

INTERIM  
FINAL



# Technical Guidance Manual for the Implementation of the Hawai`i State Contingency Plan

## SECTION 3

### SITE INVESTIGATION DESIGN AND IMPLEMENTATION



**CONTENTS**

**Acronyms and Abbreviations.....3-3**

**3.0 Site Investigation Design and Implementation .....3-4**

**3.1 Site Investigation Scoping.....3-6**

3.1.1 Review Site History and Existing Data .....3-6

3.1.2 Consult with Stakeholders.....3-7

3.1.3 Review the Overall Site Investigation Approach.....3-7

**3.2 Systematic Planning of Site Investigation.....3-8**

3.2.1 Overview of Systematic Planning Steps.....3-12

**3.3 Conceptual Site Models .....3-30**

3.3.1 Summarize Known Site Conditions .....3-30

3.3.2 Screen for Potential Environmental Hazards .....3-31

3.3.3 Default Conceptual Site Models.....3-32

3.3.4 Advanced Conceptual Site Models .....3-33

3.3.5 Maintaining and Updating the Conceptual Site Model .....3-40

**3.4 Selection of Decision Units.....3-42**

3.4.1 Decision Units Associated with Exposure Areas.....3-42

3.4.2 Decision Units Associated with Spill Areas .....3-44

3.4.3 Evaluation of Decision Unit Data.....3-45

**3.5 Example Decision Units .....3-47**

3.5.1 Former Transformer Pad.....3-47

3.5.2 Former Agricultural Area .....3-47

3.5.2.1 Pesticide Storage and Mixing Area Decision Units .....3-49

3.5.2.2 Field Area Decision Units .....3-51

**3.6 Sampling and Analysis Plans .....3-59**

3.6.1 Sample Collection Strategy.....3-60

3.6.2 Sampling Collection Methods.....3-61

3.6.3 Health and Safety Plans.....3-61



**3.7 Quality Assurance Project Plans.....3-63**

**3.8 Data Quality Assessment.....3-65**

    3.8.1 Data Validation.....3-65

    3.8.2 Data Quality Assessment.....3-65

**3.9 Site Investigation Reports.....3-68**

**3.10 Environmental Hazard Evaluation.....3-70**

**References.....3-72**

**FIGURES**

Figure 3-1. Expanded Overview of the Site Assessment Process.....3-4

Figure 3-2. Nine Steps of the Systematic Planning Approach.....3-8

Figure 3-3. Summary of Environmental Hazards Considered in a Typical Environmental Hazard Evaluation .....3-26

Figure 3-4. Pictorial Conceptual Site Model .....3-30

Figure 3-5. Four Default Conceptual Site Models provided in the HDOH Tier 1 EALs .....3-32

Figure 3-6. Default Conceptual Site Model.....3-34

Figure 3-7. Expanded Conceptual Site Model.....3-37

Figure 3-8. Model/example of Exposure Area Decision Units ...3-44

Figure 3-9. Decision Unit to Investigate Suspected PCB Spill...3-47

Figure 3-10. Decision Unit for Large Agricultural Site.....3-48

Figure 3-11. Decision Units at an Industrial Site.....3-49

Figure 3-12. Former and Planned Uses as Bases for Decision Units .....3-50

Figure 3-13. Example Neighborhood-Scale Decision Units.....3-52

Figure 3-14. Example Lot Scale Decision Units .....3-55

Figure 3-15. Hypothetical Lot-Size Decision Units .....3-56

Figure 3-16. Grouped Lots for Decision Units at a Proposed Residential Site.....3-57

Figure 3-17. Decision Units to Investigate a Contaminated Commercial Site .....3-58



### ACRONYMS AND ABBREVIATIONS

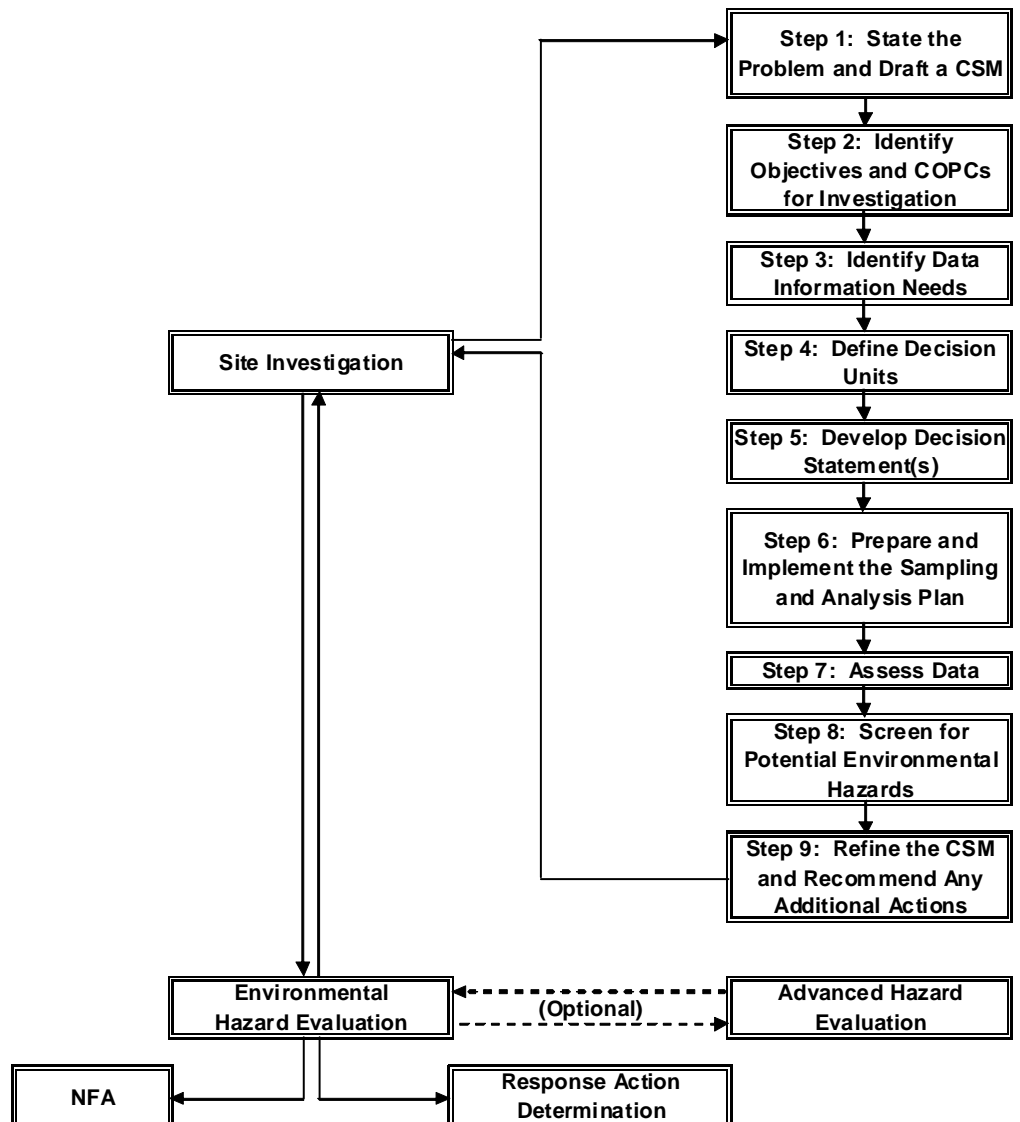
<b>ASTM</b>	American Society for Testing and Materials
<b>CFR</b>	Code of Federal Regulations
<b>COPC</b>	Chemicals of Potential Concern
<b>CSM</b>	Conceptual Site Model
<b>Dioxins</b>	Polychlorinated dibenzodioxins
<b>DQA</b>	Data Quality Assessment
<b>DQO</b>	Data Quality Objectives
<b>DU</b>	Decision Unit
<b>EAL</b>	HDOH Tier 1 Environmental Action Level
<b>EHE</b>	Environmental Hazard Evaluation
<b>FID</b>	Flame ionization detector
<b>Ft2</b>	Square feet
<b>furans</b>	Polychlorinated dibenzofurans
<b>HAR</b>	Hawai'i Administrative Rules
<b>HAZWOPER</b>	Hazardous Waste Operations and Emergency Response
<b>HASP</b>	Health and Safety Plan
<b>HDOH</b>	Hawai'i Department of Health
<b>HEER Office</b>	Hazard Evaluation and Emergency Response Office
<b>HIOSH</b>	Hawai'i Occupational Safety and Health Administration
<b>HRS</b>	Hawai'i Revised Statutes
<b>mg/kg</b>	Milligrams per kilogram
<b>OSHA</b>	Occupational Safety and Health Administration
<b>%</b>	Percent
<b>PAH</b>	Polynuclear Aromatic Hydrocarbon
<b>PCB</b>	Polychlorinated biphenyl
<b>PID</b>	Photoionization detector
<b>PQL</b>	Practical Quantitation Limit
<b>QC</b>	Quality Control
<b>QA</b>	Quality Assurance
<b>QAPP</b>	Quality Assurance Project Plan
<b>RL</b>	Reporting Limit
<b>RSD</b>	Relative standard deviation
<b>SAP</b>	Sampling and Analysis Plan
<b>SCP</b>	Hawai'i State Contingency Plan
<b>SPLP</b>	Synthetic Precipitation Leaching Procedure
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TGM</b>	Technical Guidance Manual
<b>UCL</b>	Upper Confidence Level
<b>USEPA</b>	United States Environmental Protection Agency
<b>VSP</b>	Visual Sample Plan
<b>XRF</b>	X-Ray Fluorescence



3.0 SITE INVESTIGATION DESIGN AND IMPLEMENTATION

This section of the Technical Guidance Manual (TGM) provides an overview of the most important elements in the site assessment process – the Site Investigation [Figure 3-1 (below); refer also to Figure 2-1 in Section 2].

Figure 3-1. Expanded Overview of the Site Assessment Process



The purpose of conducting a site investigation is to collect environmental data to evaluate site conditions (“how bad is it?”) in order to support decision-making (“what should we do about it?”). Site investigations may be carried out at different stages of the



State Contingency Plan (SCP) process to collect data to answer a wide variety of questions, such as:

- Has a hazardous substance release occurred at the site?
- Does the release pose an environmental hazard? If so, under what circumstances?
- What method should be used to clean up this site?
- Has the cleanup eliminated the environmental hazard?
- What is the extent and magnitude of contamination caused by the release?

The scope and detail of the site investigation varies greatly from site to site, depending on the questions the investigation is intended to answer and the site complexity. A **systematic planning approach** is recommended to ensure that the data collected during the site investigation is of the type and quality needed to meet the overall site assessment objectives. In addition, the Site Investigation and Environmental Hazard Evaluation (EHE, see Section 13) stages of the site assessment process are necessarily interlinked and iterative (refer to Figure 3-1). The EHE is continually updated as additional site investigation data are obtained; these updates support further guidance for the site investigation.

For example, detection of high levels of tetrachloroethylene in groundwater during a site investigation may suggest vapor intrusion as a potential environmental hazard; this may trigger an investigation of soil gas data near existing buildings and expand the scope of the groundwater investigation. Linking the Site Investigation and Environmental Hazard Evaluation stages of the process in this manner from the very beginning of the project improves the effectiveness and efficiency of the overall site assessment process. This in turn helps to expedite completion of the project and avoid costly and unnecessary delays in site redevelopment.