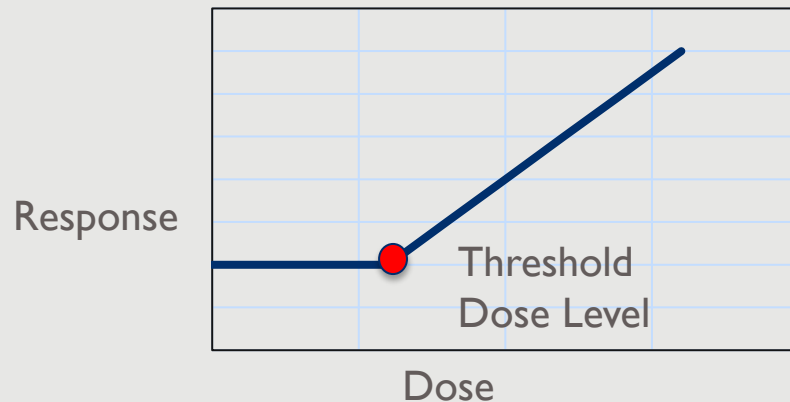
Potential Health Effects – Carcinogenic Effects – 2,3,7,8-TCDD

- Lack of USEPA carcinogenicity assessment therefore use alternate values for oral (ingestion), dermal and inhalation exposure levels
- Alternative values based on the **dose-response relationship** – how varying doses effect body function or health
- Based on observed data from **animal, human clinical, and cell studies**
- Either **threshold** or **non-threshold effects**
- **Threshold Effects** – Not toxic at small doses, there is a threshold where doses become toxic
- **Non-Threshold Effects** – Toxic at small doses and toxicity increases with dose concentration

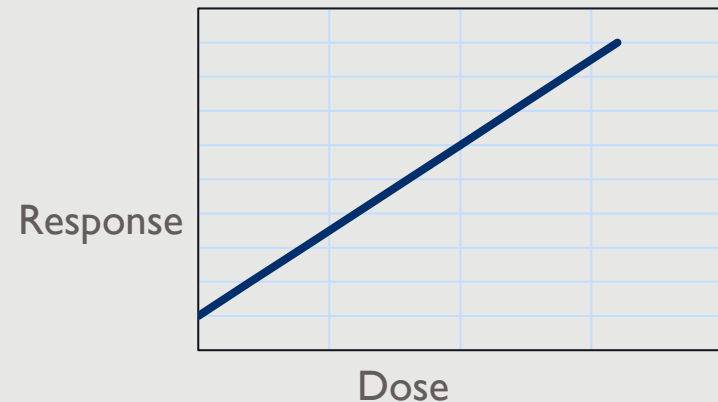
DIOXIN HAZARD COMMUNICATION

Health Risks – Carcinogenic Effects – 2,3,7,8-TCDD

- **Threshold** = no response over a range of low doses that include zero



- **Non-threshold** = some response at all doses above zero



DIOXIN HAZARD COMMUNICATION



Health Risks – Carcinogenic Effects – 2,3,7,8-TCDD

- JECFA established that 2,3,7,8-TCDD carcinogenicity occurred at a higher threshold than noncancer effects,
- JECFA established a tolerable daily intake (TDI) of **2.3 pg/kg-day**
 - The TDI is a **threshold-based** value derived from an **animal study** that evaluated effects on the reproductive tracts of prenatally-exposed male rats
 - JECFA concluded that the TDI based on noncancer effects also addresses carcinogenic risk

DIOXIN HAZARD COMMUNICATION



Health Risks – Carcinogenic Effects – 2,3,7,8-TCDD

- California Office of Environmental Health Hazard Assessment (OEHHA) developed oral (ingestion) and inhalation cancer toxicity values (oral slope factor and inhalation unit risk) based on a **non-threshold effect** assumption
 - Oral cancer slope factor of **130,000 (mg/kg-day)⁻¹**
 - Inhalation unit risk of **38 (μg/m³)⁻¹**
- Both oral slope factor and inhalation unit risk are based on results of an **animal study** of hepatocellular adenoma/carcinoma tumor data in male mice



DIOXIN HAZARD COMMUNICATION

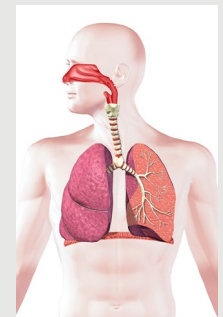
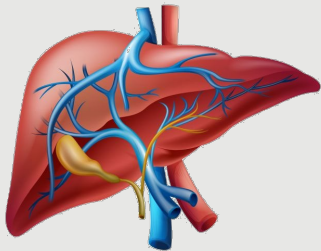
Health Risks – Noncarcinogenic Effects – 2,3,7,8-TCDD

- Oral (ingestion) and dermal noncancer effects were evaluated using USEPA Reference Dose (RfD) of **7×10^{-10} mg/kg-day**
 - Based on two **epidemiological studies** on developmental effects of human exposure to 2,3,7,8-TCDD following the Seveso accident in Italy
 - The RfD is based on the Lowest Observed Adverse Effect Level (LOAEL) for:
 - Decreased sperm count and motility in men exposed to 2,3,7,8-TCDD as boys
 - Increased levels of thyroid stimulating hormone in newborns whose mothers were exposed to 2,3,7,8-TCDD

DIOXIN HAZARD COMMUNICATION

Health Risks – Noncarcinogenic Effects – 2,3,7,8-TCDD

- Inhalation Reference Concentration (RfC) was evaluated using the California OEHHA recommended exposure level (REL) for chronic inhalation of 2,3,7,8-TCDD: $4 \times 10^{-5} \mu\text{g}/\text{m}^3$
 - Derived from an **animal study** of rats, which established a No Observed Adverse Effect Level (NOAEL) for:
 - Target organs and organ groups, which included the **liver**, **reproductive system**, **development**, **endocrine system**, **respiratory system**, and **hematopoietic system**





OUTLINE

- Frequently Asked Questions
- Health Risk Communication
- Dioxin Hazard Communication
- **Potential Exposure**
- Medical Surveillance Program
- Frequently Asked Questions – Answers



POTENTIAL EXPOSURE

- Symptoms of Exposure
- Potential Exposure Scenarios
- Procedures – If Develop Symptoms
- Procedures – If Exposure Occurs

POTENTIAL EXPOSURE

Symptoms of Exposure

- **Acute Exposure** (high concentration, short duration)
 - Onset of symptoms can take days to weeks
 - Symptoms of acute exposure
 - Skin and eye irritation
 - Allergic dermatitis
 - Chloracne
 - Porphyria (skin itching and tenderness, swelling, nervous system disorders)
 - Gastrointestinal disturbances
- **Long-term Exposure** (low to any concentration, long duration)
 - Impairment of the immune system, nervous system, endocrine system, and reproductive function
 - Cancer





POTENTIAL EXPOSURE

Routes

- **Dermal Contact** – direct skin contact with contaminated media, contaminated media exposed to your eyes
- **Inhalation** – exposure to contaminated air or dust
- **Ingestion** – eating contaminated media



POTENTIAL EXPOSURE

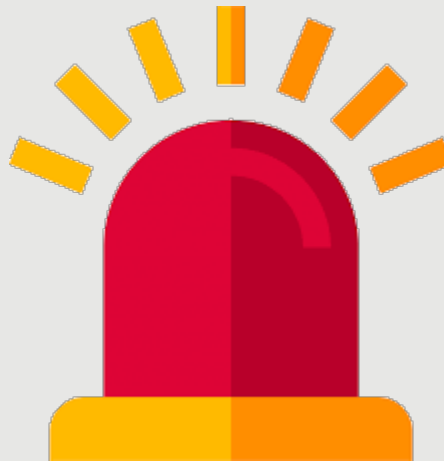
Example Scenarios

- **Failure of Personal Protective Equipment (PPE)**
 - During excavation of contaminated soil, respirator is not secured properly, and you notice the seal is broken
 - During sediment sampling in a submerged area, you notice water inside your coveralls from a small tear
- **Failure of Procedures**
 - During decontamination you make contact with external contaminated surface of PPE
- **Accidental Incident**
 - During excavation, the wind speed rises quickly, dust suppression techniques fail, and the field office is exposed to contaminated dust

POTENTIAL EXPOSURE

Procedures – If Develop Symptoms

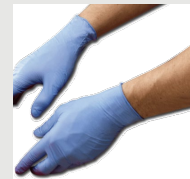
- Notify the task safety lead and your supervisor
- Notify the Lead Safety & Environmental Compliance Specialist (LSECS) or the Health, Safety, and Environment (HSE) Officer
- Follow directions for additional blood testing and physician visits



POTENTIAL EXPOSURE

Procedures – If Exposure Occurs

- Notify the task safety lead and your supervisor
- Notify LSECS or the HSE officer
- Follow directions for additional blood testing and physician visits
- Review site activities & PPE procedures and take corrective actions





OUTLINE

- Frequently Asked Questions
- Health Risk Communication
- Dioxin Hazard Communication
- Potential Exposure
- **Medical Surveillance Program**
- Frequently Asked Questions – Answers



MEDICAL SURVEILLANCE PROGRAM

- Purpose
- Levels of Monitoring
 - Level 1
 - Level 2
 - Level 3
 - Occasional Site Workers
- Frequency of Examinations and Testing
- Action Limit for Blood Serum Dioxin Levels
- Assurance of Confidentiality
- Record Keeping and Data Management
 - Anonymous Dioxin Blood Serum Results
 - Occupational Health Physician

MEDICAL SURVEILLANCE PROGRAM

Purpose

- One requirement of **Site-Wide Health & Safety Plan (HASP)**
- **Set limits** so that worker **health is not** affected
- **Monitoring** to:
 - Ensure **effectiveness**:
 - Appropriate PPE;
 - Appropriate site control measures; and
 - Utilized properly by the employees.
 - Know when to **take corrective action**





MEDICAL SURVEILLANCE PROGRAM

Levels of Monitoring

- Based upon nature of work activities, activity hazard analysis (AHA), and required PPE
- Four PPE levels of protection from hazardous materials (A, B, C, & D):
 - Level A highest level of protection
 - Level D the lowest
 - Based upon USEPA Hazwoper standard (29 CFR 1910.120 and 8 CCR 5192).
- Level of PPE determined through AHA and may change based on new information.



MEDICAL SURVEILLANCE PROGRAM

Levels of Monitoring (continued)

- **Level 1** – Wearing Level C PPE or more stringent >30 days a year
- **Level 2** – Wearing Level D PPE (or no PPE) but onsite >90 days a year
- **Level 3** – Wearing Level B PPE or more stringent >15 days a year (workers with highest risk for dioxin exposure).

* Day = 8 hours.

Medical Surveillance Orientation – for Level 1, Level 2, Level 3, and occasional site workers

Not monitored – site visitors, vendors, and delivery personnel

MEDICAL SURVEILLANCE PROGRAM

Levels of Monitoring (continued)

Occasional Site Workers

- Outside of exclusion zone
- On site more than 30 days/year, 8 hours/day but not more than 90 days



MEDICAL SURVEILLANCE PROGRAM

Frequency of Examinations and Testing

Level 1 and Level 2

- Baseline at start of assignment/employment
- Annual
- Exit at end of assignment/employment

Level 3

- Baseline at start of assignment/employment
- Every six months
- Exit at end of assignment/employment



MEDICAL SURVEILLANCE PROGRAM

Frequency of Examinations and Testing (continued)

Level 1, Level 2, and Level 3:

- Post exposure examination
- Post injury examination
- If symptoms of exposure develop
- If serum dioxin level exceeds allowable
- If occupational health physician recommends



MEDICAL SURVEILLANCE PROGRAM

Type of Examinations

Level 1 and Level 3 Examination:

- Baseline medical and work history questionnaire with updates completed annually or as triggered by exposure or injury event
- Hazardous substance handling history
- Blood testing
 - Complete blood count (CBC) / Sequential Multi-Channel Analysis
 - Serum dioxin with Health / Lifestyle questionnaire
- Other biological systems testing
- Cardiopulmonary function testing



MEDICAL SURVEILLANCE PROGRAM

Type of Examinations (continued)

Level 2 Examination:

- Baseline medical and work history questionnaire with updates completed annually or as triggered by exposure or injury event
- Serum dioxin blood testing with Health / Lifestyle questionnaire



MEDICAL SURVEILLANCE PROGRAM

Action Limit for Blood Serum Dioxin Levels

Project Action Limit for Blood Serum Dioxin is 30 picograms/gram (pg/g lipid or parts per trillion) TEQ.

- TEQ = toxicity equivalents which standardizes toxicity of dioxins/furans and dioxin-like substances to 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD)
- Part per trillion = one drop of water in an Olympic-sized swimming pool



MEDICAL SURVEILLANCE PROGRAM

What Happens if a Worker's Blood Serum Dioxin Exceeds Action Limit?

- Employee will:
 - **Be restricted** from performing intrusive work, or
 - **Stop working** on the site.
- Consult with attending occupational physician
- Perform confirmation sampling
- Further blood testing to assess health conditions
- Review site activities & PPE procedures and take corrective actions

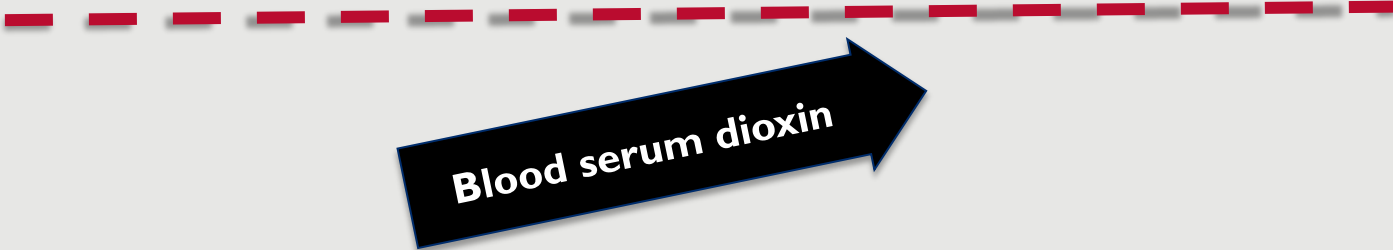


MEDICAL SURVEILLANCE PROGRAM

What Happens if a Worker's Blood Serum Dioxin Increases Over Time?

- Small changes up to $\pm 20\%$ can occur without indicating an issue
- Will identify which congeners are the source of elevated levels
 - If 2,3,7,8-TCDD is substantially elevated, this may indicate a site-related exposure
 - Employee will:
 - **Be restricted** from performing intrusive tasks, or
 - **Stop working** on the site.
- Consult with attending occupational physician

Dioxin Blood Serum Action Limit of 30 pg/g



Blood serum dioxin



MEDICAL SURVEILLANCE PROGRAM

What Happens if a Worker's Blood Serum Dioxin Increases Over Time? (continued)

- Perform confirmation sampling
- Further blood testing to assess health conditions
- Review site activities & PPE procedures and take corrective actions
- A&E Bien Hoa Contractor will recommend changes for USAID consideration in (sub)contractor activities and/or to the HASP
- (Sub)contractors will provide re-training in identified areas and closely observe the worker for the first three (3) days on site after

MEDICAL SURVEILLANCE PROGRAM

Assurance of Confidentiality

- Consent form will be signed before blood is drawn
 - Will be written in native language
- Anonymous Employee Identification Number will be assigned
 - Only the person drawing the blood and the occupational health physician will know the Employee Identification Number



MEDICAL SURVEILLANCE PROGRAM

Record Keeping and Data Management

- Anonymous dioxin blood serum results
 - All results will be completely anonymous and stored only with the employee identification number
- Occupational health physician will contact employee with...
 - Results of analysis and
 - Further action required, if any





OUTLINE

- Frequently Asked Questions
- Health Risk Communication
- Dioxin Hazard Communication
- Potential Exposure
- Medical Surveillance Program
- **Frequently Asked Questions – Answers**



FREQUENTLY ASKED QUESTIONS

- What are dioxins?
- Why are dioxin concentrations reported as TEQ concentrations?
- Is the level of harm the same for different dioxin congeners?
- Where do 'background' exposures of dioxins come from?
- What are some of the non-site related ways that I can be exposed to dioxins?
- What is the lifespan of dioxin?
- Why is dioxin dangerous?
- What are the health effects?
- Are some groups more sensitive to the effects of dioxin exposure than others?
- Why is "serum dioxin testing" used to assess the amount of dioxins accumulated in the body?
- How are the dioxin blood serum results interpreted?
- Are there levels of dioxins which are considered as 'acceptable' or 'problematic'?



FREQUENTLY ASKED QUESTIONS

What are Dioxins?

- Group of toxic chemical compounds with similar chemical structures and biological effects
- Generally stick to soil/sediment particles, not water soluble, and don't break down easily
- Absorbed and stored in fat and tissue and so bioaccumulate in the food chain
- Over 400 types of dioxin-related compounds – only 17 with significant toxicity
- Three closely related families: 1) polychlorinated dibenzodioxins (PCDDs), 2) polychlorinated dibenzofurans (PCDFs), and 3) Certain planar polychlorinated biphenyls (PCBs)
- PCDDs and PCDFs are not commercial chemical products but are trace level byproducts of combustion and several industrial chemical processes.
- Most toxic PCDD congener is 2,3,7,8-TCDD
- 2,3,7,8-TCDD is the primary congener associated with Agent Orange and primary type of dioxin at the Bien Hoa Airbase Area



FREQUENTLY ASKED QUESTIONS

Why are dioxin concentrations reported as TEQ concentrations?

- Total dioxin concentrations of all congeners reported as 2,3,7,8-TCDD toxicity equivalents (TEQ) using toxicity equivalent factors (TEF)
 - Dioxins have different numbers and locations of chlorines
 - Congener = variant or configuration of a common chemical structure
- Because the mechanism of toxicity is the same, TEFs can be used to represent toxicity of a congener relative to 2,3,7,8-TCDD (the most toxic)
 - 2,3,7,8-TCDF has a TEF of 0.1 or 1/10 , so it is 10 times less toxic than 2,3,7,8-TCDD
 - A TEF value is assigned to each congener, multiplied by the concentration of each congener, and then added together to express the total dioxin concentration in TEQ
- TEQ concentrations can be directly compared with toxicity criteria, screening levels, and regulatory requirements for 2,3,7,8-TCDD

FREQUENTLY ASKED QUESTIONS

Is the level of harm the same for different dioxin congeners?

- No, because the variability in chemical structure (number and location of chlorines) affects a congener's toxicity
- 2,3,7,8-TCDD is the most toxic
- Dioxins are most often found in mixtures in the environment which is why measurements of TEQ are useful
- Level of harm depends on the type of dioxin(s), amounts present, type of exposure and duration





FREQUENTLY ASKED QUESTIONS

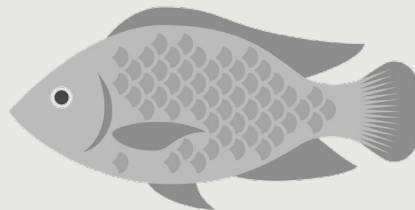
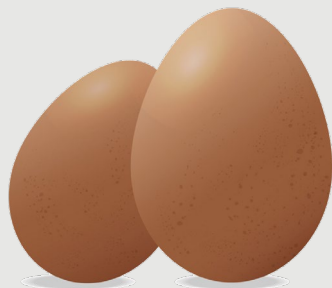
Where do 'background' exposures of dioxins come from?

- Widely distributed in the environment at low concentrations from:
 - **Industrial processes:** chemical manufacturing, chlorine bleaching of pulp and paper
 - **Combustion:** car emissions, waste incineration, burning of trash, wood stoves, smoking cigarettes
 - **Natural sources:** wildfires, volcanoes
- Dioxins are persistent and bioaccumulate (meaning dioxin concentrations build up in the body over time)
- Most people have detectable limits in their tissues
- Background levels accumulate over a lifetime and persist for years – even if no additional exposure (rate of degradation depends on congener)

FREQUENTLY ASKED QUESTIONS

What are some of the non-site related ways that I can be exposed to dioxins?

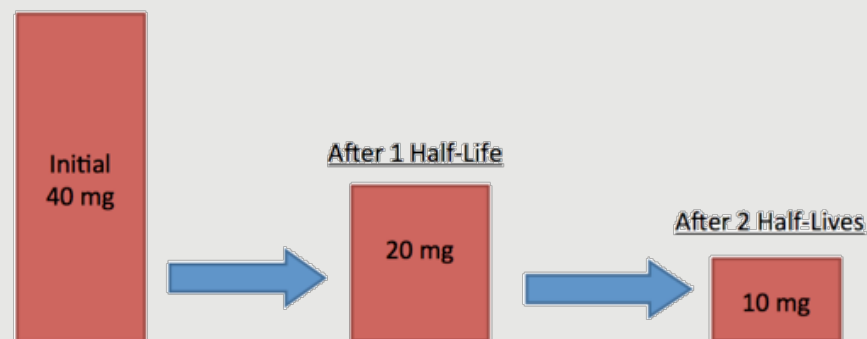
- More than 90% of human dioxin exposure is through food
- Dioxin contaminated high-fat foods: milk products, eggs, meat, and some fish
- Burning trash containing plastics or chemicals
- Cigarette smoke
- Vehicle exhaust



FREQUENTLY ASKED QUESTIONS

What is the lifespan of dioxin?

- Measured in half-lives:
 - time for concentration to decrease to half of the original amount.
- Depends on its location:
 - In the environment depends on the type of soil and depth
 - On the surface will be broken down by the sun in 1-3 years depending on conditions
 - In subsurface soil and waterbody sediments can have a half-life of more than 100 years
 - In human body is 3-15 years, can be as high as 20 years with the TCDD half life averaging 7 years





FREQUENTLY ASKED QUESTIONS

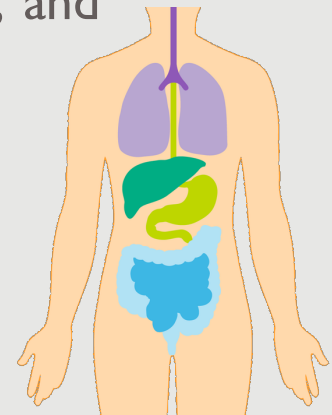
Why is dioxin dangerous?

- Toxic over many years, not water soluble, and does not degrade easily
- Clings to soil/sediment and can be transported by surface water downstream into sediments of surface water bodies where it can enter the food chain
- Chemically stable and retained in human fatty tissue
- Alters cellular and chemical balances involved in bodily functioning and reproductive processes
- Some health effects cannot be corrected or reversed
- Genetic effects may skip a generation and reappear in third or subsequent generations

FREQUENTLY ASKED QUESTIONS

What are the health effects?

- Dioxins are highly toxic and can cause cancer, reproductive and developmental problems, damage to the immune system and can interfere with hormones
- Short-term exposure of high levels may result in skin lesions (chloracne, patchy darkening of the skin) and altered liver function
- Long-term exposure is linked to impairment of the immune system, developing nervous system, endocrine system, and reproductive function





FREQUENTLY ASKED QUESTIONS

Are some groups more sensitive to the effects of dioxin exposure than others?

- The developing fetus is the most sensitive to dioxin exposure
- Pregnant or nursing mothers
 - Dioxin exposure can effect the developing fetus
 - Dioxin is stored in breast milk due to the high fat content
- Children, including infants who are nursing, are more sensitive because:
 - Children and infants are smaller and receive higher does of chemical exposure per body weight
 - Children and infants are more vulnerable to toxic exposures as their body grows

FREQUENTLY ASKED QUESTIONS

Why is “blood serum dioxin testing” used to assess the amount of dioxins accumulated in the body?

- Dioxin level in blood serum is measured relative to the blood lipid (fat) level
- Because dioxins are absorbed and stored in fatty tissues or body fat
- Blood serum dioxin testing is less invasive than taking a sample of body fat





FREQUENTLY ASKED QUESTIONS

How are the dioxin blood serum results interpreted?

- Individual dioxin results may vary and analytical method may show up to 20% difference
- Influenced by a person's blood chemistry and lipid content at the time of sampling
- Lipid levels can change day-to-day or even meal-to-meal
- **Most important consideration is changes in a person's blood serum dioxin levels over time**
- Small changes up to $\pm 20\%$ can occur without indicating an issue
- If 2,3,7,8-TCDD is substantially elevated, this may indicate a site-related exposure



FREQUENTLY ASKED QUESTIONS

Are there levels of dioxins which are considered as ‘acceptable’ or ‘problematic’?

- There are no definitive levels of dioxins which are considered ‘acceptable’ or ‘problematic’
- Different countries and jurisdictions have their own guidelines for determining acceptable levels of dioxin in human blood or other media (e.g., soil, food, breast milk, etc.)
- Conservative action limit has been set for the Project that is protective of human health:
 - Project Action Limit for Blood Serum Dioxin = 30 picograms/gram of lipid (pg/g or parts per trillion) TEQ



SUMMARY

- The Medical Monitoring program set limits so that worker health is not affected, and then monitors to:
 - Ensure effectiveness: appropriate PPE, appropriate site control measures, and utilized properly by the employees.
 - Know when to take corrective action
- Dioxin is absorbed into the body through ingestion of food; exposure to your skin, mouth and eyes; and inhalation
- Health effects can be experienced 3 to 30 years later
- Report any symptoms to your supervisor immediately, especially skin rashes/irritations
- There is no known or acceptable treatment for dioxin exposure
- Exposure to only a minute amount is needed for exposure to occur and potentially impact your future health

References

Biological Half Life:

- Milbrath et al. (2009). Apparent Half-Lives of Dioxins, Furans, and Polychlorinated Biphenyls as a Function of Age, Body Fat, Smoking Status, and Breast-Feeding. *Environ Health Persp.* 117 417.

Toxicity Value Hierarchy:

- USEPA (2003). Human Health Toxicity Values in Superfund Risk Assessments. Washington, D.C., U.S. Environmental Protection Agency.

PCDD/F Toxicological Profiles:

- ATSDR (1994). Toxicological Profile for Chlorinated Dibenzo-p-Furans. Agency for Toxic Substances and Disease Registry, U.S. Department of Human Health Services.
- ATSDR (1998). Toxicological Profile for Chlorinated Dibenzo-p-Dioxins. Agency for Toxic Substances and Disease Registry, US Department of Health and Human Services.

Toxicity Equivalent Factors (TEF):

- Van den Berg, M., L. S. Birnbaum, et al. (2006). "The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds." *Toxicol Sci* 93(2): 223-241.

Threshold/Non-Threshold Approach to Carcinogen Risk Assessment:

- USEPA (1989). Risk Assessment Guidance for Superfund (RAGS): Volume I – Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, U.S. Environmental Protection Agency.
- USEPA (2005). Guidelines for Carcinogen Risk Assessment, U.S. Environmental Protection Agency

References

Toxicological Values and Studies Relied Upon:

- JECFA (2002). Polychlorinated dibenzodioxins, polychlorinated dibenzofurans, and coplanar polychlorinated biphenyls, Joint FAO/WHO Expert Committee on Food Additives WHO Food Additives Series 48.
- NTP (1982). Bioassay of 2,3,7,8-tetrachlorodibenzo-p-dioxin for possible carcinogenicity (dermal) C.T. Program. National Cancer Institute, Bethesda, MD, and National Toxicology Program, Research Triangle Park, NC, National Toxicology Program.
- OEHHA (2011). Technical Support Document for Cancer Potency Factors Appendix B: Chemical-Specific Summaries of the Information Used to Derive Unit Risk and Cancer Potency Values. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.
- OEHHA (2015). Guidance Manual for Preparation of Health Risk Assessments. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.
- USEPA (2012). 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD); CASRN 1746-01-6. Integrated Risk Information System, U.S. Environmental Protection Agency.
- Baccarelli, A., S. M. Giacomini, et al. (2008). "Neonatal thyroid function in Seveso 25 years after maternal exposure to dioxin." *PLoS Med* 5(7): e161.
- Mocarelli, P., P. M. Gerthoux, et al. (2008). "Dioxin exposure, from infancy through puberty, produces endocrine disruption and affects human semen quality." *Environ Health Perspect* 116(1): 70-77.
- OEHHA (1999). Technical Support Document for the Derivation of Noncancer RELs Appendix D.3 Chronic RELs and toxicity summaries using the previous version of the Hot Spots Risk Assessment guidelines. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.
- OEHHA (2014). Technical Supporting Document for Noncancer RELs Appendix D. Individual Acute, 8-Hour, and Chronic Reference Exposure Level Summaries. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.
- Kociba, R. J., D. G. Keyes, et al. (1978). "Results of a two-year chronic toxicity and oncogenicity study of 2,3,7,8-tetrachlorodibenzo-p-dioxin in rats." *Toxicol Appl Pharmacol* 46(2): 279-303.

References

General Dioxin Resources:

- Centers for Disease Control and Prevention (CDC). 2017. National Biomonitoring Program, Chemical Factsheets; Dioxins, Furans and Dioxin-Like Polychlorinated Biphenyls Factsheet. Available at https://www.cdc.gov/biomonitoring/DioxinLikeChemicals_FactSheet.html. April.
- Environment Agency of Japan. 2000. Report on Tolerable Daily Intake (TDI) of Dioxins and Related Compounds. Available at https://www.env.go.jp/en/chemi/dioxins/tdi_report.pdf. August.
- National Institute of Environmental Health Sciences (NIEHS). 2017. Dioxins. Available at <https://www.niehs.nih.gov/health/topics/agents/dioxins/index.cfm>. August.
- New Zealand Ministry of Health. 2008. Serum Dioxin Testing Factsheet. Available at <https://www.health.govt.nz/system/files/documents/pages/dioxins-practitioners-serumtesting.pdf>. June.
- The Aspen Institute. 2020. The Agent Orange in Vietnam Program. Available at <https://www.aspeninstitute.org/programs/agent-orange-in-vietnam-program/>.
- United States Department of Veteran Affairs. 2017. Agent Orange. Available at <https://www.publichealth.va.gov/exposures/agentorange/index.asp>.
- United States Environmental Protection Agency (USEPA). 2019. Learn about Dioxin. Available at <https://www.epa.gov/dioxin/learn-about-dioxin>. July.
- World Health Organization (WHO). 2020. International Programme on Chemical Safety, Dioxins and dioxin-like substances. Available at https://www.who.int/ipcs/assessment/public_health/dioxins/en/.

APPENDIX B. DIOXIN REFERENCE LIST

Dioxin References and Additional Background Information

- Abad, E., J.J. Llerena, J. Sauló, J. Caixach, and J. Rivera. 2000. Comprehensive study on dioxin contents in binder and anticaking agent feed additives. *Organohalog Compd* 46:439-442.
- ACC (American Chemistry Council). 2003. Interpreting the 2,3,7,8-TCDD (Dioxin) CDC Monitoring Data. Accessed at: http://www.dioxinfacts.org/dioxin_health/cdc/TCDDCombined.pdf
- AEA (AEA Technology plc). 1999. Compilation of EU Dioxin Exposure and Health Data. Task 7 - Ecotoxicology Report. Prepared for the European Commission DG Environment and the UK department of the Environment Transport and the Regions (DETR). Report no. AEAT/EEQC/0016. October.
- Agency for Toxic Substances and Diseases Registry (ATSDR). 1994. Toxicological Profile for Chlorinated Dibenzo-p-Furans. Agency for Toxic Substances and Disease Registry, U.S. Department of Human Health Services.
- ATSDR. 1998. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins. Agency for Toxic Substances and Disease Registry, US Department of Health and Human Services.
- ATSDR. 2008. Public Health Statement for Chlorinated Dibenzo-P-dioxins (CDDs). In: Encyclopedia of Earth. Eds. Cutler J. Cleveland (Washington, D.C.: Environmental Information Coalition, National Council for Science and the Environment). [First published in the Encyclopedia of Earth November 13, 2007; Last revised April 23, 2008; Retrieved July 8, 2009]. Accessed at: [http://www.eoearth.org/article/Public_Health_Statement_for_Chlorinated_Dibenzo-Pdioxins_\(CDDs\)](http://www.eoearth.org/article/Public_Health_Statement_for_Chlorinated_Dibenzo-Pdioxins_(CDDs))
- Aylward L.L., J.S. LaKind and S.M. Hays. 2008. Derivation of Biomonitoring Equivalent (BE) Values for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds: A Screening Tool for Interpretation of Biomonitoring Data in a Risk Assessment Context. *Journal of Toxicology and Environmental Health, Part A*, 71: 1499-1508.
- Baccarelli, A., S. M. Giacomini, et al.. 2008. "Neonatal thyroid function in Seveso 25 years after maternal exposure to dioxin." *PLoS Med* 5(7): e161.
- Centers for Disease Control and Prevention (CDC). 2017. National Biomonitoring Program, Chemical Factsheets; Dioxins, Furans and Dioxin-Like Polychlorinated Biphenyls Factsheet. Available at https://www.cdc.gov/biomonitoring/DioxinLikeChemicals_FactSheet.html. April.
- Domingo, J.L., M. Schuhmacher, M.C. Agramunt, L. Muller, and F. Neugebauer. 2001. Levels of metals and organic substances in blood and urine of workers at a new hazardous waste incinerator. *Int Arch Occup Environ Health* 2001; 74:263-9.
- Environment Agency of Japan. 2000. Report on Tolerable Daily Intake (TDI) of Dioxins and Related Compounds. Available at https://www.env.go.jp/en/chemi/dioxins/tdi_report.pdf. August.

Hansson, M., L. Barregard, G. Sallsten, B.G. Svensson, and C. Pappe. 1997. Polychlorinated dibenzop-dioxin and dibenzofuran levels and patterns in polyvinylchloride and chloralkaliindustry workers. *Int Arch Occup Environ Health*; 70:51–6.

Hansson, M., T. Grimstad and C. Pappe. 1995. Occupational exposure to polychlorinated dibenzop-dioxins and dibenzofurans in a magnesium production plant. *Occup Environ Med*; 52:823–6.

Hatfield/Office 33. 2009. Comprehensive Assessment of Dioxin Contamination in Da Nang Airport, Viet Nam: Environmental Levels, Human Exposure and Options for Mitigating Impacts. Hatfield Consultants Ltd., North Vancouver, BC, Canada; Office 33, Ha Noi, Viet Nam. (Can be downloaded from www.hatfieldgroup.com)

IARC (International Agency for Research on Cancer). 1997. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 69: Polychlorinated Dibenzopara-Dioxins and Polychlorinated Dibenzofurans. World Health Organization. Lyon, France.

Iida, T., H. Hirakawa, T. Matsueda, S. Takenaka, M.L. Yu, and Y.L. Guo. 1999. Recent trend of polychlorinated dibenzop-P-dioxins and their related compounds in the blood and sebum of Yusho and Yu Cheng patients. *Chemosphere*; 38: 981–93.

IOM (Institute of Medicine). 1994. Veterans and Agent Orange - Health effects of herbicides used in Viet Nam. National Academy Press, Washington, D.C., 812 p.

Joint FAO/WHO Expert Committee on Food Additives (JECFA). 2002. Polychlorinated dibenzodioxins, polychlorinated dibenzofurans, and coplanar polychlorinated biphenyls, Joint FAO/WHO Expert Committee on Food Additives WHO Food Additives Series 48.

Kociba, R. J., D. G. Keyes, et al.. 1978. "Results of a two-year chronic toxicity and oncogenicity study of 2,3,7,8-tetrachlorodibenzo-p-dioxin in rats." *Toxicol Appl Pharmacol* 46(2): 279-303.

Milbrath et al.. 2009. Apparent Half-Lives of Dioxins, Furans, and Polychlorinated Biphenyls as a Function of Age, Body Fat, Smoking Status, and Breast-Feeding. *Environ Health Persp*. 117 417.

Mocarelli, P., P. M. Gerthoux, et al.. 2008. "Dioxin exposure, from infancy through puberty, produces endocrine disruption and affects human semen quality." *Environ Health Perspect* 116(1): 70-77.

National Institute of Environmental Health Sciences (NIEHS). 2017. Dioxins. Available at <https://www.niehs.nih.gov/health/topics/agents/dioxins/index.cfm>. August.

National Toxicology Program (NTP). 1982. Bioassay of 2,3,7,8-tetrachlorodibenzo-pdioxin for possible carcinogenicity (dermal) C. T. Program. National Cancer Institute, Bethesda, MD, and National Toxicology Program, Research Triangle Park, NC, National Toxicology Program.

New Zealand Ministry of Health. 2008. Serum Dioxin Testing Factsheet. Available at <https://www.health.govt.nz/system/files/documents/pages/dioxins-practitioners-serumtesting.pdf>. June.

Office of Environmental Health Hazard Assessment (OEHHA). 1999. Technical Support Document for the Derivation of Noncancer RELs Appendix D.3 Chronic RELs and toxicity summaries using the previous version of the Hot Spots Risk Assessment guidelines. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.

OEHHA. 2011. Technical Support Document for Cancer Potency Factors Appendix B: Chemical-Specific Summaries of the Information Used to Derive Unit Risk and Cancer Potency Values. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.

OEHHA. 2014. Technical Supporting Document for Noncancer RELs Appendix D. Individual Acute, 8-Hour, and Chronic Reference Exposure Level Summaries. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.

OEHHA. 2015. Guidance Manual for Preparation of Health Risk Assessments. Air Toxics Hot Spot Program, Office of Environmental Health Hazard Assessment.

Päpke, O., M. Ball and A. Lis. 1992. Various PCDD/PCDF patterns in human blood resulting from different occupational exposures. *Chemosphere*; 25:1101–8.

Park, H., M.G. Ikononou, H.S. Kim, JW. Choi, and Y.S. Chang. 2009. Dioxin and dioxin-like PCB profiles in the serum of industrial and municipal waste incinerator workers in Korea. *Environment International* 35: 580-587.

Schechter, A., L. Birnbaum, J.J. Ryan, and J.D. Constable. 2006. Dioxins: an overview. *Environ Res* 101: 419-428.

Schechter, A.J., R. Malkin, O. Päpke, M. Ball, and P.W. Brandt-Rauf. 1991. Dioxin levels in blood of municipal incinerator workers. *Med Sci Res*; 19:331–2.

Srogi, K. 2008. Levels and congener distributions of PCDDs, PCDFs and dioxin-like PCBs in environmental and human samples: a review. *Environ Chem Lett* 6:1-28.

The Aspen Institute. 2020. The Agent Orange in Vietnam Program. Available at <https://www.aspeninstitute.org/programs/agent-orange-in-vietnam-program/>.

United States Department of Veteran Affairs. 2017. Agent Orange. Available at <https://www.publichealth.va.gov/exposures/agentorange/index.asp>.

United States Environmental Protection Agency (USEPA). 1989. Risk Assessment Guidance for Superfund (RAGS): Volume I – Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, U.S. Environmental Protection Agency.

USEPA. 2003. Human Health Toxicity Values in Superfund Risk Assessments. Washington, D.C., U.S. Environmental Protection Agency.

USEPA. 2005. Guidelines for Carcinogen Risk Assessment, U.S. Environmental Protection Agency

USEPA. 2012. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD); CASRN 1746-01-6. Integrated Risk Information System, U.S. Environmental Protection Agency.

USEPA. 2019. Learn about Dioxin. Available at <https://www.epa.gov/dioxin/learn-about-dioxin>. July.

Van den Berg, M., L. S. Birnbaum, et al.. 2006. "The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds." *Toxicol Sci* 93(2): 223-241.

World Health Organization (WHO). 2020. International Programme on Chemical Safety, Dioxins and dioxin-like substances. Available at https://www.who.int/ipcs/assessment/public_health/dioxins/en/.

WHO/EURO. 1998a. WHO revises the Tolerable Daily Intake (TDI) for dioxins. World Health Organization, European Centre for Environment and Health; International Programme on Chemical Safety. *Organohalogen Compounds* 38, 295.

WHO/EURO. 1998b. Assessment of the health risk of dioxins: re-evaluation of the Tolerable Daily Intake (TDI). World Health Organization, European Centre for Environment and Health; International Programme on Chemical Safety. WHO Consultation, May 25-29, 1998. Geneva, Switzerland.

APPENDIX C. BLOOD SERUM DIOXIN RESULT SUMMARY

**APPENDIX D. CONSENT FORM FOR
BLOOD SAMPLING AND
ANALYSIS**

CONSENT FORM FOR BLOOD SAMPLING AND ANALYSIS

DIOXIN REMEDIATION AT BIEN HOA AIRBASE AREA PROJECT

This is to certify that I consent to and authorize the A&E Bien Hoa Contractor to collect my blood for analysis of dioxin as part of the Blood Serum Dioxin Monitoring Program delineated in the Dioxin Remediation at Bien Hoa Airbase Area Project Site-Wide Health and Safety Plan (HASP), Sections 9.18.1 and 9.18.2.

I understand that the venipuncture process involves a small medical risk and may result in bruising around the area from which the blood is taken.

I understand that the results of this test will be provided only to me and to the designated responsible Occupational Health Physician. My name will not be associated with any laboratory results, sample containers, or other materials or information. However, the A&E Bien Hoa Contractor will compile anonymous blood sample results that will be shared with USAID.

If results are outside of the action limits stated in the aforementioned Project Site-Wide HASP, I will be notified by the Occupational Health Physician and given the opportunity to discuss the results and determine further actions required.

I understand that, as with medical testing of any nature, the potential for falsely elevated, lowered, positive, or negative laboratory values is present.

Patient's Name (printed)		Date	
Patient's Signature		Email or phone (for results)	
THIS SECTION FOR USE BY SAMPLER ONLY			
Date/Time of Blood Draw		Unique Patient ID Number Assigned?	YES / NO

APPENDIX E. FOLLOW-UP LETTER

APPENDIX E. FOLLOW-UP LETTER

[Date]

RE: Serum Dioxin Test Results

USAID Dioxin Remediation at Bien Hoa Airbase Area Project – Bien Hoa, Vietnam

Dear [Patient's full name]:

Based on your work activities during the remediation of dioxin at the Bien Hoa Airbase Area, you are required to participate in a medical monitoring program to document the levels of dioxin in your blood. A sample of your blood was collected and sent for analysis to the Center of Analytical Services and Experimentation HCMC (CASE), a division of Ho Chi Minh City Department of Sciences and Technology with financial independence, an ISO 17025, ISO 14001:2015 and IQNET certified laboratory that conducts analysis of human blood and other environmental samples. The purpose of this letter is to provide the results of your blood chemistry analysis.

Dioxins are absorbed by fat, so concentrations of different dioxins are presented as parts per trillion (ppt) of dioxin on a lipid-weight basis (i.e., based on how much fat is in the blood sample) and are summarized as a total value called *Toxic Equivalents (TEQ)*.

The American Chemistry Council (ACC) has developed a guideline value of 30 ppt in human serum lipid that may be used for comparative purposes in various populations. However, as noted below, results may vary significantly among individuals from different countries, and based on other factors such as work history, diet, age, health status and age. The ACC guideline is based on the World Health Organization's (WHO) Tolerable Daily Intake guidelines (1998).

The following is a summary of your baseline (if applicable) and follow-up Total Dioxin results for comparison purposes:

Chemical of Concern	Concentration Detected (ppt. 2,3,7,8) ¹	Concentration Detected (ppt. Total TEQ) ²	ACC 2003 Guideline (ppt. TEQ)
Baseline Total Dioxin	[Result/Undetected]	[Result/Undetected]	30
Follow-Up Total Dioxin	[Result/Undetected]	[Result/Undetected]	

There is no current standard of comparison to quantify the health risk of varying levels of dioxins and furans found in the human body. The ACC Guideline is general and should not be interpreted as a health-based standard. Actual blood serum dioxin levels vary significantly among individuals.

The most important consideration is the potential change in a person's blood serum dioxin level over time. Small changes may be expected and are not cause for concern. The analytical method may also produce up to a 20 percent difference between readings and can be influenced by one's blood chemistry at the time of sampling. Lipid levels can change from day-to-day or even meal-to-meal because blood lipid content is closely linked to diet.

Please contact your Contractor Safety Officer (CSO) if you would like to discuss the results in greater detail. You may also wish to share this information with your personal physician if you have specific personal medical questions.

[Doctor prints name]

Print Name

[Doctor signs]

Signature

¹ 2, 3, 7, 8-TCDD is the dioxin of concern to the site due to its association with Agent Orange.

² TEQ is a measure of all dioxin compounds together including 2, 3, 7, 8-TCDD.

APPENDIX M: SHORT-FORM SUPPLEMENTAL HEALTH AND SAFETY PLAN FORMAT (NON- INTRUSIVE SITE ACTIVITIES)

SHORT-FORM SUPPLEMENTAL HEALTH AND SAFETY PLAN FORMAT (NON-INTRUSIVE SITE ACTIVITIES)

Site Name:	Site Contact:	Telephone:
Location:	Client Contact:	Telephone:
Prepared By:	Date:	Date of Proposed Activities:
Objectives: USAID will conduct a Site Walk at the Bien Hoa Airbase Area for selected visitors to Inspect the Bien Hoa Airbase Interim measures Project area. Activities include visual site reconnaissance in the Pacer Ivy and former quarry areas of the Airbase only. No intrusive site activities will be conducted, and site reconnaissance will take place from vehicles or on improved surfaces, such as compacted stone, concrete, or paved roadways. Site Type: <i>Check as many as applicable.</i> ☐ Active ☐ Industrial Waste ☐ Unknown ☐ Inactive ☐ Landfill ☐ Other (specify) <u>Active military Airbase.</u> ☐ Secure ☐ Confined space ☐ Unsecure ☐ Uncontrolled Waste		
Site Description and History: Per USAID: "In 2016, the United States Agency for International Development (USAID), in close collaboration with the Government of Vietnam (GVN), completed the "Environmental Assessment of Dioxin Contamination at Bien Hoa Airbase" which meets the requirements of Title 22 CFR Part 216. The overall objective of the Environmental Assessment (EA) was to inform potential future actions on and around Bien Hoa Airbase to address dioxin-related contamination. The EA serves as the primary resource documenting characterization of dioxin contamination on and around the Bien Hoa Airbase (https://www.usaid.gov/vietnam/documents/environmental-assessment-dioxin-contamination-bien-hoa-airbase)... "The EA estimated the volume of dioxin-contaminated soils and sediments as approximately 408,500 (baseline estimated volume) to 495,300 cubic meters (m3) (baseline estimated volume plus contingency). This consists of approximately 315,700 to 377,700 m3 of contaminated soil and 92,800 to 117,600 m3 of contaminated sediment found both on and around the Airbase. Of the dioxin-contaminated baseline volume of 408,500 m3, 42% is in the Pacer Ivy Area, 24% is in the Z1 Area (including the Z1 Landfill), and 15% is in the Southwest Area (see Figure 1 next page). The remaining 19% is located in the ZT, Northwest, and Northeast Areas. Approximately 5% of the dioxin-contaminated baseline volume is located off of the Airbase."		

Radiological Hazards of Concern:

- ☐ Ionizing radiation (Radioactive materials, X-ray)

Safety Hazards of Concern During This Site Walk

- ☐ Heavy Equipment
- ☐ Confined Space Entry
- ☐ Energized and rotating equipment (drill rig)
- ☐ Steam cleaning equipment
- ☐ Excavations
- ☐ Welding or torch cutting (Hot work)
- ☐ Sharp Objects
- ☐ Compressed Gas Cylinder
- ☐ Lock-out Tag-out
- ☐ Hazardous energy sources

Physical Hazards of Concern:

- ☐ Heat stress
- ☐ Cold stress
- ☐ Slips, trips, falls
- ☐ Illumination

Biological Hazards of Concern:

- ☐ Poisonous plants
- ☐ Spiders
- ☐ Medical waste; blood; bodily fluids

Unexploded Ordnance:**NO KNOWN RADIOLOGICAL HAZARDS OF CONCERN**

- ☐ Non-ionizing radiation (ultraviolet, lasers)
- ☐ Buried utilities
- ☐ Overhead utilities
- ☐ Suspended loads
- ☐ Buried drums
- ☐ Work over or near water
- ☐ Work from elevated platforms
- ☐ Manual Lifting
- ☐ Traffic Control
- ☐ Forklift
- ☐ Other (specify) Walking on/near an active runway
- ☐ Vibration Aircraft
- ☐ Noise
- ☐ Solar (sunburn)
- ☐ Unstable or steep terrain
- ☐ Other (specify) Contaminated dust
- ☐ Snakes
- ☐ Stinging insects (bees, wasps)
- ☐ Animals (feral dogs)
- ☐ Ticks

Uncontrolled Chemical Hazards Present at Site	Highest Observed Concentration	PEL/TLV	IDLH Level	Symptoms and Effects of Acute Exposure	Photo-ionization Potential (eV)
Dioxin (as 2,3,7,8-TCDD)					NONE
Arsenic					NONE
Notes: Contaminants identified in screening sampling performed by others. Area was known to be a storage area for various defoliant agents used during the Vietnam conflict. ¹Source: CDM International. “Environmental Assessment of Dioxin Contamination at Bien Hoa Airbase,” Section 1, pg. 11. 03 May 2016. ²Source: CDM International. “Environmental Assessment of Dioxin Contamination at Bien Hoa Airbase,” Section 3, pg. 53. 03 May 2016.					
bgs = below ground surface CARC = Carcinogenic eV = Electron volt IDLH = Immediately dangerous to life or health mg/m³ = Milligram per cubic meter NA = Not available PEL = Permissible exposure limit ppm = parts per million ppt = parts per trillion TEQ = Toxic Equivalent TLV = Threshold limit value					

Field Activities Covered Under This Plan: *(attach additional sheets if more than one task)*

Task I Description	Type	Work Uniform		Date of Activities
		Primary	Contingency	
	☐ Intrusive ☒ Non-intrusive	Normal work clothing, boots, hi-visibility vest	Safety glasses, boot covers, hearing protection	

Site Personnel and Responsibilities (include subcontractors):

Name, Affiliation	Task #	Responsibilities

Protective Equipment:		Standard Operating Procedures (SOPs) – Task I
Task: ☒ 1 ☐ 2 ☐ Work Uniform ☒ Normal ☒ Other* ☐ Modified		1. Site walk includes only non-intrusive activities. Participants will remain in vehicles or on improved paved/graveled/hard-surfaced areas. 2. Standing water (puddles) are to be avoided to prevent slipping and minimize spread of sludge/soil onto clothing and boots. 3. If conditions are windy, use eye protection to prevent injury by flying small debris. 4. Do not enter any vegetation-covered areas or stand under trees or vines to prevent snakebite or contamination. 5. Treat all snakes as poisonous. Do not approach or attempt to handle. 6. Do not approach or touch any stray animals, as they may carry parasites and rabies. 7. Check your skin for ticks during and after the site walk. 8. Use mosquito/tick repellent prior to site entry. 9. Report any injury to the identified CSO and LSECS immediately. Any break in the skin will require attention. A first aid kit is available on site. 10. In the event of thunderstorms, site walk activities will be discontinued immediately and shelter taken in vehicles or solid structures. DO NOT take shelter under trees or open canopy structures. 11. In the event of dusty conditions, personnel will remain in vehicles. 12. All steps will be taken to prevent heat-related illness including consumption of water, dressing to suit weather conditions, taking breaks in air-conditioned vehicles or in shaded areas other than under trees, and monitoring each other for signs of heat stress. 13. Additional SOPs and site information are included in HASP attachments.
RESPIRATORY ☐ Not needed ☐ APR: _____ ☐ Cartridge: _____ ☐ Escape mask: _____ ☐ Other: _____ PROTECTIVE CLOTHING ☐ Not needed ☐ Tyvek® coveralls: _____ ☐ Saranex® coveralls: _____ ☐ Coveralls: _____ ☐ Other: <u>Hi-visibility vests.</u>		
HEAD AND EYE ☐ Not needed ☐ Safety glasses: <u>See SOPs.</u> ☐ Face shield: _____ ☐ Goggles: _____ ☐ Hard hat: <u>As required by host.</u> ☐ Other: _____ GLOVES ☐ Not needed ☐ Undergloves: _____ ☐ Gloves: _____ ☐ Overgloves: _____		
FIRST AID EQUIPMENT ☐ Standard First Aid kit ☐ Portable eyewash BOOTS ☐ Not needed ☐ Work boots: <u>Hard-toed footwear.</u> ☐ Overboots: <u>See SOPs.</u> *OTHER Drinking water as required; sunscreen; insect repellent. Long pants and long-sleeved shirt recommended; head covering are recommended. Hard-toed footwear and high-visibility vests are required.		

Site Maps

Emergency Contacts	Telephone
Police	113
Fire	114
Ambulance	115
Assistance	116
Bien Hoa Airbase Area Contact	
Medical Emergency	
Hospital Name:	Dong Nai International Hospital
Hospital Address: *	1048A Pham Van Thuan, Quarter 2, Tan Mai Ward, Bien Hoa City, Dong Nai Province
Hospital Telephone:	Emergency: +84 251 3 840 840 General: +84 251 3 955 955
Ambulance Telephone:	115
Route to Hospital	See next page for route map and directions.
USAID Team Members	
A&E Personnel	
Additional Comments: • Site Walk participants will not use or handle any hazardous chemicals or hazardous waste. • A Safety Meeting to review the requirements of this HASP will be held and documented for Site Walk activities. • All participants will follow all USAID, CSO, and LSECS directives and requirements. • All injuries and incidents are to be reported to the CSO and LSECS.	

Hospital Route Map	Written Directions
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NOTE: Individual site transportation is not available during the conduct of reconnaissance activities. Use ambulance service (115) or the provided transportation services, with the following information noted to driver:

Dong Nai International Hospital

Bệnh viện Quốc tế Hoàn Mỹ Đồng Nai

1048A Phạm Văn Thuận, Tân Mai, Thành phố Biên Hòa, Đồng Nai, Vietnam

APPENDIX N: UXO AWARENESS TRAINING

UXO AWARENESS TRAINING

WRITTEN UXO AWARENESS TRAINING PLAN

Each employer at the site must develop, implement, and maintain a written unexploded ordnance (UXO) Awareness Training Program. The program must include instruction of all field employees on:

- The safe distance to move away from UXO;
- Contact information and instruction of who to call when a possible UXO is encountered; and
- Detail that no one is to come closer to the UXO than the established safe distance until the UXO has been removed and an all clear has been given to employees for the return to this area.

Examples of what training may include are, an explanation of what a UXO is and types of UXO with typical photos and dangers. The training should:

- Explain UXO = Unexploded Ordnance;
- Provide a list of likely types of UXO a worker could encounter at the site location;
- Provide pictures of likely UXO in differing states of composition including: clean, dirty, rusty, shiny, and so on; and
- Conclude with the 3R's training as a mitigation process to encountering UXO.

Training should also stress the high danger UXO poses. Some results of contact with UXO can be:

- Serious injury or possible death;
- Damage to property or equipment;
- Loss of work.

THE 3R'S OF UXO SAFETY:

- Recognize
 - Training should encourage employees to always be on the lookout for UXO and what to do when they spot what they think could be UXO.
- Retreat
 - Each contractor's training should instruct employees how far to move away from the UXO and what to do to secure the area, so no one gets near the possible UXO.
- Report
 - The contractor should include in the UXO training names and phone numbers for supervisory employees to contact, who in turn know who to further contact to alert and conduct removal.

Remember early identification of potential UXO is the first and most important step in reducing risk posed by UXO.

APPENDIX O: SILICA EXPOSURE CONTROL

WRITTEN SILICA EXPOSURE CONTROL PLAN

Each employer at the site must develop, implement, and maintain a written Silica Exposure Control Plan. This written plan shall include:

- A description of the tasks in the workplace that involve exposure to respirable crystalline silica;
- A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task; and
- A description of the housekeeping measures used to limit employee exposure to respirable silica.

HAZARD COMMUNICATION

Silica must be included in each employer's hazard communication program as applicable. This includes having a Safety Data Sheet (SDS) for silica containing products.

COMPETENT PERSON DESIGNATION

Occupational Health and Safety Administration's (OSHA's) respirable crystalline silica standard for the construction industry, 29 CFR 1926.1153 paragraph (g)(4) states, "The employer shall designate a competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan."

EXPOSURE CONTROL PLAN REVIEW AND AVAILABILITY

The employer shall review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary. The employer shall make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this section, their designated representative, and the oversight contractor.

APPENDIX P: HASP SIGNATURE FORM

Short Form HASP Approvals

DATE

Contractor Project Manager

Date

Contractor ECS

Date

Contractor Safety Officer

Date

Contractor PM

Date

HASP Signature Form

(use additional sheets as necessary)

I have read, understood, and agree with the information set forth in this Health and Safety Plan and will follow the direction of the CSO and HSO as well as procedures and guidelines established in the appropriate HASP annex and SHASP. I understand the training and medical requirements for conducting field work and have met these requirements.

Name _____

Signature

Date _____

Name

Signature

Date _____

Name _____

Signature

Date _____

Name _____

Signature

Date _____

Name _____

Signature

Date _____

Name

Signature

Date _____

APPENDIX Q: SOP AND RELATED ATTACHMENTS

STANDARD OPERATING PROCEDURE (SOP) FOR BIOHAZARDS

Biological hazards, or “biohazards,” include plants, animals or their products, and parasitic or infectious agents that may present potential risks to participant health. This SOP discusses procedures for working with biohazards, preventive guidelines, and first aid procedures for the most common hazards field staff are likely to encounter at the Bien Hoa Airbase Area.

This SOP discusses general precautions for working around:

Insects and arachnids;

Snakes; and

Animals.

The general precautions and emergency actions are from information on the following websites:

Centers for Disease Control and Prevention (<https://wwwnc.cdc.gov/travel/yellowbook/2018/select-destinations/vietnam>);

International Association for Medical Assistance to Travelers (<https://www.iamat.org/country/vietnam/risk/zika-virus>,
<https://www.iamat.org/country/vietnam/risk/dengue>,
<https://www.iamat.org/country/vietnam/risk/chikungunya>,
<https://www.iamat.org/country/vietnam/risk/malaria>, and
<https://www.iamat.org/country/vietnam/risk/japanese-encephalitis>);

U.S Library of Medicine, National Institutes of Health (Centipede sting treatment - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4244901/>);

Thailand Snakes section on Vietnam (<https://www.thailandsnakes.com/southeast-asia-venomous-snakes/vietnam-snakes-venomous-dangerous/>);

World Health Organization (<https://www.who.int/snakebites/treatment/en/>);

Mayo Clinic (<https://www.mayoclinic.org/first-aid/first-aid-snake-bites/basics/art-20056681> and
<https://www.mayoclinic.org/first-aid/first-aid-animal-bites/basics/art-20056591>);

Hub Pages Travel Site (<https://hubpages.com/travel/Vietnam-Poisonous-Snakes-and-Venomous-Spiders-and-other-Dangerous-Animals-and-Insects>);

INSECTS AND ARACHNIDS

Stinging or biting insects or arachnids in the area of Bien Hoa Airbase Area include mosquitoes, centipedes, bees, wasps, ticks, and various spiders. SOPs for reducing the chance of insect bites or stings and for treating bites or stings are listed below.

PREVENTIVE MEASURES

- Participants should keep as much skin area covered as possible by wearing long-sleeved shirts, long pants, and a hat. Pant legs should be tucked into socks or boots and shirts into pants. In addition, participants should wear light colored clothing.
- Insect repellent containing 20-30% DEET or 20% Picaridin should be used on exposed skin, and permethrin should be sprayed on or soaked into clothing. Application of DEET or permethrin on skin should be repeated if perspiring or if working in rainy conditions.
- Avoid areas of standing water where mosquitoes generally breed and inhabit.
- Tall grasses and brush that could harbor mosquitoes, ticks, spiders, and centipedes should be avoided.
- Several times during the day and at the end of the day, each participant should perform a check for evidence of imbedded ticks or previous bites. Particular attention should be paid to the scalp, neck, ankles, back of the legs, and waist.
- When opening well covers, vaults, or other closed items, participants should watch for hornet or wasp nests, spiders, and centipedes. Participants should never reach into spaces where they cannot clearly see their hands and arms.
- Participants should watch carefully for stinging insects around open beverages or food.
- Participants with known allergic response to insect stings must inform the CSO and LSECS at the beginning of each field effort and must carry an antidote kit if so advised by their physician.
- A person suspected of being stung or bitten by a centipede, spider, or a scorpion must receive immediate medical attention. The sting of the giant Vietnamese centipede is particularly painful, and the venom of several spiders and scorpions can cause various illnesses if not treated properly and immediately.

TREATMENTS

Bee or Wasp Stings

If stung by a bee or wasp:

Carefully remove the stinger (if present).

Wash thoroughly with soap and water.

Apply cold pack.

Use antidote kit if known to be allergic. Call for emergency assistance if symptoms appear.

Monitor for allergic reaction:

Extreme swelling;

Redness;

Pain;

Face, neck or tongue swelling;

Difficulty breathing.

Spider Bites

Many varieties of spiders are present in Vietnam, including the Giant Golden Orb, Yellow Sac, Grass Cross, Jumping, and Tarantula. While their bites are painful and may require first aid and monitoring, none are considered extremely hazardous.

Wash the bite area with soap and water.

Apply cold pack.

Monitor for allergic reaction.

Extreme swelling;

Redness;

Pain;

Face, neck or tongue swelling;

Difficulty breathing.

Request advanced medical care if symptoms persist.

Centipede Stings

The Vietnamese Giant Centipede is a poisonous, aggressive arachnid, which grows up to 20 cm in length. One death has been reported in the Pacific as a result of a centipede sting to the head. Although not normally a medical emergency, their sting is extremely painful and immediate treatment is required.

Wash the area with soap and water.

Apply hot water or hot compress to help deactivate the poison.

Follow hot pack with ice/cold pack.

- Monitor for allergic reaction.
 - Extreme swelling;

Redness;

Pain;

Face, neck or tongue swelling;

Difficulty breathing.

Seek immediate advanced medical care for the pain or for secondary infection.

Mosquitoes

Mosquitoes in Vietnam are known to carry a variety of diseases, including:

Zika Virus

Causes severe birth defects and diseases in infants born to pregnant women infected with the virus. Pregnant participants should avoid travel to Vietnam.

No known treatment or immunization.

Dengue

Peak transmission during the rainy season.

Flu-like symptoms, high fever, pain behind the eyes, muscle, joint, and bone pain, severe headache, and red rash.

No known treatment or immunization.

Chikungunya

Carriers typically found in and around urban and suburban dwellings.

Peak transmission during the rainy season.

Sudden onset high fever, severe muscle and joint pain, headache, fatigue, nausea, vomiting, and rash. Joint pain can last for several months.

No known treatment or immunization.

Malaria

Not active in the Bien Hoa Airbase Area at this time, but present in most rural areas in Vietnam.

Some strains are resistant to conventional drug treatment.

Requires pretreatment with antimalarial drugs before, during, and after visiting the area.

Japanese Encephalitis - Mosquito-Borne

Transmitted by evening-biting mosquitoes that have fed on infected wildlife.

High fever, severe headache, vomiting, diarrhea, fatigue and weakness. Some neurological symptoms.

20-30% fatality rate.

No antiviral treatment available.

Immunization available.

Snakes

Of approximately 140 species of snakes identified in Vietnam, at least 37 are poisonous and potentially harmful to humans, including:

1. *Azemiops feae* – Fea's Viper
2. *Bungarus candidus* – Malayan Krait, Common Krait, Blue Krait, Javan Krait
3. *Bungarus fasciatus* – Banded Krait, Golden Banded Snake
4. *Bungarus flaviceps* – Red-headed Krait, Yellow-Headed Krait, Kinabalu Krait
5. *Bungarus slowinskii* – Red River Krait
6. *Calliophis intestinalis* – Banded Long-glanded Coral Snake, Brown Long-glanded Coral Snake
7. *Calliophis maculiceps* – Small-spotted Coral Snake
8. *Calloselasma rhodostoma* – Malayan Pit Viper
9. *Daboia siamensis* – Eastern Russell's Viper, Daboia, Siamese Russell's Viper
10. *Deinagkistrodon acutus* – Sharp-nosed Pit Viper, Hundred-pacer
11. *Naja atra* – Chinese Cobra, Taiwan Cobra, Formosan Cobra
12. *Naja kaouthia* – Monocellate Cobra, Thailand Cobra, Monacled Cobra
13. *Naja siamensis* – Thai Spitting Cobra
14. *Ophiophagus hannah* – King Cobra, Hamadryad, Jungle Cobra
15. *Ovophis monticola* – Mountain Pit Viper, Blotched Pit Viper,

16. *Ovophis tonkinensis* – Tonkin Pit Viper
17. *Protobothrops cornutus* – Horned Pit Viper, Fan-Si-Pan Horned Pit Viper
18. *Protobothrops jerdonii* – Jerdon's Pit Viper, Bourret's Pit Viper
19. *Protobothrops mucrosquamatus* – Chinese Habu, Taiwanese Pit Viper
20. *Rhabdophis angeli* – Angel's Keelback
21. *Rhabdophis callichroma* –
22. *Rhabdophis chrysargos* – Speckle-bellied Keelback
23. *Rhabdophis nigrocinctus* – Green Keelback, Banded Keelback
24. *Rhabdophis nuchalis* – Hubei Keelback
25. *Rhabdophis subminiatus* – Red-necked Keelback, Heller's Keelback
26. *Sinomicrurus kelloggi* – Kellog's Coral Snake
27. *Sinomicrurus macclellandi* – Macclelland's Coral Snake
28. *Triceratolepidophis sieversorum* – Three Horned-scaled Pitviper
29. *Trimeresurus albolabris* – White-lipped Green Pit Viper, White-lipped Pit Viper, White-lipped Tree Viper
30. *Trimeresurus gumprechtii* – Gumprecht's Green Pit Viper
31. *Trimeresurus macrops* – Dark Green Pit Viper, Large-eyed Pit Viper
32. *Trimeresurus popeiorum* – Pope's Pit Viper, Pope's Green Pit Viper
33. *Trimeresurus stejnegeri* – Chinese Bamboo Pit Viper, Chinese Green Tree Viper
34. *Trimeresurus truongsongensis* – Quang Binh Pitviper
35. *Trimeresurus vogeli* – Vogel's Green Pitviper, Vogel's Pitviper
36. *Tropidolaemus philippinensis* – South Philippine Temple Pit Viper
37. *Tropidolaemus wagleri* – Wagler's Pit Viper, Temple Pit Viper

Preventive Measures

During site reconnaissance activities:

Assume that every snake you see is poisonous. If you see a snake, avoid it.

Do not walk through tall vegetation where you cannot see your feet or the path you are walking.

Do not reach down into vegetation or any place where you cannot see your hands.

Be watchful of overhanging vegetation and do not brush against it. Many vipers live in trees and will drop onto anyone standing or walking under overhanging limbs or vines.

If you are bitten by any kind of snake, request emergency medical assistance IMMEDIATELY.

If you are bitten, do not attempt to catch the snake. Request assistance from another person on the site to identify the species IF POSSIBLE.

If you encounter a snake, note the location on site maps for future reference by anyone performing site activities.

First Aid for Snake Bites

Anyone who has been bitten by a snake must be transported immediately to the nearest hospital facility while first aid measures are administered:

Move the victim away from the area where the bite occurred. If the snake is still attached, use a stick or other tool – NOT hands – to make it detach.

Remove tight clothing or jewelry from near the bite since severe swelling can occur.

Reassure the victim.

Position victim so the bite is at or below heart level.

Completely immobilize the victim. If bitten on an extremity, immobilize the limb with a splint.
Clean the wound but don't flush with water. Apply a clean dry dressing to the bite to keep it covered.
Pain near the bite site may be severe, but do not administer anything by mouth.
Vomiting may occur so monitor the victim and roll them to their left side to prevent choking.
Closely monitor airway and breathing and administer CPR if needed.

DO NOT:

Apply a tourniquet.

Cut or excise the area around the bite.

Use suction.

Apply poultices, ointments, or folk remedies to the bite.

Apply ice or heat to the wound site.

Administer medication, alcohol, or caffeine.

Treating medical personnel may prescribe acetaminophen (Paracetamol or Tylenol) for pain, which can be extreme.

Dogs and Other Mammals

Dogs, other house pets, and bats are considered potential carriers of rabies, whether domesticated house pets or stray/feral animals. The population of stray/street dogs in Vietnam has grown in recent years, and encounters with them are likely on the site. Many of the dogs are feral and have always lived on streets or in open areas. Some are also stray house pets that have been released into the area. None of the dogs should be considered approachable, as many are not human-friendly. In addition, because they are not properly cared for by veterinarians, they are infested with various parasites and rabies.

Parasites can be transmitted by simply touching an infected animal. Rabies can be transmitted by transmission of saliva from the infected animal by biting or licking, or by being scratched by the animal's claws or nails.

Preventive Measures

During site reconnaissance activities:

Do not approach or touch any animals that approach you. Contact with the animals should be avoided.

Report the presence of the animal to the CSO and LSECS whether or not symptoms of rabies are present.

Note the location of any animals on site maps for future reference by anyone performing site activities.

Do not feed or offer water to any animals on site.

If a dead animal is found on the site, do not touch it, as it could be infested with parasites.

Avoid animal droppings.

First Aid for Animal Bites or Scratches

Anyone who has been bitten or scratched by an animal on site must seek immediate medical attention. Do not attempt to capture the animal. Report the incident to Vietnamese military official present at the Airbase.

- Wash the area thoroughly with soap and water.
- Apply antibiotic cream and cover with a clean bandage.
- Seek advanced medical care at the nearest hospital facility.

Chemical Information: Dioxin and Arsenic

The following section includes Safety Data Sheets (SDSs) for Dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin or 2,3,7,8-TCDD) and Arsenic Compounds. Sources are:

Safety Data Sheets (SDSs)

[Dioxin 1746-01-6](#)

[Arsenic 7440-38-2](#)

Additional information is available on the following websites:

US Environmental Protection Agency (USEPA)

[USEPA Bulletin - Dioxin](#)

[USEPA Supporting Documents - Dioxin](#)

[USEPA Bulletin - Arsenic Compounds](#)

National Institute for Occupational Safety and Health (NIOSH) Pocket Guide

[NIOSH Pocket Guide - Dioxin](#)

[NIOSH Pocket Guide - Arsenic](#)

SAFETY DATA SHEET

Version 6.1
Revision Date 06/17/2019
Print Date 08/18/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN
1X1&

Product Number : 48599
Brand : Supelco
Index-No. : 601-021-00-3
CAS-No. : 1746-01-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure (Category 2), Central nervous system, H373
Aspiration hazard (Category 1), H304
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word	Danger
Hazard statement(s)	
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs (Central nervous system) through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Synonyms : 2,3,7,8-TCDD

Supelco - 48599

Page 2 of 10

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

**Millipore
Sigma**

Component	Classification		Concentration
Toluene			
CAS-No.	108-88-3	Flam. Liq. 2; Skin Irrit. 2; Repr. 2; STOT SE 3; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; H225, H315, H361, H336, H373, H304, H401 Concentration limits: 20 %: STOT SE 3, H336;	>= 90 - <= 100 %
EC-No.	203-625-9		
Index-No.	601-021-00-3		
Registration number	01-2119471310-51-XXXX		
2,3,7,8-Tetrachlorodibenzo-p-dioxin			
CAS-No.	1746-01-6	Acute Tox. 1; Skin Irrit. 2; Carc. 1A; Repr. 1B; STOT SE 1; Aquatic Chronic 1; H300, H310, H315, H350, H360, H370, H410 M-Factor - Aquatic Chronic: 100.000	< 0.1 %
EC-No.	217-122-7		

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Dry powder Dry sand

Unsuitable extinguishing media

Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Toluene	108-88-3	TWA	100 ppm 375 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	150 ppm 560 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
	Remarks	Z37.12-1967		
		CEIL	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		Peak	500 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Visual impairment Female reproductive Pregnancy loss 2018 Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 375 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 560 mg/m3	USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Toluene	108-88-3	Toluene	0.02 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to last shift of workweek			
		Toluene	0.03 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

		o-Cresol	0.3mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|--|------------------------------------|
| a) Appearance | Form: liquid
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | No data available |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | 4 °C (39 °F) - closed cup |

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

Hazardous decomposition products formed under fire conditions. - Carbon oxides

In the event of fire: see section 5

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity**

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations**13.1 Waste treatment methods****Product**

Contact a licensed professional waste disposal service to dispose of this material. Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information**DOT (US)**

UN number: 1294 Class: 3
Proper shipping name: Toluene
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

Packing group: II

IMDG

UN number: 1294 Class: 3
Proper shipping name: TOLUENE

Packing group: II

EMS-No: F-E, S-D

IATA

UN number: 1294 Class: 3
Proper shipping name: Toluene

Packing group: II

SECTION 15: Regulatory information**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
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SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Toluene	CAS-No. 108-88-3	Revision Date 2007-07-01
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SECTION 16: Other information

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.1

Revision Date: 06/17/2019

Print Date: 08/18/2019

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: As
Molecular weight	: 74.92 g/mol
CAS-No.	: 7440-38-2
EC-No.	: 231-148-6
Index-No.	: 033-001-00-X

Hazardous components

Component	Classification	Concentration
Arsenic		
	Acute Tox. 4; Acute Tox. 3; Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H302, H331, H350, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Arsenic	7440-38-2	TWA	0.01 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lung cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen		

		C	0.0020 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A 15 minute ceiling value		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	inorganic arsenic plus methylated metabolites	35µg As/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of the workweek (After four or five consecutive working days with exposure)			

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: powder Colour: light grey, black
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point/range: 817 °C (1,503 °F) - lit.
f) Initial boiling point and boiling range	613 °C (1,135 °F) - lit.
g) Flash point	Not applicable
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	5.727 g/mL at 25 °C (77 °F)
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat Exposure to air may affect product quality.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Arsenic oxides
Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 763 mg/kg

Remarks: Behavioral:Ataxia. Diarrhoea

LD50 Oral - Mouse - 145 mg/kg

Remarks: Behavioral:Ataxia. Diarrhoea

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Carcinogenicity

No data available

IARC: 1 - Group 1: Carcinogenic to humans (Arsenic)

NTP: Known - Known to be human carcinogen (Arsenic)

OSHA: OSHA specifically regulated carcinogen (Arsenic)

Reproductive toxicity

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CG0525000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 9.9 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 3.8 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1558 Class: 6.1 Packing group: II
Proper shipping name: Arsenic
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1558 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: ARSENIC
Marine pollutant: yes

IATA

UN number: 1558 Class: 6.1 Packing group: II
Proper shipping name: Arsenic

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D004 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

New Jersey Right To Know Components

Arsenic	CAS-No. 7440-38-2	Revision Date 2015-11-23
California Prop. 65 Components		
WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No. 7440-38-2	Revision Date 2007-09-28
Arsenic		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H331	Toxic if inhaled.
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.13

Revision Date: 09/12/2018

Print Date: 05/10/2019

PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

For the Contractor Site Walk at the Bien Hoa Airbase Area, the following are examples of the PPE required under this Site Walk HASP.

HARD-TOED FOOTWARE (WORK BOOTS)



HEARING PROTECTION (IF AIRCRAFT ARE ACTIVE)



HARD HAT (WORN AS REQUIRED BY HOST)



HI-VISIBILITY SAFETY VEST (WORN AS REQUIRED BY HOST)



For the Contractor Site Walk at the Bien Hoa Airbase Area, the following are examples of the PPE considered **optional** under this Site Walk HASP.

EYE PROTECTION (IN WINDY CONDITIONS)



BOOT COVERS (FOR WET OR MUDDY CONDITIONS)



STANDARD OPERATING PROCEDURES BEFORE, DURING, AND AFTER SITE WALK

BEFORE SITE WALK

- Attend the safety briefing presented by the CSO and LSECS.
- Read and sign the HASP.
- Ask questions if you are in doubt as to what to do.
- Have all required PPE ready on hand.
- Ensure your personal drinking water supply.
- Locate the first aid kit, hand sanitizers, and wound cleaning supplies.
- Be prepared with a clean change of clothing and shoes in the event that dusty or muddy conditions are encountered.
- If dusty conditions are encountered, site walk may be postponed until conditions improve.

DURING THE SITE WALK

Site Walk includes only non-intrusive activities. Participants will remain in vehicles or on improved/paved/hard-surfaced areas.

- Do not wander away from the group. Remain with your USAID escorts.
- Standing water (puddles) are to be avoided to prevent slipping and minimize spread of sludge/soil onto clothing and boots.
- If conditions are windy, use eye protection to prevent injury by flying small debris.
- Do not enter any vegetation-covered areas or stand under trees or vines to prevent snakebite or contamination.
- Treat all snakes as poisonous. Do not approach or attempt to handle.
- Do not approach or touch any stray animals, as they may carry parasites and rabies.
- Check your skin for ticks during and after the site walk.
- Use mosquito/tick repellent prior to site entry. Reapply as needed.
- Use sunscreen and reapply as needed.
- Report any injury to the CSO and LSECS immediately. Any break in the skin will require attention. A first aid kit is available on site.
- In the event of thunderstorms, site walk activities will be discontinued immediately and shelter taken in vehicles or solid structures. Do not take shelter under trees or open canopy structures.
- In the event of dusty conditions, personnel will remain in vehicles. Site walk activities may be cancelled if conditions persist.
- All steps will be taken to prevent heat-related illness including consumption of water, dressing to suit weather conditions, taking breaks in air-conditioned vehicles or in shaded areas other than under trees, and monitoring each other for signs of heat stress.

- Keep your head and neck shaded as much as possible.
- If the site is wet, any permeable materials dropped on the ground will require disposal. Gloves will be required to retrieve such materials to place in garbage bags.
- Care shall be taken to prevent contamination of clothing, boots, and vehicle interiors during the site walk.
- If you are injured or ill, request assistance from the SHSP immediately.
- Be watchful of others in your group. Monitor for signs of heat stress or other illness.

AFTER THE SITE WALK

- Check all clothing for dust and brush it off (brushing downward and away from the face). Assist the other members of the group in removing as much dust as possible.
- Check boots for soil or mud. Clean off as much as possible until a water source can be located to remove with water.
- If soil or dust is sticking to clothing, remove clothing and place into plastic bag. Brush hair to remove dust, and place brush in plastic bag with soiled clothing. Wash hands, face, and other exposed skin with soap and water. If not available, use wet wipes. Last, change into clean clothes and shoes (see “Before Site Walk”).
- Do not wear soiled clothing again until after laundering.
- Do not wear boots again until thoroughly clean and dry.
- Check skin and clothing for ticks. Report any tick bites and request first aid.
- Ensure that any PPE, plans, notes, books, phones, or other materials brought onto the site are free of dust and mud.