

## **ATTACHMENT 6**

### **SCOPE OF WORK FOR CORRECTIVE MEASURES IMPLEMENTATION**

#### **PURPOSE**

The purpose of the Corrective Measures Implementation (CMI) program is to design, construct, operate, maintain and monitor the performance of the corrective measure or measures selected by the Department. Corrective measures are intended to protect human health and/or the environment from hazardous waste releases from the Facility. The Owner/Operator or Respondent will furnish all personnel, materials and services necessary to implement the corrective measures program.

#### **SCOPE**

The documents required for Corrective Measures Implementation are, unless the Department of Toxic Substances Control (Department) specifies otherwise, a Corrective Measures Implementation Workplan, Operation and Maintenance Plan, Draft Plans and Specifications, Final Plans and Specifications, Construction Workplan, Construction Completion Report and Corrective Measure Completion Report. The scope of work (SOW) for each document is specified below. The SOWs are intended to be flexible documents capable of addressing both simple and complex site situations. If the Owner/Operator or Respondent can justify, to the satisfaction of the Department, that a plan and/or report or portions thereof are not needed in the given site specific situation, then the Department may waive that requirement.

The scope and substance of the CMI should be focused to fit the complexity of the site-specific situation. Not all of the documents included in the CMI SOW may be needed for every facility.

The Department may require the Owner/Operator or Respondent to conduct additional studies beyond what is discussed in the SOWs in order to support the CMI program. The Owner/Operator or Respondent will furnish all personnel, materials and services necessary to conduct the additional tasks.

#### **A. Corrective Measures Implementation Workplan**

The Owner/Operator or Respondent shall prepare a CMI Workplan that clearly describes the size, shape, form, and content of the proposed corrective measure, the key components or elements that are needed, describes the designers vision of the corrective measure in the form of conceptual drawings and schematics, and includes procedures and schedules for implementing the corrective

measure(s).

Note that more than one CMI Workplan may be needed in situations where there is a complex site with multiple technologies being employed at different locations. The CMI Workplan must be approved by the Department prior to implementation. The CMI Workplan must, at a minimum, include the following elements:

1. Introduction/Purpose

Describe the purpose of the document and provide a summary description of the project.

2. Media Cleanup Standards

Discuss the media cleanup standards for the facility.

3. Conceptual Model of Contaminant Migration

It is important to know where the contaminants are and to understand how they are moving before an adequate corrective measure can be developed. To address this critical question, the Owner/Operator or Respondent must present a conceptual model of the site and contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed by looking at the applicable physical parameters (e.g., water solubility, density, Henry's Law Constant, etc.) for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to ground water, etc.). Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found. This analysis may have already been done as part of earlier work (e.g., Current Conditions Report). If this is the case, then provide a summary of the conceptual model with a reference to the earlier document. If not, then field validation of the conceptual model is required.

4. Description of Corrective Measures

Considering the conceptual model of contaminant migration, qualitatively describe what the corrective measure is supposed to do and how it will function at the Facility. Discuss the constructability of the corrective measure and its ability to meet the corrective measure objectives.

5. Data Sufficiency

Review existing data needed to support the design effort and establish whether

or not there are sufficient accurate data available for this purpose. The Owner/Operator or Respondent must summarize the assessment findings and specify any additional data needed to complete the corrective measure design. The Department may require or the Owner/Operator or Respondent may propose that sampling and analysis plans and/or treatability study workplans be developed to obtain the additional data. Submittal times for any new sampling and analysis plans and/or treatability study workplans must be included in the project schedule.

6. Project Management

Describe the management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will direct the corrective measure design and implementation effort (including contractor personnel).

7. Project Schedule

The project schedule must specify all significant steps in the process and when all CMI deliverables (e.g., Operation and Maintenance Plan, Corrective Measure Construction Workplan, etc.) are to be submitted to the Department.

8. Design Criteria

Specify performance requirements for the overall corrective measure and for each major component. The Owner/Operator or Respondent must select equipment that meets the performance requirements.

9. Design Basis

Discuss the process and methods for designing all major components of the corrective measure. Discuss the significant assumptions made and possible sources of error. Provide justification for the assumptions;

10. Conceptual Process/Schematic Diagrams.

11. Site plan showing preliminary plant layout and/or treatment area.

12. Tables listing number and type of major components with approximate dimensions.

13. Tables giving preliminary mass balances.

14. Site safety and security provisions (e.g., fences, fire control, etc.).

15. Waste Management Practices

Describe the wastes generated by the construction of the corrective measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

16. Required Permits

List and describe the permits needed to construct and operate the corrective measure. Indicate on the project schedule when the permit applications will be submitted to the applicable agencies and an estimate of the permit issuance date.

17. Long-Lead Procurement Considerations

The Owner/Operator or Respondent shall prepare a list of any elements or components of the corrective measure that will require custom fabrication or for some other reason must be considered as long-lead procurement items. The list must include the reason why the items are considered long-lead items, the length of time necessary for procurement, and recognized sources of such procurement;

18. Appendices including:

Design Data - Tabulations of significant data and assumptions used in the design effort;

Equations - List and describe the source of major equations used in the design process;

Sample Calculations - Present and explain one example calculation for significant or unique design calculations; and Laboratory or Field Test Results.

## **B. Operation and Maintenance Plan**

The Owner/Operator or Respondent shall prepare an Operation and Maintenance (O&M) Plan that includes a strategy and procedures for performing operations, long term maintenance, and monitoring of the corrective measure. A draft Operation and Maintenance Plan shall be submitted to the Department simultaneously with the draft Plans and Specifications. A final Operation and Maintenance Plan shall be submitted to the Department simultaneously with the final Plans and Specifications. The O&M plan shall, at a minimum, include the following elements:

### **1. Introduction/Purpose**

Describe the purpose of the document and provide a summary description of the project.

### **2. Project Management**

Describe the management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will operate and maintain the corrective measures (including contractor personnel);

### **3. System Description**

Describe the corrective measure and identify significant equipment.

### **4. Personnel Training**

Describe the training process for O&M personnel. The Owner/Operator or Respondent shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

### **5. Start-Up Procedures**

Describe system start-up procedures including and operational testing.

### **6. Operation and Maintenance Procedures**

Describe normal operation and maintenance procedures including:

- a. Description of tasks for operation;
- b. Description of tasks for maintenance;

- c. Description of prescribed treatment or operation conditions; and
- d. Schedule showing frequency of each O&M task.

7. Replacement schedule for equipment and installed components.

8. Waste Management Practices

Describe the wastes generated by operation of the corrective measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

9. Sampling and Monitoring

Sampling and monitoring activities may be needed for effective operation and maintenance of the corrective measure. If sampling activities are necessary, the O&M plan must include a complete sampling and analysis section which specifies at a minimum the following information:

- a. Description and purpose of monitoring tasks;
- b. Data quality objectives;
- c. Analytical test methods and detection limits;
- d. Name of analytical laboratory;
- e. Laboratory quality control (include laboratory QA/QC procedures in appendices)
- f. Sample collection procedures and equipment;
- g. Field quality control procedures:
  - o duplicates (10% of all field samples)
  - o blanks (field, equipment, etc.)
  - o equipment calibration and maintenance
  - o equipment decontamination
  - o sample containers
  - o sample preservation
  - o sample holding times (must be specified)
  - o sample packaging and shipment
  - o sample documentation (field notebooks, sample labeling, etc);
  - o chain of custody;
- h. Criteria for data acceptance and rejection; and
- i. Schedule of monitoring frequency.  
The Owner/Operator or Respondent shall follow all Department and USEPA guidance for sampling and analysis. The Department may request that the sampling and analysis section be a separate document.

10. Corrective Measure Completion Criteria

Describe the process and criteria (e.g., ground water cleanup goal met at all compliance points for one year) for determining when corrective measures may cease. Also describe the process and criteria for determining when maintenance and monitoring may cease. Criteria for corrective measures such as a landfill cap must be carefully crafted to account for the fact that a landfill cap will never actually "cease" but will need to be maintained and monitored for a long period of time. Satisfaction of the completion criteria will trigger preparation and submittal of the Corrective Measure Completion Report.

11. O&M Contingency Procedures:

- a. Procedures to address system breakdowns and operational problems including a list of redundant and emergency back-up equipment and procedures;
- b. Should the corrective measure suffer complete failure, specify alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and/or the environment or exceed cleanup standards;
- c. The O&M Plan must specify that, in the event of a major breakdown and/or complete failure of the corrective measure (includes emergency situations), the Owner/Operator or Respondent will orally notify the Department within 24 hours of the event and will notify the Department in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on human health and/or the environment; and
- d. Procedures to be implemented in the event that the corrective measure is experiencing major operational problems, is not performing to design specifications and/or will not achieve the cleanup goals in the expected timeframe. For example, in certain circumstances both a primary and secondary corrective measure may be selected for the Facility. If the primary corrective measure were to fail, then the secondary would be implemented. This section would thus specify that if the primary corrective measure failed, then design plans would be developed for the secondary measure.

12. Data Management and Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data.

The O&M Plan shall specify that the Owner/Operator or Respondent collect and

maintain the following information:

- a. Progress Report Information
  - o Work Accomplishments (e.g., performance levels achieved, hours of treatment operation, treated and/or excavated volumes, concentration of contaminants in treated and/or excavated volumes, nature and volume of wastes generated, etc.).
  - o Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).
- b. Monitoring and laboratory data;
- c. Records of operating costs; and
- d. Personnel, maintenance and inspection records.  
These data and information should be used to prepare Progress Reports and the Corrective Measure Completion Report.

## C. Draft Plans and Specifications

**[Note - The Owner/Operator or Respondent may propose or the Department may require the submittal of other draft plans and specifications.]**

The Owner/Operator or Respondent shall prepare draft Plans and Specifications that are based on the CMI Workplan but include additional design detail. A draft Operation and Maintenance Plan and Construction Workplan shall be submitted to the Department simultaneously with the draft Plans and Specifications. The draft design package must include drawings and specifications needed to construct the corrective measure. Depending on the nature of the corrective measure, many different types of drawings and specifications may be needed. Some of the elements that may be required are:

- o General Site Plans
- o Process Flow Diagrams
- o Mechanical Drawings
- o Electrical Drawings
- o Structural Drawings
- o Piping and Instrumentation Diagrams
- o Excavation and Earthwork Drawings
- o Equipment Lists
- o Site Preparation and Field Work Standards
- o Preliminary Specifications for Equipment and Material

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications to the Department, the Owner/Operator or Respondent shall:

- a. Proofread the specifications for accuracy and consistency with the CMI Workplan; and
- b. Coordinate and cross-check the specifications and drawings.

#### **D. Final Plans and Specifications**

The Owner/Operator or Respondent shall prepare final Plans and Specifications that are sufficient to be included in a contract document and be advertised for bid. A final Operation and Maintenance Plan and Construction Workplan shall be submitted to the Department simultaneously with the final Plans and Specifications. The final design package must consist of the detailed drawings and specifications needed to construct the corrective measure. Depending on the nature of the corrective measure, many different types of drawings and specifications may be needed. Some of the elements that may be required are:

- o General Site Plans
- o Process Flow Diagrams
- o Mechanical Drawings
- o Electrical Drawings
- o Piping and Instrumentation Diagrams
- o Structural Drawings
- o Excavation and Earthwork Drawings
- o Site Preparation and Field Work Standards
- o Construction Drawings
- o Installation Drawings
- o Equipment Lists
- o Detailed Specifications for Equipment and Material

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the final project specifications to the Department, the Owner/Operator or Respondent shall:

- a. Proofread the specifications for accuracy and consistency with the preliminary design; and
- b. Coordinate and cross-check the specifications and drawings.

## **E. Construction Workplan**

The Owner/Operator or Respondent shall prepare a Construction Workplan which documents the overall management strategy, construction quality assurance procedures and schedule for constructing the corrective measure. A draft Construction Workplan shall be submitted to the Department simultaneously with the draft Plans and Specifications and draft Operation and Maintenance Plan. A final Construction Workplan shall be submitted to the Department simultaneously with the final Plans and Specifications and final Operation and Maintenance Plan. Upon receipt of written approval from the Department, the Owner/Operator or Respondent shall commence the construction process and implement the Construction Workplan in accordance with the schedule and provisions contained therein. The Construction Workplan must be approved by the Department prior to the start of corrective measure construction. The Construction Workplan must, at a minimum, include the following elements:

### **1. Introduction/Purpose**

Describe the purpose of the document and provide a summary description of the project.

### **2. Project Management**

Describe the construction management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will direct the corrective measure construction effort and provide construction quality assurance/quality control (including contractor personnel);

### **3. Project Schedule**

The project schedule must include timing for key elements of the bidding process, timing for initiation and completion of all major corrective measure construction tasks as specified in the Final Plans and Specifications, and specify when the Construction Completion Report is to be submitted to the Department;

### **4. Construction Quality Assurance/Quality Control Program**

The purpose of construction quality assurance is to ensure, with a reasonable degree of certainty, that a completed corrective measure will meet or exceed all design criteria, plans and specifications. The Construction Workplan must include a complete construction quality assurance program to be implemented by the Owner/Operator or Respondent.

5. Waste Management Procedures

Describe the wastes generated by construction of the corrective measure and how they will be managed.

6. Sampling and Monitoring

Sampling and monitoring activities may be needed for construction quality assurance/quality control and/or other construction related purposes. If sampling activities are necessary, the Construction Workplan must include a complete sampling and analysis section which specifies at a minimum the following information:

- a. Description and purpose of monitoring tasks;
- b. Data quality objectives;
- c. Analytical test methods and detection limits;
- d. Name of analytical laboratory;
- e. Laboratory quality control (include laboratory QA/QC procedures in appendices)
- f. Sample collection procedures and equipment;
- g. Field quality control procedures:
  - o duplicates (10% of all field samples)
  - o blanks (field, equipment, etc.)
  - o equipment calibration and maintenance
  - o equipment decontamination
  - o sample containers
  - o sample preservation
  - o sample holding times (must be specified)
  - o sample packaging and shipment
  - o sample documentation (field notebooks, sample labeling, etc);
  - o chain of custody
- h. Criteria for data acceptance and rejection; and
- i. Schedule of monitoring frequency.

The Owner/Operator or Respondent shall follow all Department and USEPA guidance for sampling and analysis. The Department may request that the sampling and analysis section be a separate document.

7. Construction Contingency Procedures

- a. Changes to the design and/or specifications may be needed during construction to address unforeseen problems encountered in the field. Procedures to address such circumstances, including notification of the Department, must be included in the Construction Workplan;

- b. The Construction Workplan must specify that, in the event of a construction emergency (e.g., fire, earthwork failure, etc.), the Owner/Operator or Respondent will orally notify the Department within 24 hours of the event and will notify the Department in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on public health and/or the environment; and
  - c. Procedures to be implemented if unforeseen events prevent corrective measure construction. For example, in certain circumstances both a primary and secondary corrective measure may be selected for the Facility. If the primary corrective measure could not be constructed, then the secondary would be implemented. This section would thus specify that if the primary corrective measure could not be constructed, then design plans would be developed for the secondary measure.
8. Construction safety procedures should be specified in a separate Health and Safety Plan.
9. Data Management and Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data.

The Construction Workplan shall specify that the Owner/Operator or Respondent collect and maintain the following information:

- a. Progress Report Information
  - o Work Accomplishments (e.g., hours of operation, excavated volumes, nature and volume of wastes generated, area of cap completed, length of trench completed, etc.).
  - o Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).
- b. Monitoring and laboratory data;
- c. Records of construction costs; and
- d. Personnel, maintenance and inspection records.  
This data and information should be used to prepare progress reports and the Construction Completion Report.

## 10. Cost Estimate/Financial Assurance

If financial assurance for corrective measure construction and operation is required by an enforcement order, facility permit, or through use of Department discretion, the Construction Workplan must include a cost estimate, specify which financial mechanism will be used and when the mechanism will be established. The cost estimate shall include both construction and operation and maintenance costs. An initial cost estimate shall be included in the draft Construction Workplan and a final cost estimate shall be included in the final Construction Workplan. The financial assurance mechanism may include a performance or surety bond, a trust fund, a letter of credit, financial test and corporate guarantee equivalent to that in the California Code of Regulations, Title 22, Section 66264.143, 66265.143 or any other mechanism acceptable to the Department.

Financial assurance mechanisms are used to assure the Department that the Owner/Operator or Respondent has adequate financial resources to construct and operate the corrective measure.

## **F. Construction Completion Report**

The Owner/Operator or Respondent shall prepare a Construction Completion Report which documents how the completed project is consistent with the Final Plans and Specifications. A Construction Completion Report shall be submitted to the Department when the construction and any operational tests have been completed. The Construction Completion Report shall, at a minimum, include the following elements:

1. Purpose;
2. Synopsis of the corrective measure, design criteria, and certification that the corrective measure was constructed in accordance with the Final Plans and Specifications;
3. Explanation and description of any modifications to the Final Plans and Specifications and why these were necessary for the project;
4. Results of any operational testing and/or monitoring, indicating how initial operation of the corrective measure compares to the design criteria;
5. Summary of significant activities that occurred during construction. Include a discussion of problems encountered and how they were addressed;
6. Summary of any inspection findings (include copies of key inspection documents in appendices);
7. As built drawings; and
8. A schedule indicating when any treatment systems will begin full scale operations.

## **G. Corrective Measure Completion Report**

The Owner/Operator or Respondent shall prepare a Corrective Measure Completion Report when the Owner/Operator or Respondent believes that the corrective measure completion criteria have been satisfied. The purpose of the Corrective Measure Completion Report is to fully document how the corrective measure completion criteria have been satisfied and to justify why the corrective measure and/or monitoring may cease. The Corrective Measure Completion Report shall, at a minimum, include the following elements:

1. Purpose;
2. Synopsis of the corrective measure;
3. Corrective Measure Completion Criteria

Describe the process and criteria for determining when corrective measures, maintenance and monitoring may cease. Corrective measure completion criteria were given in the final Operation and Maintenance (O&M) Plan;

4. Demonstration that the completion criteria have been met. Include results of testing and/or monitoring, indicating how operation of the corrective measure compares to the completion criteria;
5. Summary of work accomplishments (e.g., performance levels achieved, total hours of treatment operation, total treated and/or excavated volumes, nature and volume of wastes generated, etc.);
6. Summary of significant activities that occurred during operations. Include a discussion of problems encountered and how they were addressed;
7. Summary of inspection findings (include copies of key inspection documents in appendices); and
8. Summary of total operation and maintenance costs.

## H. Submittal Summary

The following list provides a summary of when and how key documents should be submitted to the Department. The Department may adjust this list to meet site-specific circumstances.

1. The submittal schedule for the documents listed below should be included in an enforcement order, permit or otherwise specified by the Department.
  - o CMI Workplan
2. The submittal schedule for the documents listed below must be specified in the CMI Workplan. The groupings reflect which documents should be submitted together.
  - o Draft Plans and Specifications
  - o Draft Operation and Maintenance Plan
  - o Draft Construction Workplan
  
  - o Final Plans and Specifications
  - o Final Operation and Maintenance Plan
  - o Final Construction Workplan
3. The submittal schedule for the document listed below must be specified in the Final Construction Workplan.
  - o Construction Completion Report
4. The submittal schedule for the document listed below is based on when the Owner/Operator or Respondent believes the completion criteria have been satisfied.
  - o Corrective Measure Completion Report
5. The submittal schedule for Progress Reports and a Health and Safety Plan shall be specified in the order or permit.