

# Construction Management Plan



*Prepared for*  
**City of Baton Rouge/East Baton Rouge Parish**  
**Department of Public Works**

*Prepared by*  
**CH2MHILL**

*In association with*  
**SIGMA Consulting Group, Inc.**

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# Introduction

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## 1.1 Purpose

The purpose of this Construction Management Plan is to establish uniform policies and procedures that will be used by construction management personnel in to implement technical and administrative tasks for contracts making up the City of Baton Rouge, East Baton Rouge Parish (C-P)/Department of Public Works (DPW) program. This management plan is a guidance document and is intended to be flexible in its application. It is intended that revisions and improvements be made to the plan as warranted. The Program Construction Manager is responsible for implementing the plan and issuing updates as appropriate.

This manual is not intended to be a step-by-step procedure for each activity. It is, instead, a document that outlines general activities, procedures, and requirements for C-P/DPW and the Contractor throughout the construction phase of projects. These procedures must always be read and implemented in conjunction with the related Contract Conditions and specification section, which in the case of a conflict is more specific and supersedes these procedures. Compliance with these procedures is implicit with a Contract, and no additional measurement or payment will be associated.

## 1.2 Scope

This Construction Management Plan has been written to help uniformly direct and control activities during the construction of C-P/DPW projects. Contractor, subcontractors, and Field Inspectors working on C-P/DPW projects are required to know specification requirements for their contracted work as issued by Design Engineer. This manual was designed to cover most issues involved in a large construction project. The size, scope, and/or technical complexity of the contract will determine the relevant procedures in the manual to be utilized. All contracts will not necessarily require use of every form listed in this manual.

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# Program Description

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## 2.1 Rehabilitation Projects

Sewer system rehabilitation projects will be implemented to repair or replace components of the system that are defective and permit excessive infiltration and inflow.

The rehabilitation portion of the Program consists of 26 construction projects located throughout the C-P. The first projects will begin in 2008, and the last project is scheduled for completion in 2014. Four to six projects will begin construction each year. Design and construction will be continuous through 2014. Approximately 5 million feet of gravity sewer will be inspected in these rehabilitation projects. The estimated total project cost of the rehabilitation projects is \$297 million.

## 2.2 Capacity Improvement Projects

Capacity improvement projects have been defined based on three factors:

1. Computer "InfoWorks Model" comparison of existing capacity to predicted peak wet weather flows.
2. Physical evidence of inadequate capacity based on C-P/DPW records.
3. Predicted growth in demand for wastewater capacity.

Capacity projects include replacement of inadequately sized gravity sewers and forcemains as well as rehabilitation or replacement of pump stations.

Projects located nearest to the wastewater treatment plants are, in general, scheduled for the earlier years in the program.

The capacity improvements portion of the program consists of 57 projects located throughout the Parish. The first projects started in 2007, and the last project is scheduled for completion in 2014. Seven to twelve projects will begin construction every year from 2008 through 2013, and design and construction will be continuous through 2014. Approximately 380,000 linear feet of gravity sewer, 570,000 linear feet of forcemain, and 150 pump stations will be upgraded as a part of the capacity projects. The estimated total project cost of the capacity improvement projects is \$602.6 million.

## 2.3 Wastewater Treatment Improvements/Storage Projects

The Program Delivery Plan (PDP) includes reservoir storage and repumping projects at three locations, as noted in Table 2-1.

TABLE 2-1  
Reservoir Storage and Repumping Projects

<b>Location</b>	<b>Storage Volume</b>
Choctaw Drive	24 MG
Hooper Road	10 MG
South WWTP	64 MG

The wet weather treatment capacity of the South WWTP will be expanded to accommodate the predicted peak flow of 200 million gallons per day (mgd) after peak shaving storage.

In addition to the wet weather improvement and storage projects, three immediate action projects will be undertaken at the South WWTP. The purpose of those projects is to assist the plant in complying with Consent Decree discharge limits. These projects are described in this report.

The South WWTP immediate action projects' design work started in 2007 with construction schedule to begin in 2009. The South WWTP wet weather projects and the Choctaw storage projects will start design in 2008 with construction proceeding in 2009. The Hooper Road storage project is scheduled in subsequent years. Project budget for wastewater treatment and storage projects is \$299.8 million.

# Program Organization and Responsibilities

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## 3.1 General Relationships

The C-P/DPW will enter into a contract with a Contractor to perform construction in accordance with prescribed plans and specifications made part of the Contract. The Program Manager will provide construction management services. Inherent in the services provided by C-P/DPW and CH2M HILL are responsibilities pertaining to Contractor performance.

## 3.2 Program Organizational Relationships and Staffing

The South WWTP project organization during construction will consist of the following:

- Chief Construction Engineer (Jose L. Alvarez, P.E.)
- Program Construction Manager (Mike Uchniat)
- Project Construction Manager (Jonathan McGrew SWWTP)
- Senior Project Controls Specialist (James Caston)
- Project Controls Specialist (Larry Simon)
- Invoice Manager (Connie Sexton)
- Document Control (Casey Rebstock)
- Wastewater Inspection Coordinator (E.J. Amato)
- Full-time Field Inspectors
  - Gary Metz (SWWTP)
  - Dennis Tweedy (SWWTP)
- C-P/DPW Design Project Manager (Charlie Woodruff)
- Design Engineers
  - CDM (SWWTP IAP #2)
  - MWH (SWWTP IAP #3)
  - URS (SWWTP IAP #5)
  - Specialty Inspectors, as required
- General Contractor

The Project Construction Manager, Administrative Specialist (if required), and the Field Inspectors will be located in a construction trailer located at the plant site and other construction locations (TBD). All other positions are located in the main offices of C-P/DPW, CH2M HILL, and Design Engineers.

## 3.3 Staff Responsibilities

### 3.3.1 General

Responsibilities of the Project Construction Manager, Program Construction Manager, Project Controls Specialist, Field Inspectors, and the Administrative Specialist (if needed) are provided in the following paragraphs.

### 3.3.2 Project Construction Manager

Specific duties during construction include the following:

- Manage scope, quality, schedule, and cost of construction and post-construction phases of the project.
- Assist in developing construction contract award documentation for C-P/DPW.
- Establish construction team and provide project team leadership by clearly defining project objectives and member roles including:
  - Assist Program Construction Manager in determining scope of Design Engineers' services during construction, and negotiate agreement that identifies the specific tasks and budget required of Design Engineer during construction phase.
  - Define level of inspection services required; secure appropriate inspectors, and coordinate inspection activities for the duration of the project to ensure quality of construction. Ensure field personnel maintain proper daily inspection logs.
  - Define level of testing services required; secure and coordinate appropriate testing services for the duration of project to ensure quality of construction; ensure proper quality control documentation and corrective work, as required; and review and approve for payment third party testing services, as appropriate.
- Assist C-P/DPW with timely execution of construction contract and issue Notice to Proceed to Contractor.
- Provide construction contract administration to ensure construction quality meets contract requirements. This shall include onsite visits and the monitoring of submittals, field reports, and test reports.
- Coordinate input and review comments on Contractor's submittals with Design Engineer and Contractor, as appropriate. Ensure timely responses on submittals to Contractor and proper logging and tracking of submittals.
- Manage field staff including conducting the following tasks:
  - Monitor team member performance and initiate corrective actions and recommendations, as appropriate.
  - Provide direction to and ensure timely responses by Design Engineer, as appropriate.

- Involve Design Engineer in contract administration to ensure project quality, schedule, and budget compliance.
- Monitor, review, and recommend approval of payment requests submitted by Design Engineer and ensure timely processing of payments.
- Manage document control system (using Prolog) to ensure proper filing of construction phase documents and maintain such files until submitted to C-P/DPW Project Manager at project close out.
- Function as primary contact with representatives of Design Engineer, Contractor, materials testing firm, and the internal team members.
- Arrange and conduct construction meetings; ensure meeting minutes are properly prepared, recorded, and issued.
- Review and transmit correspondence between Design Engineer (Engineer of Record) and Contractor.
- Negotiate contract changes with Contractor to ensure timely responses to change issues and Change Order development, and ensure proper supporting documentation from Contractor.
- Review daily and other inspection reports.
- Prepare monthly progress report to C-P/DPW reflecting the status of the construction contract. Report and brief project team and C-P/DPW as necessary.
- Refine the cash flow for the construction phase of the project to reflect Contractor's construction schedule and Schedule of Values.
- Review and recommend approval of Contractor progress payment applications. Ensure receipt of proper payment documentation. Ensure timely processing of payments.
- Ensure on-going communications with C-P/DPW Chief Construction Engineer and Design Engineer (Engineer of Record) regarding:
  - Potential Change Orders
  - Pending Requests for Information
  - Status of Design Engineer's duties
  - Staffing requirements and budget status
- Assist C-P/DPW Wastewater Inspection Coordinator in direction of Field Inspector activities.
- Assist with management of testing and surveying subcontracts, if required.
- Be vigilant for signs of potential claims and mitigate causes.
- Review construction schedule and provide comments to Design Engineer and Contractor, as appropriate; monitor and document construction progress; initiate remedial actions, as required; and ensure submittal(s) by Contractor of updated and

recovery schedules as changes occur to ensure schedule remains in compliance with overall project goals.

- Analyze Change Orders for schedule impacts.
- Ensure Contractor's compliance with C-P/DPW environmental requirements and coordinate Contractor activities with C-P/DPW environmental and safety personnel.
- Conduct final inspection and establish final punch list.
- Ensure receipt of proper final payment documentation, final approved operations and maintenance (O&M) manuals, and as-built drawings reviewed and approved by Field Inspector and Design Engineer. Verify completion of punch list components and O&M training prior to recommending final payment.
- Coordinate construction contract closeout procedures, including preparation of Record Drawings by Design Engineer.
- Ensure plant and operations personnel receive appropriate numbers of copies of O&M manuals, Record Drawings, and other documents that might be required for reference during operations.
- Coordinate notifications and responses to warranty issues.
- Coordinate anniversary inspection prior to warranty expiration(s).

### **3.3.3 Program Construction Manager**

Specific duties during construction include the following:

- Review requests for additional C-P/DPW funding to support project initiatives.
- Serve as liaison between the project and other C-P/DPW departments or business lines.
- Assist C-P/DPW in preparing agendas and conducting Prebid Meeting and Preconstruction Conference.
- Determine scope of Design Engineers' services during construction, and negotiate agreement that identifies the specific tasks and budget required of Design Engineer during construction phase.
- Monitor project for compliance to program requirements and C-P/DPW requirements.
- Provide specialized support to Project Construction Managers as required. Such support may include additional staffing, specialized equipment, or outside contract services.

### **3.3.4 Project Controls Specialist**

The Project Controls Specialist is generally responsible to Project Construction Manager for overall project controls; scheduling, cost trending, cash flow projections, cost to date and cost to completion reporting, and consolidating inputs from all parties into a single monthly report.

### 3.3.5 Field Inspectors

C-P/DPW will designate a Field Inspector as an authorized representative of the C-P/DPW and will be assigned to observe and inspect the project and the materials to be used therein.

Specific duties during construction include the following:

- Observe Contractor and subcontractors during construction activities in accordance with C-P/DPW directives, ensuring completion of the project according to the Contract Documents.
- Observe implementation of the Contractor's Safety and Health Plan.
- Coordinate initial survey meeting onsite to ensure proper turnover of Design Engineer's survey data to Contractor and advise Project Construction Manager as surveying occurs.
- Advise Project Construction Manager when the Design Engineer is required to witness special field tests.
- Maintain mark-up of drawings to reflect as-built conditions and review Contractor's red-lined and as-built drawings. Review Contractor's final red-lined drawings on a monthly basis and ensure proper submittal of these documents to Design Engineer for development of Record Drawings.
- Review field progress against approved schedule and document/report variations.
- Document construction activities by taking photos and preparing Daily Inspection Report.
- Review progress payment applications with Contractor and make recommendations on percentage complete for pay items to Project Construction Manager.
- Monitor weather delay days during each month.

### 3.3.6 C-P/DPW Safety Representative

C-P/DPW Safety Representative will make periodic site visits for safety compliance.

### 3.3.7 Administrative Specialist (if required)

Specific duties during construction include the following:

- Answer the telephones.
- Manage Prolog for field efforts.
- Ensure proper maintenance of field office equipment.
- Word processing.
- Prepare the minutes of construction meetings.
- Date stamp incoming mail, log it in, and provide proper distribution.
- Oversee construction filing system.
- Produce monthly construction progress reports.
- Maintain logs.

- Monitor Contractor submittals and upload final version to Website via Prolog.
- Assist Project Construction Manager in human resource issues.

### 3.4 General Responsibility Matrix

Additional detail regarding the responsibilities of the Program Construction Manager, Project Construction Manager, and the Field Inspectors are provided on Table 3-1.

TABLE 3-1  
General Responsibility Matrix for Construction Phase  
(P=Primary, S=Secondary, A=Audit, J=Joint Primary Responsibility)

Line	Function	Program Manager/ Program Construction Manager				
		C-P/ DPW	Program Construction Manager	Project Construction Manager	Field Inspector	Design Engineer
1	Terminate Contract	J	J	S		S
2	Stop Work	J	J	S		
3	Suspend Work	P	P	S		
4	Execute Contract Changes	P	S			
5	Resolve Claims	P	P	S		
6	Maintain Onsite Project Office Files	A		A	P	
7	Clarify Technical Issues			S	S	P
8	Provide Technical Clarification to Contractor at Site			S	P	P
9	Prepare / Recommend Change		S	P	S	S
10	Conduct Extra Work Negotiations		S	P	S	
11	Execute Change Orders	J	J	S		
12	Verify Contractor Obtained Permits			A	P	S
13	Secure Owner-furnished Permits	S	S	A		P
14	Provide Horizon and Vertical			A	S	P
15	Monitor Contractor Survey			A	P	S
16	Approve Project Schedule		A	P	S	
17	Ensure Schedule Compliance		A	P	P	
18	Conduct Project Meetings			P	S	
19	Report Progress	A	A	S	P	
20	Photograph Documentation			S	P	
21	Verify Contractor Maintained As-built Drawings			A	P	
22	Certify Progress Payment			P	S	
23	Process and Pay Progress	J	J	A	S	
24	Review Contractor Submittals			A	S	P
25	Monitor Timely Review of		A	P	S	
26	Approve Contractor Submittals			A	A	P
27	Prepare Daily Inspection Reports			A	P	
28	Provide Off-site Inspection / Performance, Quality, Workmanship		A	S		P

**TABLE 3-1**  
 General Responsibility Matrix for Construction Phase  
 (P=Primary, S=Secondary, A=Audit, J=Joint Primary Responsibility)

Line	Function	C-P/ DPW	Program Manager/ Program Construction Manager	Project Construction Manager	Field Inspector	Design Engineer
29	Provide Onsite Inspection / Performance, Quality, Workmanship			A	P	S
30	Accept Materials Delivered Onsite or Off-site			P off-site	P onsite	S
31	Verify Onsite Material Deliveries			A	P	
32	Report Subsurface Conditions Prior to Concrete Placement			A	P	
33	Inspect Formwork			A	P	
34	Inspect and Approve Rebar			A	P	
35	Authorize Concrete Placement			A	P	
36	Monitor Concrete Placements			A	P	
37	Inspect Pipe Installation		A	S	P	
38	Arrange On-site Material Testing			S	P	
39	Approve Operating Manuals	J	J			S
40	Perform Substantial Completion / Final Inspection	J	J	J	J	J
41	Provide Final Payment	J	J	S		
42	Review and Recommend Final Payments			P		S
43	Provide Services During Warranty Period			P		
44	Prepare Project Closeout			P	S	

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# Services During Bidding

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## 4.1 General

C-P/DPW will distribute Bidding Documents to planholders and maintain planholder list. Planholder list shall be distributed to Program Construction Manager and Design Engineer on a regular basis.

Each project will designate one person to whom questions are directed. Design Engineer and Construction Manager will assist C-P/DPW in answering bidder questions.

A Prebid Meeting will be held to review specific aspects of the bidding process, Contract Documents, submittals required with bid, form of bid, minimum requirements for Bidder to be qualified, and special requirements of the project construction to ensure bidders will be responsive. Meeting date shall be published in Bid Documents. Generally held about halfway between the date the Bid Documents are issued and the bid opening date. At least 2 weeks should be allowed between the Prebid Meeting and bid date to allow distribution of minutes and answers to questions without having bidders ask for time extension to incorporate information into their bids.

Addendum modifying Bid Documents may not be issued within 72 hours of bid opening time, excluding Saturdays, Sundays, and legal holidays. If an addendum is issued in the 72-hour period before bid opening, the bid date must be extended at least 7 days, but not more than 21 days without re-advertising.

## 4.2 Prebid Meeting

C-P/DPW and Program Construction Management Team will conduct a Prebid Meeting for each Contract to be bid. The meeting should be attended by planholders, C-P/DPW Design Project Manager, Project Construction Manager, and Program Construction Manager.

### 4.2.1 Meeting Agenda

Meeting agenda will be developed by the C-P/DPW and Program Construction Management Team for each Prebid Meeting. As a minimum, agenda shall contain bidding timeframe and dates, procedures for inquiries (Q&A), construction site issues, public issues, and other issues identified by attendees.

Questions from bidders will be taken and responded to immediately if possible. Questions that require additional research or input from sources not at the meeting will be recorded and answers published along with the minutes via addendum.

### **4.2.2 Minutes**

Minutes will be prepared by the C-P/DPW and Program Construction Management Team within 7 working days. Copies are to be furnished to attendees and planholders. The Design Engineer will provide written responses to all questions as part of an addendum.

## **4.3 Bid Evaluation**

Design Engineer and Program Construction Manager will assist C-P/DPW in evaluating bids and bidders for each project.

## **4.4 Conformed Documents**

After the bid opening, Design Engineer will incorporate addenda changes into Contract Documents and issue a final conformed set of Contract Documents. Copies will be distributed to the construction team by C-P/DPW and Program Construction Manager.

# Construction Management Procedures

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## 5.1 General Onsite Office Administration

The Project Construction Manager will maintain an office at the project site if required. The Project Construction Manager and field staff will be responsible for implementing and maintaining office procedures and policies as generally described in the following paragraphs.

### 5.1.1 Office Hours/Holidays

Regular Field Office hours will be 7:00 am to 5:00 pm, Monday through Friday.

C-P/DPW scheduled holidays for 2009 are as follows:

January 1  
January 19  
February 24  
April 10  
May 25  
July 3  
September 7  
November 11  
November 26  
November 27  
December 24  
December 25  
December 31

### 5.1.2 Correspondence Procedures

**General:** All issues of importance to the administration of the Contract must be substantiated by permanent records such as correspondence, notes, and photographs. It is important to summarize verbal communications with notes covering conferences, telephone calls, and discussions, giving the date, location, parties involved, and important issues discussed. Website via Prolog document management software may be utilized for the purpose of standardizing correspondence, ensuring electronic filing and retrieval, and providing access to everyone involved in the project to the level of their security. It is expected that participants in the project will utilize Prolog to the extent described herein, including the use of appropriate forms and document filing and storage to allow retrieval by others at a later date.

**Written Correspondence:** Contractual communications have a legal basis. Written correspondence is the most common. Instructions regarding format and distribution are provided below. All forms of communication shall contain the appropriate C-P/DPW project number.

**Letters and Memoranda:** Construction related letters and memoranda may be prepared in the conventional manner using word processing software. C-P/DPW standards for document preparation employ Microsoft products, including Word for written correspondence and Excel for spreadsheet preparation.

**RFIs:** Requests for Information will be prepared on Prolog website using the form provided under the Collaboration menu selection. Individuals who are to receive the RFI are notified of the correspondence by a notice automatically sent via e-mail.

**E-Mail:** E-mail correspondence should be used only for messages which, by nature, have no need to be documented. If a message needs to be documented, then it needs to be either created on Prolog website or created outside of website and later scanned and uploaded.

**Correspondence Management and Control:** Prolog website provides many functions to facilitate correspondence production, management, and control. Documents originating in website are automatically logged and filed in the database. Documents not originating in website, but which are important enough to document, should be scanned and uploaded to the appropriate file in website. Documents residing in Prolog website can be accessed for reading by anyone having the security clearance. Project staff is expected to become familiar with these management and control functions and utilize them as appropriate.

**Document Numbering:** To facilitate document filing and retrieval, each document to be scanned and uploaded to Prolog website will be given a document number. This document number will be assigned by Document Control at the time they upload the document to the website. The document number to be assigned to each document shall comply with the numbering system outlined in Chapter 13.

**Distribution:** Documents to be sent to the Contractor or C-P/DPW on Prolog website are to be scanned into Prolog website should be copied to the following:

- C-P/DPW Chief Construction Engineer
- Program Construction Manager
- Project Construction Manager
- Design Engineer
- Contractor
- Administrative Specialist (if required)

The document received by the Administrative Specialist (if required) will be considered the Project File, which will be used for scanning and uploading to Prolog website and for filing, as a hardcopy, in a folder to be maintained in the Field Office. To the extent possible, letters and memos should be distributed electronically to the addressee and those copied.

**Correspondence Reply:** Incoming correspondence from Contractor will be uploaded to the Prolog website. And responsibility for action assigned, and answered within the time period indicated in Paragraph 5.4 – Clarifications in one of the following ways:

- Reply in full.
- Interim reply stating date by which a full answer can be expected.
- Acknowledgment of receipt. Upon receipt of incoming correspondence, Administrative Specialist (if needed) will date stamp copies and distribute to construction team

members. Project Construction Manager will assign file numbers to the file copy, and designate necessary action or information for routing.

**Correspondence Logging:** A correspondence log for incoming and outgoing correspondence between Contractor or other agencies and the Project Construction Manager or Field Inspector will be maintained using the letter number, date of letter, subject, subject file number, and cross-reference letter number (cross-referencing shall be done when applicable for ease of ready reference). To the extent possible, responses to incoming correspondence will be logged on the same line with response letter number and date.

**Meetings, Conferences, and Discussions:** It is imperative that accurate minutes be recorded to avoid misunderstandings regarding agreements and conclusions reached during meetings, and to ensure that further documentation is recorded accurately and presented in a timely manner. These records will be processed using either Prolog website "Minutes of Meeting" form, or in another word processing format, but uploaded to a Prolog website folder. After the minutes have been prepared in final form, one copy will be sent to each attendee, Project Construction Manager, C-P/DPW Chief Construction Engineer, Design Engineer, and the file. To the extent possible, the distribution can be made electronically from Prolog website.

**Telephone Conversations:** Significant telephone conversations will be documented and appropriately filed using either the Prolog website "Record of Conversation" form or C-P/DPW Form 003 "Telephone Conversation Record." If the C-P/DPW form is used, then it must be scanned and uploaded to Prolog for future reference and retrieval, as necessary.

### 5.1.3 Project Files

The purpose of the project file is to provide secure storage and ready retrieval of project records. The project files will contain correspondence and documents pertaining to the administration of the project contract. A complete file will be kept in the Field Office onsite, as well as electronically on Prolog website.

Three basic file containers shall be used. They include:

- Standard legal four or six drawer, steel, lockable file cabinets.
- Three-ring binders.
- Drawing file or rack.

Project files will be arranged consistent with Uniform Filing System as shown in Section 13.

### 5.1.4 Visitor Control

Casual visitors to the site will be discouraged due to safety considerations. All visits will be scheduled and arranged through the Project Construction Manager's office. The Project Construction Manager will inform the Contractor of scheduled visits or tours.

The Project Construction Manager will maintain a Visitor Register, and visitors will be required to sign the register and wear an I.D. badge. The Project Construction Manager will ensure that visitors wear appropriate safety equipment during their visit.

Visitors or inquiries from the press or news broadcasters will be referred to appropriate C-P/DPW representative.

### 5.1.5 Project Construction Manager Communication

**Contractor:** The Project Construction Manager will communicate with Contractor in a professional, businesslike manner. Contacts will be made with the authorized representatives of the Contractor. No contacts will be made with Contractor's subcontractors or vendors without the knowledge or presence of the Contractor.

**C-P/DPW:** The Project Construction Manager's point of contact will be C-P/DPW Chief Construction Engineer.

**Engineer:** The Project Construction Manager's point of contact with each Design Engineer will be Design Engineer's Project Manager.

**Public:** Contacts with the public will be courteous, but the Project Construction Manager is not authorized to answer questions. No one, other than C-P/DPW or their designee is authorized to answer questions from the public.

### 5.1.6 Photographs

Each onsite Field Office will be provided a digital camera in order to obtain an adequate photographic record of the progress of the work. Photographs will be taken by Field Inspector and Project Construction Manager to cover the following items:

- Progress of the work.
- Accidents or damage.
- Unsafe or hazardous working conditions.
- Unusual construction techniques.
- Areas where claims and/or changes are anticipated.
- Movement or possible damage to surrounding land or structures.

When appropriate, digital photos will be uploaded to Prolog website by attaching them to the Daily Inspection Report. Other photos taken of the site can be uploaded to Prolog website and attached to the appropriate file as noted in Chapter 13.

**Contractor Provided:** Contractor shall submit progress photos if required by the Contract Documents.

### 5.1.7 Property Accountability

At various times each Field Office may use property owned by the Design Engineer, C-P/DPW, or Contractor. Maintaining accountability for this property is important. Therefore, the Project Construction Manager will develop an inventory of non-expendable property. The Administrative Specialist (if needed) will maintain this inventory in an up to date condition, accounting for any lost, damaged, or returned property. As a minimum, the inventory will include:

- Date of acquisition
- Ownership
- Serial number
- Location
- User
- Final Disposition

## 5.2 Contract Document Control

The Project Construction Manager will obtain two complete copies of the executed Contract, with full size drawings to be used as the official onsite Contract. A copy will also be maintained by the Design Engineer. One copy will be stored for reference while the other will be used extensively by site staff and marked up with changes and references to submittals, RFI's, Field Work Directives, and Change Orders.

### 5.2.1 Changes to Contract Documents

The Project Construction Manager or Field Inspector will post changes to the official onsite Contract Documents after incorporation of the change in the Contract by Field Work Directive or Change Order. The Project Construction Manager will distribute copies of the executed contract changes in accordance with **Table 5-1** and **Figure 5-1**.

TABLE 5-1  
Distribution of Contract Change Documentation

Proponent	Field Work Directive or Change Order	Specifications	Full-Size Drawings
Design Engineer*	1 copy	1 copy	1 copy
Project Construction Manager	1 copy	1 copy	1 copy
C-P/DPW Chief Construction Engineer*	1 copy	1 copy	1 copy
Program Construction Manager*	1 copy	1 copy	1 copy

\* When state, county, or city coordination is involved, sufficient copies will be provided for distribution to those agencies.

Drawings or specifications superseded by subsequent contract changes will be retained for record purposes and marked "superseded" (SS), date superseded, and Field Work Directive or Change Order number associated with change.

### 5.2.2 Contract Document Revision Log

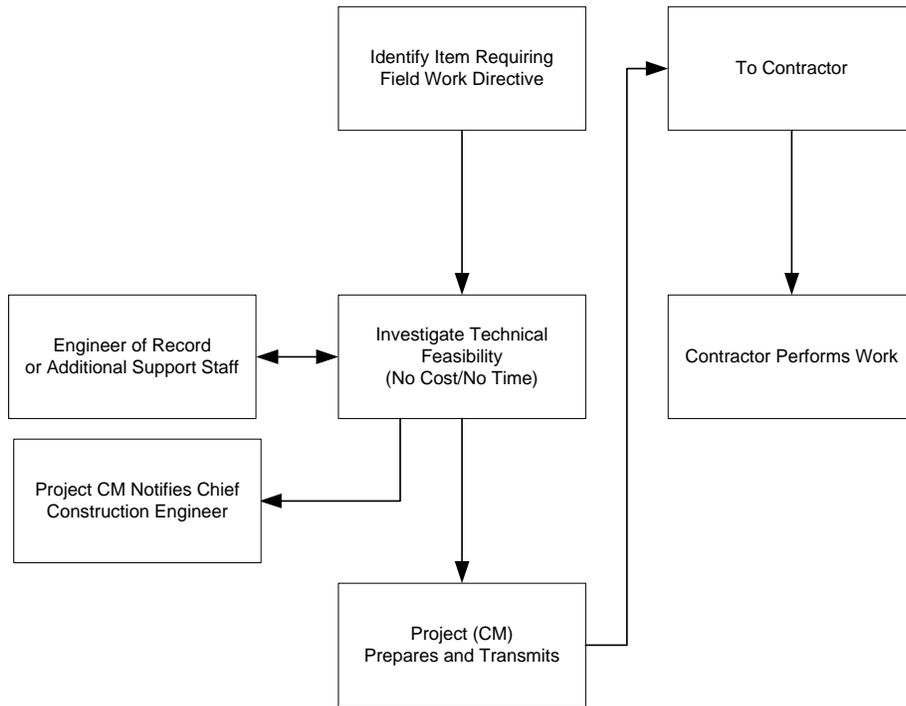
The Project Construction Manager will maintain and distribute a log of specifications and drawings that shows the latest current revision and which revisions have been superseded since contract award.

### 5.2.3 Record Drawings

Record Drawings are required to provide information as indicated by the Contract Documents. The Record Drawings include pertinent information from shop drawings and submittals, as well as any changes from the original drawing. During construction, it is the primary responsibility of the Contractor and the secondary responsibility of the Field Inspector under the direction of the Project Construction Manager to ensure Record Drawings are kept current. As a minimum, Record Drawings will contain the following:

- Revisions, additions, or deletions; accompanied by sufficient annotations to adequately describe the as-built condition.

**FIGURE 5-1**  
Field Directive Flow Chart



- Field Work Directive or Change Order numbers will be placed next to the revisions, as appropriate.
- Surveyed measurements of final locations and elevations.
- Contractor-installed temporary work that is not removed at the end of construction.

Color codes will not be used to describe as-built conditions, unless they can be easily identified on black and white photocopies.

Field Inspectors will coordinate with Contractor on a timely basis to review Contractor's ongoing maintenance of as-built documents to ensure revisions, additions, and deletions are recorded complete and accurate in a timely manner. Monthly reviews will be made by the Project Construction Manager and Design Engineer to verify accuracy. In addition to the field marked-up as-built drawings, Prolog website will be used to record as-built conditions.

At the conclusion of the project, the Contractor's as-built drawings will be reviewed by the Field Inspector and Project Construction Manager. One complete set of as-built documents will be forwarded to the Design Engineer, who will incorporate the indicated changes into the contract Record Drawings. The Design Engineer will then submit one set of mylars, one electronic copy, and marked-up drawings used to produce the Record Drawings, to Program Construction Manager.

## 5.3 Shop Drawings and Samples

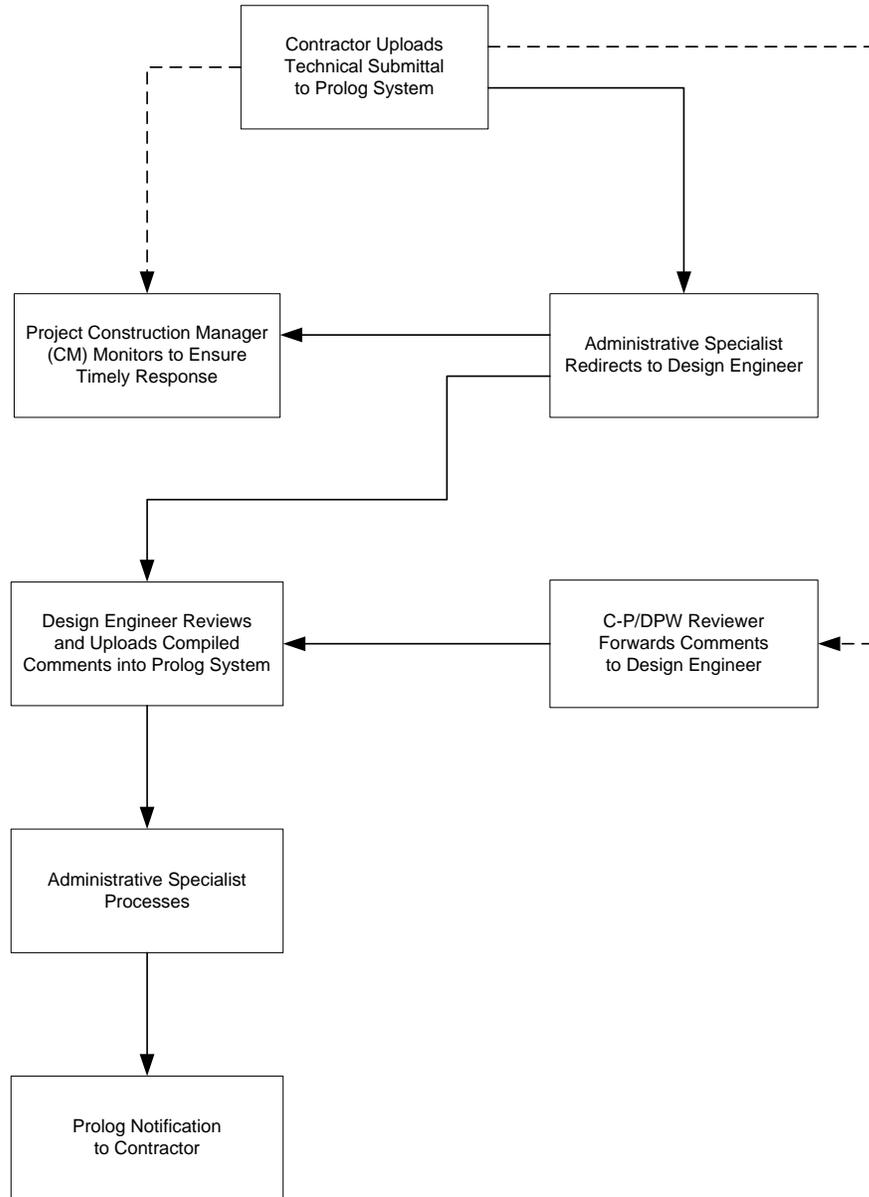
Review of shop drawings, working drawings, catalog cuts, O&M manuals, and samples is necessary to ensure materials and components to be supplied for incorporation into the work satisfy the criteria established by the Contract. The following paragraphs establish a routine system whereby the Field Inspector and Project Construction Manager can ensure coordination and performance of reviews of Contractor submissions and return review findings to Contractor in an expeditious manner. See **Figure 5-2**.

Reference Section 01 33 00, Shop Drawings, Product Data and Samples, O&M Manuals, and Miscellaneous Submittals for project specific shop drawing requirements.

### 5.3.1 Review Responsibilities

The Design Engineer(s) will have the primary responsibility for reviewing shop drawing submittals. Some submittals will also be reviewed by C-P/DPW staff. Those that are to be reviewed by C-P/DPW will be identified following Contractor's submission of Shop Drawing Register, which is due at the Preconstruction Conference. It is the responsibility of the Project Construction Manager to monitor the review process and to ensure that a timely review is performed. The Design Engineer is expected to review each submittal and respond to the Contractor by the specified deadline as noted in the Contract Documents to avoid construction delay.

**FIGURE 5-2**  
Shop Drawing Review Flow Chart



### 5.3.2 Transmittal Forms

The Contractor must use a C-P/DPW Form 005 “Transmittal of Contractor’s Submittal” for submittals, shop drawings, and samples. Standard C-P/DPW forms will also be used along with other forms listed herein, and as required by the Contract Documents. Approvals required by a public agency will be obtained by the Contractor prior to the submittal to the Project Construction Manager. Evidence of such approval will accompany the transmittal.

### 5.3.3 Submittal Schedule and Review Procedures

The Contractor is required to include submittal requirements in the project schedule. The submission schedule will be reviewed by the Project Construction Manager, field staff, and Design Engineer to ensure timely submissions are identified for items required by the specifications, that submissions are in sequence with the construction schedule, and that sufficient time is allowed for review and response. The Project Construction Manager and Field Inspectors are expected to inform the Contractor when the submission schedule is not being met. A description of the submittal process is presented below.

**Transmittal of Submittal:** The Contractor will upload submittals to the Prolog website. Each submittal shall be accompanied by a Transmittal of Contractor’s Submittal with the appropriate submittal number as defined in the Contract Documents and reference to relevant drawing and/or specification section. The Contractor will include a statement that they have reviewed the submittal materials, including those coming from subcontractors, and have verified that to the best of their understanding they fully meet the contract requirements. If there are exceptions to the drawings or specifications, they will be stated on the Transmittal of Contractor’s Submittal.

**Design Engineer or C-P/DPW Review:** Submittal reviews are required to determine adequacy, completeness, and compliance with Contract Documents. Should Design Engineer determine submittal is incomplete, they will immediately return unreviewed with specific comments to Contractor. Exceptions to review of incomplete submittals, may be allowed if Design Engineer is notified before submission and agrees to review partial submittal.

The Project Construction Manager will deliver the copy to C-P/DPW staff if requested. The C-P/DPW review time is anticipated to be 5 working days. C-P/DPW comments shall be transmitted to Project Construction Manager who will in turn transmit to Design Engineer. The Design Engineer will consider the C-P/DPW review comments in with their comments before returning submittal to Contractor.

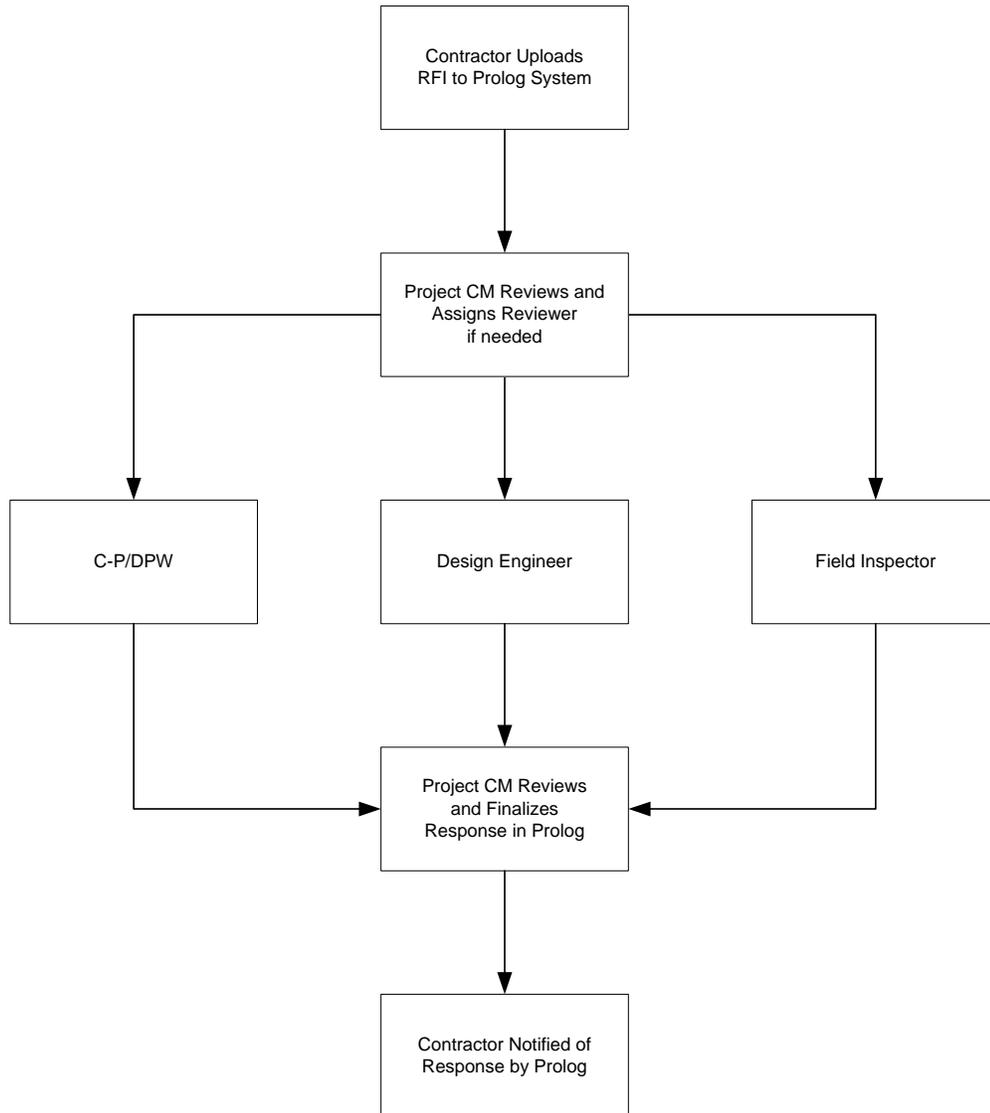
## 5.4 Clarifications

Each construction project expects that additional information will be required throughout duration of project. Information will be provided by the Design Engineer as required, and when requested by the Field Inspector, Project Construction Manager, or the Contractor.

### 5.4.1 Request for Information (RFI)

RFIs will be initiated by Contractor via the Prolog website. RFIs will be submitted using the Prolog website Request for Information form transmitted electronically (see Figure 5-3).

FIGURE 5-3  
RFI Flow Chart



**BTR SSO**

The Project Construction Manager will respond to the RFI if the information is readily available or redirect the RFI to the Field Inspector or Design Engineer, as appropriate. The appropriate person will provide a written response to the RFI. RFIs will be classified into three groups as follows:

**Category 1 - Major Clarifications (Prolog: high importance):** Additions and changes made to the Contract Documents necessary for the Contractor to construct the project. These requests will be responded to within a period of 3 working days if marked urgent.

**Category 2 - Minor Clarifications (Prolog: normal importance):** Information already on the drawings such as dimensions and inconsistencies between drawings and specifications. These requests will be responded to within a period of 3 to 5 working days.

**Category 3 -Clarifications for Contractor's Convenience (Prolog: low importance):** These include requests for variations from the Contract Documents, reconfirmation of Contract Documents, corrective action for Contractor's field errors and defective work. These requests will be responded to with a period of 10 working days.

The Contractor will be responsible for categorizing each RFI, and ensuring a prompt, clear response. If the RFI requires additional documentation, it will be returned to the Contractor with a response indicating Contractor will be required to resubmit with additional data.

## 5.5 Contract Changes

A change to the Contract is made by Field Work Directive or Change Order that adds, deletes, or revises the general scope of the Contract or changes the sequence of the performance of the work. A Change Order adjusts the contract sum and/or the period of performance. A Field Work Directive does not involve cost or time. Oral instruction or other forms of communication do not change the Contract. Field Work Directives or Change Orders will only be issued to incorporate technically approved changes. Change Orders are to be prepared on the C-P/DPW Form 010 "Change Order". Field Work Directives are to be prepared on the C-P/DPW Form 011 "Field Work Directive". A flowchart of the change process is shown in **Figure 5-4**.

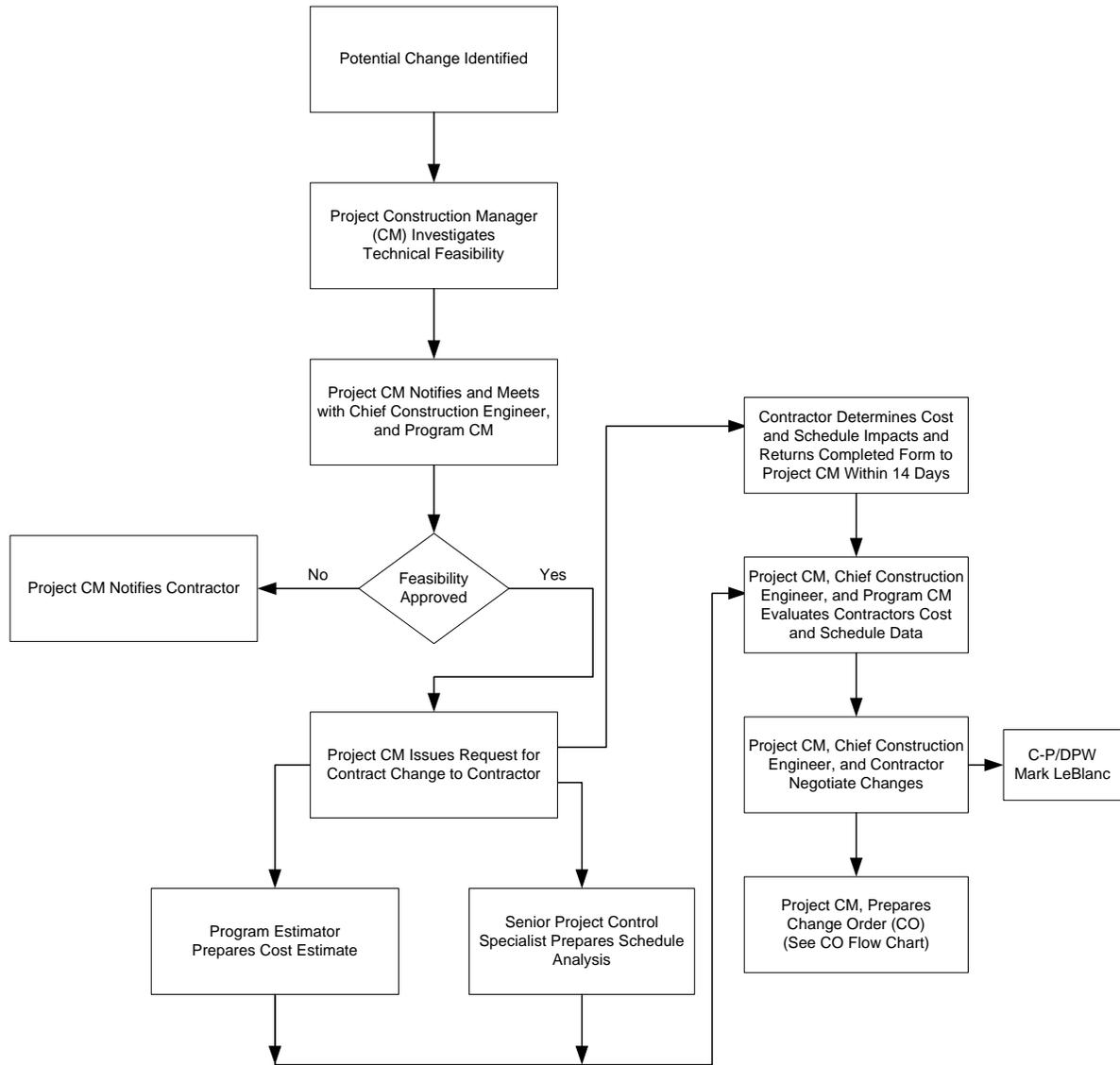
### 5.5.1 Change Approval Process

An identified change that is expected to result in a modification to the Contract price or schedule will need to be processed as a Change Order in the manner described herein (and shown in **Figure 5-5**). Changes may be initiated by any party in the construction process, that is, C-P/DPW, Project Construction Manager, Design Engineer, or Contractor.

Regardless of the initiating party, certain strict protocols need to be employed, as follows:

- Party initiating proposed change notifies Project Construction Manager of the change.
- Upon receipt of proposed change, the Project Construction Manager will forward request to C-P/DPW Chief Construction Engineer and Program Construction Manager.
- Project Construction Manager, C-P/DPW Chief Construction Engineer, and Program Construction Manager will meet and determine if change is worthy.

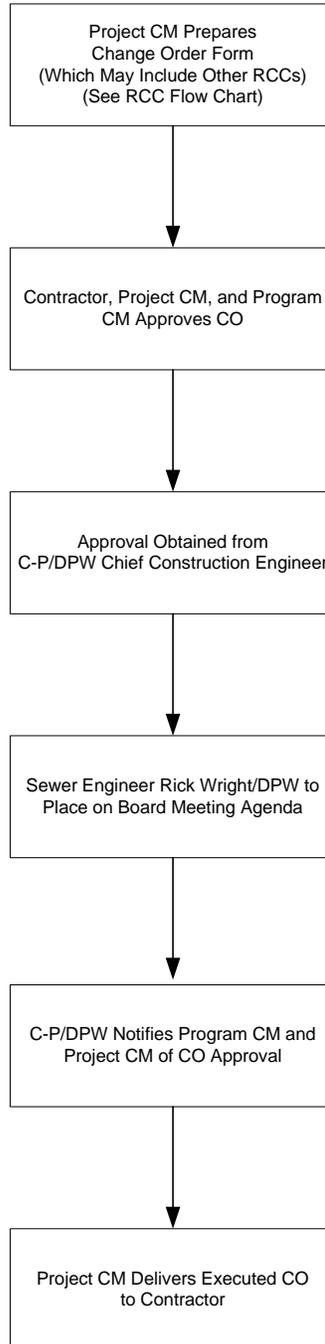
**FIGURE 5-4**  
Request for Contract Change Flow Chart



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**FIGURE 5-5**  
Change Order Process Flow Chart



- Using the C-P/DPW Form 008 “Request for Contract Change (RCC)”, Project Construction Manager completes the form, as appropriate, including sufficient details to allow Contractor to prepare a price for the change, and then sends form to the Contractor.
- Contractor estimates changes required in terms of cost and/or schedule, includes that information on the RCC form, and returns the form with signature to the Project Construction Manager.
- Upon receipt of the RCC form, the Project Construction Manager, along with other technical specialists deemed necessary, including selected staff from C-P/DPW and the Design Engineer, will review the proposal from the Contractor and develop a strategy for negotiations.
- Project Construction Manager, C-P/DPW Chief Construction Engineer, and Program Construction Manager negotiates the proposed cost and schedule with the Contractor and a final decision is developed. Project Construction Manager notifies the Program Construction Manager of the agreed-upon cost and schedule changes.
- If the negotiation process resulted in a modification to the cost and schedule originally proposed by the Contractor, then the Project Construction Manager revises the RCC form, as necessary, and resubmits to the Contractor for signature, or alternatively, the negotiation meeting minutes may be used to document the agreement.
- Depending on the urgency of the change in question and the amount of the change, the RCC may be combined with other processed RCC items into a single Change Order. The Project Construction Manager prepares the Change Order using C-P/DPW Form 010 “Change Order”; backup information is included as attachments with the form.
- Upon completion of the Change Order form, the Project Construction Manager seeks approval of the C-P/DPW Chief Engineer and Program Construction Manager. Upon receiving verbal approval, secures a signature from the Contractor, then signs the form and forwards to C-P/DPW Chief Construction Engineer for final processing.
- The Project Construction Manager, with assistance from the Senior Project Controls Specialist, will maintain a running log of Change Orders on the C-P/DPW Form 019 “Change Order Log.”
- Each RCC (regardless of the initiator) and Change Order will be assigned a sequential number by the Project Construction Manager.

## 5.6 Payment Requests

The General Provisions Section 10 of the 1997 Standard Specification for Public Works Construction specifies the manner in which Contractor payment requests are to be submitted and the documentation required to substantiate the request. The Contract technical specifications detail the methods of measurement to be used to determine the amounts earned. The Field Inspector and Project Construction Manager will review each Contractor payment request for completeness and for verification of earned amounts prior to certification of entitlement for payment.

### 5.6.1 Calculation and Recording of Pay Amounts

The specifications establish the criteria for measurement and payment of all items. There are numerous acceptable methods to implement these requirements and thus determine the correct amount to be paid. The following are the most common methods used. Whichever method is chosen, the Project Construction Manager and the Contractor will agree to the procedure to be used for each pay item prior to submission of pay items.

**Theoretical Computations:** Items such as concrete, excavation, embankment, paving, clearing, and grubbing are measured and paid to neat lines or other established pay lines. Therefore, the amounts must be arithmetically calculated based on accurate dimensions determined from the Contract Drawings or from field surveys. The computations must be prepared on calculation sheets that are neat, legible, date signed, and assigned a pay number and title. Reference should be made to applicable drawings. Sketches may be attached to supplement the calculations.

**Field Measurements and Verifications:** Numerous items require measurement in place. The measurement of such items must be made while they are accessible during installation. The Contractor must be present while such measurements are being made in order to prevent disagreement.

**Lump Sum Pay Amounts:** The contract bidding schedule contains a lump sum bid. All progress payments against the lump sum bid must have supporting data in order to ascertain a reasonable partial payment.

### 5.6.2 Material Delivered But Not Incorporated

The General Provisions of the 1997 Standard Specification for Public Works Construction allow for material delivered onsite to be taken into consideration in computing progress payments. Payment for these materials can be made only after the Contractor has provided adequate documentation indicating that the Contractor is the owner of the materials.

### 5.6.3 Monthly Estimate for Payment to Contractor

The Contractor is responsible for the preparation of the monthly estimate in accordance with the Contract. Contractor shall obtain concurrence with the Field Inspector and/or Project Construction Manager on item numbers, unit prices, quantities, extensions, and totals, after which the monthly estimate will be prepared. The Contractor shall certify the estimate and transmit it to the Field Inspector for further processing.

Contractor shall upload monthly pay request to C-P/DPW electronic invoicing tool.

### 5.6.4 Payments Withheld

The Project Construction Manager will not certify payment for any work for which a Notice of Non-conformance is outstanding. Providing work represented by the payment estimate has been performed in accordance with the certification statement, the Project Construction Manager will not use the payment estimate as a vehicle to recommend withholding of any payments.

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# Project Meetings

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## 6.1 General

Project meetings will be held on a scheduled basis for several specific reasons:

- To acquaint the Contractor and C-P/DPW representatives with each other's staff, expectations, procedures, and contact information;
- To review work progress;
- To review progress against cost-loaded schedule and scheduled work coming up, including expediting work requiring a schedule recovery plan;
- To coordinate interfaces between Contractor and existing facilities.

## 6.2 Preconstruction Conference

A Preconstruction Conference (Precon) will be sponsored by C-P/DPW shortly after Contract award. The Precon is designed to review the various administrative procedures and actions required by involved parties.

The Precon is held at a mutually convenient time and place for all parties. The timing must be flexible to allow the Contractor time to assign and mobilize project team and ensure the key staff will be in attendance.

The Program Construction Manager will conduct the Precon shortly after Contract award and before the Notice to Proceed. In attendance shall be representatives of C-P/DPW including their Chief Construction Engineer, Wastewater Inspection Coordinator, and Design Project Manager. In addition, assigned Field Inspector, Design Engineer, and relevant administrative staff should attend.

The Contractor should have in attendance at a minimum the following:

- Project Manager
- Project Engineer
- Project Scheduler
- Health and Safety Representative
- Quality Control Manager
- Superintendent
- Foremen
- Procurement/Logistics Manager
- At least one representative from each major subcontractor
- Project Administrator

The primary purpose of the Precon is for the parties that will be interacting to become familiar with each other's expectations, procedures, and contact information. The discussions will focus on organization, baseline schedule; Contractor's planned means and methods, procedures for reporting progress, payment, resolving issues or disputes, and obtaining additional information. The importance of this meeting can not be overestimated. This is the primary vehicle for getting the project off on the right foot.

### **6.2.1 Agenda**

The Program Construction Manager will be responsible for developing an agenda for the meeting.

Questions from C-P/DPW and the Contractor should be dealt with as openly and quickly as possible. If there are issues that require additional study or documentation, a target date should be set for a written or telephone answer. In short, this is the beginning of the business relationship which will unite both organizations for the next year. Minutes of this meeting will be published and distributed to attendees.

### **6.2.2 Minutes**

Minutes will be prepared by the Program Construction Management Team within 3 working days. Minutes will be furnished to attendees. The Project Construction Manager can either provide responses to the technical design questions as part of the minutes or as a separate transmittal.

## **6.3 Daily Progress**

The Project Construction Manager may conduct a daily progress meeting, as appropriate, with Field Inspectors. The purpose of the meeting will be to review status, identify the day's upcoming activities, and coordinate resources. In the event the Project Construction Manager is unable to physically attend this meeting, the Project Construction Manager will conduct the meeting telephonically.

This meeting will be held early morning at the Project Construction Manager's Field Office. No minutes will be taken for these meetings.

## **6.4 Weekly Progress**

The Project Construction Manager will conduct weekly progress meetings with the Contractor to review status and coordinate resources. Attendees shall include C-P/DPW representative, Design Engineer, Administrative Specialist (if needed), Field Inspectors, Contractor, Subcontractors (as appropriate), and others as required. Refer to the Contract Documents.

This meeting will be held in the Construction Field Office or at an appropriate site steadily for each of the contracts on the day and at the time agreed upon.

### **6.4.1 Agenda**

The meeting will have a fixed agenda. The agenda format is as follows:

- Acknowledgement or correction of previous meeting's minutes by attendees.
- Progress of Construction:
  - Contractor shall supply a status report regarding activities completed or started since the last meeting by reviewing the previous look-ahead report.
  - Contractor shall forecast, by activity, the progress expected by the next meeting by presenting current look-ahead report.
  - Contractor shall forecast support for requirements for the next 3 weeks, such as stakeout or testing, which has been identified in Contract Documents to be performed by the Project Construction Manager.
  - Contractor shall forecast interface activities with other contractors, existing facilities, or external agencies for the forecast period.
- General Discussion
  - Project Construction Manager will advise Contractor regarding the log status of contract changes, submittals, outstanding Notices of Non-conformance, and RFIs.
  - Unresolved issues from previous meetings will be discussed.
  - Address a problem area.
  - Coordination issues between the Contractor and subcontractors.
- Comments and Questions
  - C-P/DPW
  - Project Construction Manager
  - Contractor

## 6.4.2 Minutes

Minutes will be prepared by the Project Construction Manager within 3 working days. Minutes will be furnished to attendees. Unresolved issues from previous meetings will be posted in Prolog and remain in the current minutes until addressed.

## 6.5 Monthly Schedule Meeting

The Project Construction Manager will conduct a monthly meeting to address schedule items. Participants include the Project Construction Manager, Senior Project Controls Specialist, Administrative Specialist (if needed), Design Engineer, and Contractor's Project Manager, Superintendent, Scheduler, and appropriate subcontractors.

This meeting will be held in at a predetermined place, day, and time.

### 6.5.1 Agenda

The agenda for the schedule meeting will be as follows:

- Review of Baseline Milestone (CPM) Schedule.
- Identification of activities requiring recovery plans to regain Baseline Milestone (CPM) schedule.
- A 4-week look-ahead to develop requirements for:
  - Critical submittals.
  - Onsite testing.
  - Contractor procurement activities.
  - Off-site inspection of equipment.
  - Witness performance tests.
- In accordance with Section 01 32 00, Project Schedule Specification Outline.

### **6.5.2 Minutes**

Minutes will be prepared by the Senior Project Controls Specialist within 5 working days. Minutes will be furnished to attendees. Unresolved issues from previous meetings will remain in the current minutes until addressed.

# Progress Control and Reporting

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## 7.1 Schedule Management

The Project Construction Manager and Program Construction Manager, with assistance from Senior Project Controls Specialist will take the primary role in monitoring the Contractor's construction schedule. As a minimum, the Project Construction Manager and Senior Project Controls Specialist with assistance from Program Construction Manager will perform the following activities together:

- Conduct baseline schedule meeting with the Contractor's representatives to review the requirements of the Contract Documents regarding schedule preparation and maintenance.
- Conduct a thorough review of the Contractor's preliminary baseline construction schedule. Items of interest include:
  - Compliance with the specified format.
  - Construction start, completion, and milestone dates.
  - Cost and resource allocation for each activity.
  - Logic interface requirements as outlined in the contract.
  - Unusually long or short durations.
  - Inconsistency in activity duration for similar items of work.
  - Sequences that contradict the natural overlap of activities of different trades or crews.
  - Milestone dates.
- Provide the results of the review to the Contractor and request resubmittal of the schedule, if necessary.
- Request the Contractor conduct a "time impact analysis" illustrating the influence of a delay on the current schedule when delays are experienced or a time extension is requested.

## 7.2 Monthly Status Report

Immediately following the monthly schedule meeting discussed in Section 5, the Project Construction Manager and Senior Project Controls Specialist will prepare the Monthly Status Report. The Monthly Status Report will summarize the condition of the project. Required information includes:

- Financial status to include budgeted cost of work scheduled, actual cost of work performed, cost variances, and total encumbered cost on open purchase orders.
- Descriptions of the results of the cost variance analysis.
- Discussion of the project's critical issues.
- Discussion of the work completed this month.
- Discussion of the work to be completed next month.
- Graphic depiction of the project's S curve.
- Graphic depiction of the project's summary schedule.

### 7.3 Daily Inspection Reports

The content of the Daily Inspection Report is to be used in conjunction with the diary. As such, the Prolog template for Daily Reports should only include items that relate to work progress and not conversations or other transactions. Typical actions that are to be included are presented below:

- Report number and the date of the report.
- Day of the week.
- Weather conditions. In the event of an overnight storm, the field conditions at the start of the day shall be noted.
- Average field force, both supervisory and non-supervisory.
  - Name of Contractor and each subcontractor on the job that day.
  - Number of manual workers at the site.
  - Number of superintendents and foremen at the site.
- Visitors at the site, including names, employers, time in, and time out.
- Identity, size, and type of major equipment at the site each day. If idle, indicate reason.
- Log of work commenced; status of work in progress; and log of new work started. The location and description of the work and which subcontractor is performing the work.
- The extent and reason for delays encountered.
- Attach uploaded file containing digital photographs if relevant.

# Inspections and QA/QC Testing

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## 8.1 General

This section establishes procedures for inspection of work in progress either at the site or off site. Inspection includes those actions that demonstrate and document compliance by the Contractor to predetermined quality requirements as defined by the Contract Documents.

Inspection can be categorized into three levels.

- First level inspection initially performed by Contractor, frequently confirmed by Field Inspector, performed during each work activity to ensure Contractor's activities create an end product that meets contractual requirements.
- Second level inspection includes audit activities by the Project Construction Manager which ensure first level inspection activities are occurring and are effective.
- Third level inspection occurs at the acceptance stage to verify work does in fact meet the physical and functional contract requirements for the system and has not been damaged during subsequent construction. This is normally a joint responsibility of C-P/DPW Chief Construction Engineer, Project Construction Manager, Field Inspector, Design Engineer, and Contractor and best held with all parties present at the same time.

## 8.2 Quality Control

The Contractor has the ultimate responsibility for the quality of the work and ensuring it meets all design and specification requirements. In addition, C-P/DPW will provide quality assurance inspection to confirm Contractor is achieving the project's quality goals.

The Contractor is required to meet with the Field Inspector prior to the start of a new phase of work in order to determine when quality control inspections will be required. For example, if the contractor is installing concrete footings, inspection will be required at the following times:

- At completion of excavation to ensure that the excavation conforms to the lines and grades of the work and that the bottom of the excavation has been compacted in accordance with the specification.
- At completion of the installation of forms and reinforcing steel to ensure that the forms conform to the lines and grades of the plans; that the steel has been installed according to approved shop drawings; and that all embeds are in place.
- During placement of concrete to ensure the quality of concrete meets the standards of the specification and that its placement is done in a manner that achieves the intent of the contract.

- During curing of the concrete to ensure that proper curing procedures are followed to allow the concrete to reach its required strength with minimum shrinkage cracking.

The Project Construction Manager will meet with and audit the Field Inspector to ensure that all required inspection occurs and that Field Inspectors have the equipment they need to conduct their reviews and that inspection results are recorded and filed for future reference. All failed inspections will be reported to the Contractor's Superintendent immediately. A trend of failed inspections that implies inadequate inspection and quality control by Contractor will be brought to the attention of the Project Construction Manager to resolve with the Contractor's Superintendent.

## 8.3 Testing

Materials testing will be performed by an independent testing laboratory hired by Contractor and will be conducted in accordance with the Contract Documents. The Project Construction Manager will coordinate the activities of the laboratory and ensure that testing is done in a timely manner consistent with the needs of the work.

Requirements for testing will be forecast for the following 3-week period. This forecast will be updated weekly by joint agreement of the Field Inspector with copies of the forecast forwarded to the Contractor, Project Construction Manager and the testing laboratory. Requests for testing will include the following information:

- Type of test required
- Date of required test
- Time of day of required test
- Location of required test

The results of required testing will be distributed in accordance with the Contract Documents. The Project Construction Manager, in conjunction with the Design Engineer, will interpret test results and will furnish copies to Field Inspectors for reference in the appropriate daily report. Negative test results will require the Field Inspector or Project Construction Manager to issue a Notice of Non-conformance to the Contractor.

The performance of onsite laboratory testing will be observed by Field Inspector. Appropriate entries will be made in the Daily Inspection Reports. Required entries include:

- Type of test
- Location of the work being tested
- Time of test
- Organization performing test
- Test results (if known)
- Cross-reference to previous testing, if a retest is conducted

## 8.4 Preconstruction Condition Survey and Inspection

The Project Construction Manager and Field Inspector will conduct a preconstruction inspection of the areas of proposed construction to establish a system of reference points to

permit detection of any damage that may be caused by Contractor activities. The Field Inspector will obtain photographs, sketches, and narrative descriptions of existing facilities adjacent to proposed work zones to further document their condition prior to beginning work. Documentation will be consolidated into a single report that establishes conditions prior to the commencement of work. Finally, the Project Construction Manager and Field Inspector will periodically monitor the previously established monitoring points to determine if damage has occurred.

## 8.5 Incorporation of Material into the Work

The Field Inspector, with the support of the Project Construction Manager and testing laboratories, will ensure that material delivered to the site meets the requirements of the specification prior to its incorporation into the work. Material that is damaged or of poor quality, as determined by the Field Inspector, will not be allowed to be installed. It will be rejected and immediately removed from the site.

## 8.6 Field Inspector's Role

The Field Inspector acts as the representative of the Project Construction Manager for that portion of the work to which they are assigned. The Field Inspector checks the phases of construction to ensure compliance with Contract Documents, adherence to accepted trade practices, and standards of good workmanship. The Field Inspector also maintains close observation of the quality of the materials used.

Deviations from the Contract Documents will be pointed out to the Contractor and will be noted in the Field Inspector's diary. The Field Inspector will continue to monitor the construction until the deviation is adequately addressed. In the event Contractor fails to adequately address the deviation in a timely manner, the Field Inspector will notify the Project Construction Manager and, with the Project Construction Manager's approval, issue a Notice of Non-Conformance, C-P/DPW Prolog NTC form.

The Field Inspector will prepare Daily Inspection Reports and will maintain a 'hip pocket' diary in accordance with Section 6 of this Construction Management Plan. Copies of Daily Inspector Reports will be available through Prolog to the Design Engineer, Project Construction Manager, and Program Construction Manager, and C-P/DPW Project Manager.

## 8.7 Non-conformance Reporting and Documentation

Corrective actions that bring the work into contract compliance must occur in a timely manner. If corrective action does not occur and, in the opinion of the Project Construction Manager, the non-conformance will affect the quality, safety, or continuity of the project, the Project Construction Manager must issue a Notice of Non-conformance. On Prolog, each Notice of Non-conformance will be available for viewing along with a log of completed and open Notices of Non-conformance. The Notice of Non-conformance will be signed by the Project Construction Manager and posted on Prolog.

A representative of the Contractor onsite will sign to acknowledge receipt of the notice. The Contractor will sign and return the Notice of Non-conformance upon completion of the required remedial work. The Field Inspector or Project Construction Manager will indicate approval of the remedial work by signing and dating the Contractor's copy and their copy of the Notice of Non-conformance. If the Contractor fails to complete the remedial work in a manner acceptable to the Project Construction Manager, payment for that work will be withheld.

A log will be maintained of all Notices of Non-conformance C-P/DPW Prolog NTC forms. The status of outstanding Notices of Non-conformance will be discussed at each weekly meeting.

## 8.8 Offsite Inspection

If needed, the Project Construction Manager and Design Engineer are responsible for offsite inspection of manufacturing facilities for Contractor-procured equipment and materials. Actual inspection may be performed by the Field Inspectors or personnel provided by the Design Engineer. The requirements and responsibility for offsite inspection should be determined prior to construction start. The Project Construction Manager will coordinate with the Contractor to determine the manufacturer's location, items to be manufactured, time of inspection, and the Contractor's purchase order number for each item requiring factory witness testing and inspection. Field Inspectors visiting offsite locations will prepare acceptance reports and will provide these to the Design Engineer and Project Construction Manager.

## 8.9 Survey Support

The Contractor is responsible for establishing horizontal and vertical survey control for the project, based on the control points identified on the Contract Drawings. The Design Engineer is available to provide survey support to verify the dimensional correctness of the Contractor's layout. The Project Construction Manager will coordinate the use of the Design Engineer's surveyor with the needs of the work.

# Construction QA/QC Program

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## 9.1 Introduction

This Construction Quality Control/Quality Assurance (QA/QC) Program has been written to define the activities of all persons performing, managing and administering construction for the C-P/DWP.

Quality is more than meeting the minimum requirements of the Contract Documents, completing a job on time, and within budget. Quality is also having our customers pleased with the product and service we provide. Accordingly, quality is a long-term perspective. Some of C-P/DPW's core values of quality are:

- Consistently doing what is right and appropriate.
- Being fair with others and asking the same in return.
- Being honest and acting with integrity
- Complying with the spirit of legal and regulatory requirements;
- Being courteous, responsive and helpful to others;
- Being reliable and attending to details;
- Taking timely actions;
- Being socially and environmentally responsible;
- Demonstrating high productivity and competent performance;
- Being cost conscious without compromising quality;
- Being innovative and responsive;
- Providing a positive work environment;
- Focusing and agreeing on clear and sound mutual objectives;

all to construct a quality product which will provide legendary service to C-P/DPW customers throughout its designed life expectancy.

This Construction QC/QA Program is only a guidance document which outlines general activities, procedures and reporting requirements of C-P/DPW. Contractors shall have their own Quality (QC) Plan.

## 9.2 Quality Control

The primary function of Quality Control (QC) is to establish standards of quality for construction. The Contractor's plan defines procedures to manage and control their own activities, Subcontractors' activities, and suppliers' activities; ensuring the completed project conforms to the Contract Documents.

The Contractor's QC plan is the foundation for quality work. It outlines the planned quality control procedures, and it vital to the Construction QC/QA Program. The plan must be comprehensive, detailed, and logical if the Contractor's quality control system is to be effective.

## 9.3 Objectives

The Contractor has the contractual responsibilities to manage construction quality and inspect the work. Control is an ongoing system of planning future activities. Inspection is the process by which on-going and completed work is reviewed. The objectives of QC are to see that the Contractor has adequately planned to begin a phase of work, to eliminate deficiencies, and to follow through in accomplishing the work in accordance with the Contract Documents. The objective of inspection is to see that the work is implemented in accordance with Contract Documents.

The general responsibility for quality control belongs with the Contractor. The Contractor must continually strive to make improvements and to keep deficiencies to a minimum.

## 9.4 Contractor Responsibilities

As stated previously, QC is the Contractor's responsibility. This includes, but is not limited to, the following:

- Providing the quality specified in the Contract Documents;
- Implementing and maintaining an effective QC system;
- Performance of control activities and tests; and
- Completion of acceptable documentation of QC activities.

The Contractor shall place a "competent" person onsite to oversee the QC system. This person, or an approved alternate, must have full authority to act for the Contractor on QC matters and shall be onsite during Construction activities. The responsibilities include materials, workmanship, methods, and techniques to provide that work is constructed properly by qualified, competent, and professional craftsman and tradesmen. A "competent" person is one that has been trained in excavation safety, work traffic control, and confined space entry. Competent person may instruct direct hires and subcontractors to remove and replace work which has not been properly tested, controlled, or does not meet contract requirements.

Clear and effective communication between the Contractor, Design Engineer, C-P/DPW, and the Construction Management Team is vital to QC, which is dependent on mutual cooperation. Effective QC requires the complete cooperation of the Contractor, Design Engineer, C-P/DPW, and the Construction Management Team.

The Contractor has the responsibility to be familiar with the nature and location of the work by site visits and investigations. The Contractor shall evaluate general and local conditions which may affect work and/or costs. The Contractor has the responsibility to review Contract Documents and request clarification where necessary, especially if there is an apparent conflict between drawings or specifications. All of this is accompanied by asking questions during the bidding phase and submitting Requests for Information (RFI) during construction.

## 9.5 Quality Control Plan

The Contractor shall develop a project specific Quality Control (QC) Plan. The Contractor's QC Plan will address definable features of construction and unusual or unique aspects of the job or activity for which it is written. The primary function of the QC Plan is for a successful execution of a realistic construction plan, by control and inspection, to ensure that required standards of quality are met and to preclude problems resulting from poor quality and/or workmanship. The QC Plan will define procedures to manage and control the Contractors' own operations, site conditions, workmanship and safety, as well as his subcontractors, suppliers, manufacturers, products, and services to produce work of a specified quality while completing a project that complies with the Contract Documents, on time, and within budget. The Contractor has the contractual responsibility to control construction activities, quality, inspect the work, and prepare documentation as appropriate in a timely and efficient process.

The QC Plan shall be prepared in accordance with the following concepts. Quality Control should be divided into three phases. Each control phase provides the opportunity to prevent problems, deficiencies and misunderstandings. The phases are as follows:

### 9.5.1 Preconstruction Phase

Actions in advance of construction, advance planning, shop drawings, lay out schedules, detailed sketches, test reports, mix designs, schedule of values (payment schedule for non-unit cost contracts), Contractor's Safety and Health Plan, and physical checks of material delivered to site comparing to approved submittals and contract requirements.

### 9.5.2 Construction Phase

- **Initial Phase:** The initial control of each separate feature or segment of work is made at the outset of the operation to ensure a proper start-up of work and full compliance with contract requirements. This is the phase in which the Contractor will establish acceptable standards of workmanship with a limited sample of the work being completed and subjected to a joint quality inspection by contractor, workman and Field Inspector. The initial phase is the most logical time to resolve any difference of opinion or interpretation of plans, rather than when the work in place.
- **Follow-up Phase:** Inspection and testing is made to determine continuation of compliance and workmanship standards established during preconstruction and initial phase. Follow-up inspections are more productive when they are preceded by thorough preconstruction and initial phase and workmanship standards have been established prior to construction.
- **Construction Completion Phase:** Last follow-up, or when any segment of work is complete, the Contractor is to carefully examine the work, prepare a deficiency list of anything not completed or not conforming to the contract requirements. Work yet to be accomplished could include: paperwork/documentation, submittal of test results or other documents, certificates, diagrams, warranties, Operation and Maintenance Manuals, etc.

When deficiencies are found in the Contractor's quality control and/or implementation of the QC Plan, many actions can be taken depending on circumstances. Such actions may include but are not limited to:

- Improving the QC Plan,
- Correcting deficient management,
- Removing incompetent QC personnel,
- Correcting defective work,
- Refusing to allow work to continue in defective areas, and/or
- Disallowing payment for the defective work.

An aggressive and effective application of the Contractor's QC Plan by the Contractor can minimize or eliminate the need for C-P/DPW to take these actions.

The Contractor shall develop and submit, for review by C-P/DPW, a detailed project specific Quality Control Plan after receipt of Notice of Award. It shall be reviewed and formally accepted prior to the issuance of a Notice to Proceed with construction phase activities at the site.

## 9.6 Documentation

The Contractor shall document QC activities performed during the contract by the Contractor, subcontractors, testing laboratories, and vendors in accordance with the Contract Documents. The Contractor shall prepare QC reports consisting of or considering the following items:

- Testing activities, control procedures, test frequency or quantity, test location, test results, nature of deficiencies, proposed remedial actions, and corrective procedures instituted.
- Reports shall reference specification section.
- Reports shall also include subcontractor work.
- Reports should concentrate on work items that have been completed and provide evidence of control activities.
- Reports shall be submitted on a weekly basis, but always before request for payment on completed work.
- Reports shall reflect accurate and precise QC actions taken.

## 9.7 Submittals

It is imperative that the Contractor's QC representative review submittals. Whether originating from the Contractor, subcontractors, vendors, or suppliers. The obvious absence of Contractor QC review is in itself ground for rejecting submittal.

- Typical types of submittals are:
  - Testing Data

- Shop Drawings
  - Work Schedules
  - Reports/Statements
  - Material or Product cut sheets or other descriptions
  - Materials Samples
  - Materials Testing
  - Contractor’s Safety and Health Plan
- The primary responsibility for overall management and control of submittals lies with the Contractor.
  - Submittals shall be provided in a timely manner, and according to Contract Documents, to allow for the review, approval, procurement, delivery, and QC preparatory phase of an item before it is needed for construction. The Contractor will receive no time extension for delays caused by late or deficient submittals which require multiple submissions. If a Contractor repeatedly provides deficient submittals, C-P/DPW reserves the right to back charge the cost of multiple reviews.

## 9.8 Testing

Testing procedures described in the Construction Contract Documents are another form of quality control to be performed by the Contractor, ensuring delivery of an end product which meets the requirements in the contract.

Testing requirements and procedures shall include but not be limited to the following:

- An outline of proposed testing procedures developed and submitted prior to construction.
- A listing of required tests as specified in the Contract Documents, in addition to providing a listing of non-specified testing procedures pending approvals.
- Identification of tests to be performed by an independent, C-P/DPW approved certified testing laboratory or by the Contractor with C-P/DPW approved certified equipment and procedures or by others (subcontractors or suppliers) approved by C-P/DPW.
- ASTM 3740-96, Minimum Requirement for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.

## 9.9 Quality Assurance

Quality Assurance (QA) is the means by which C-P/DPW ensures the completed project complies with the quality established by the Contract Documents. C-P/DPW ensures that Quality Control (QC) will be accomplished through reviews, observation and tests by QA personnel (Field Inspector, Design Engineer, Construction Management Team or any other authorized C-P/DPW representative).

Responsibilities of the QA personnel include but are not limited to the following:

- Respond to Contractor’s RFIs in a clear and timely manner.

- Require the materials and standard of workmanship specified in the Contract Documents.
- Require from the beginning that the Contractor demonstrate and maintain the quality specified in the Contract Documents and detailed in the Contractor's QC Plan.
- Deal only with authorized Contractor's representatives.
- Advise Contractor of document deficiencies as discovered.
- Follow up with the Contractor to ensure deficiencies are corrected.
- Establish and maintain throughout the project clear and effective communications with the Contractor.
- Designate a C-P/DPW representative as the Contractor's single point of contact.
- Identification and scheduling of training requirements for C-P/DPW personnel.
- Identification of pre-award activities.
- Identification of special project requirements.
- Establish procedures for QA tests at random unannounced intervals.
- Review qualifications of Contractor's identified quality control laboratory.

## 9.10 Specific Activities

Specific activities associated with QA include the following:

- QC Plan review and acceptance.
- Preconstruction Conference.
- Coordination meetings.
- Timely submittal reviews and acceptance.
- Timely assurance testing.
- Acceptance of completed work.
- Knowledge of and compliance with C-P/DPW QC/QA Program
- Review Contractor's Safety and Health Plan

### 9.10.1 QC's Plan Review and Acceptance

QC plan review shall include but is not limited to the following:

- Evaluation of the QC plan with regard to the Contract Document requirements and determine overall feasibility.
- Identification of any problem areas needing change or clarification.
- Determination if QC Plan provides adequate control of defined segments of work.
- Evaluation of QC staffing and organization for compliance with Contract Documents.

- Check qualifications, training (Excavation/Safety competent person, work zone traffic control, confined space entry), responsibilities, and authority (sign pay request, negotiate change orders) of Contractor's/Subcontractor's QC "competent" person.
- Determination that QC plan adequately addresses submittals process.
- Check proposed QC documentation formats.

### 9.10.2 Preconstruction Conference

This conference is a specific contract requirement and shall be held soon after contract award and prior to start of actual construction, contingent on receipt of Contract Documents specified in the General Conditions, including Contractor's QC Plan. The conference will address contract clauses covering quality control, testing, warranties, safety, personnel, and procedural items with discussions on specific rules and procedures. Specific responsibilities and authorities shall be presented and agreed upon so that the Contractor, Design Engineer, Construction Management Team, and C-P/DPW will share the same understanding of the project scope and conditions.

### 9.10.3 Coordination Meetings

These meetings are scheduled and conducted by Project Construction Manager. They will be scheduled as required and/or prior to the start of a definable feature of work on a project. The primary purpose of these meetings is to establish a positive working relationship and to achieve a mutual agreement with the Contractor on the QC Plan and Safety Plan requirements.

The Coordination Meetings should address the following:

- Responsibilities of the "Competent Person(s)" - safety and QC may be different.
- Quality control concepts.
- Definable segments of the physical work.
- Correction or expansion of the QC Plan, if necessary.
- Procedures to be followed if deficiencies are discovered.
- Testing and documentation.
- Procedures for making changes.
- Safety Plan.
- Review list of Contractor required submittals and status of review or acceptance.

Project Construction Manager will take detailed conference minutes and distribute minutes.

### 9.10.4 Submittal Reviews and Acceptance

C-P/DPW and Construction Management Team responsibilities regarding submittals include but are not limited to the following:

- Review list of submittals, prepared by Contractor, against requirements of the Contract Documents.
- Review Contractor's submittal control document for compliance with submittal schedules, review time and procurement lead times.

- Check submittal control documents against construction schedule.
- Continually monitor status of submittals.
- Respond to submittals in accordance with contract documents.
- Enforce submittal requirements of the contract documents.

### 9.10.5 Assurance Testing

Quality Assurance (QA) testing is necessary to ensure a quality project. C-P/DPW will perform QA testing to verify QC testing is accomplishing the specified objectives. QA testing can be performed by C-P/DPW personnel or an independent testing laboratory.

Specific scope and objectives include:

- Review Contractor's proposed QC testing methodology, quantity of tests, and laboratory or Contractor's equipment certifications contained in the QC plan.
- At the beginning of testing program, observe Contractor or independent laboratory sampling and testing procedures to ensure compliance with contract requirements and good practice.
- Review reports of QC tests performed and document corrective actions taken for problem area.
- Verify QC testing by random, unannounced tests that repeat the Contractor's QC tests.

## 9.11 Completion Of Work

In order to properly complete a quality project, defined procedures are necessary. Activities involving QC/QA personnel include but are not limited to the following:

- Participation in preliminary and final inspections.
- Prepare deficiency "punchlist".
- Completion of "punchlist" deficiencies.
- Review and approve As-built drawings.
- Timely submittal of approved Operation and Maintenance manuals.
- Timely completion of Operation and Maintenance training.
- Timely submittal of specified spare parts.
- Submittal of Contractor warranty information.

## 9.12 C-P/DPW Options In The QC/QA Program

The QC/QA program will be successful only if all parties are committed to "Quality of Excellence". Preparation of high quality design documents by C-P/DPW and Design Engineers provide the basis for high quality construction. Contractor Quality Control is the key to providing an excellent product. C-P/DPW's cost for providing, maintaining, and replacing its infrastructure continues to escalate. C-P/DPW core values dictate the pursuit of excellence and the elimination of poor quality, incompetence, and unsafe processes and products.

Proper QC by the Contractor can prevent adverse C-P/DPW actions. The Contract Documents contain clauses that provide means for enforcing contract compliance. Available means include, but are not limited to:

- Require Contractor to remove and replace deficient materials and/or workmanship.
- Withhold payment.
- Require removal of unqualified personnel.
- Stop work until deficiencies are corrected.
- Default the Contract.
- Enforce liquidation damages.
- Disqualification from bidding on future C-P/DPW projects.

Such drastic actions are not desirable and would be necessary only when all other more amenable avenues of partnering have failed. As originally stated, Quality is more than meeting the minimum requirements of the Contract Documents. Quality is also complying with C-P/DPW core values and providing legendary service. And this requires the complete and full commitment to quality by all parties of this partnership.

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# Substantial Completion and Final Inspection

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## 10.1 General

The Contractor will notify the CH2M HILL Project Construction Manager when elements of the project are substantially completed. The CH2M HILL Project Construction Manager will arrange for inspection of the work, which, as a minimum, will consist of at least a substantial completion inspection and a final inspection. C-P/DPW may assume beneficial occupancy at any time following the successful substantial completion inspection. Beneficial occupancy infers that the element of work and/or the facility is operational as intended and that C-P/DPW assumes responsibility for operating and maintaining a facility with an agreed list of minor contractor actions remaining.

## 10.2 Substantial Completion Inspection

### 10.2.1 Substantial Completion Date

The date of substantial completion is determined by the CH2M HILL Project Construction Manager in accordance with the Contract Documents.

### 10.2.2 Inspection Participants

Substantial completion inspections will be arranged by the CH2M HILL Project Construction Manager based on notification by the Contractor that the work is substantially complete. Mandatory participants include:

- C-P/DPW Chief Construction Engineer
- Project Construction Manager
- Program Construction Manager
- Field Inspectors
- C-P/DPW Owning Department Representative (i.e., from Treatment )
- Contractor
- Design Engineer(s)
- Outside agencies, as required

The Contractor or the CH2M HILL Project Construction Manager may call for assistance from specialists in conducting the substantial completion inspection, depending on the complexity of the work.

### 10.2.3 Substantial Completion Inspection Guidelines

The substantial completion inspection will be structured to ensure that:

- The work has been completed in substantial conformance with the Contract in preparation for a final inspection.
- Installed equipment works properly.

- Required certificates of conformance and tests, certified analyses, and laboratory tests have been submitted.
- Warranties, tools and equipment, and O&M manuals are approved and available.
- All applicable Notices of Non-Conformance have been released.

### **10.2.4 Results**

If deficiencies are noted at the completion of the substantial completion inspection, the Project Construction Manager, Field Inspector and Design Engineer will prepare a punchlist using C-P/DPW Form 021 "Final Inspection/Project Closeout Process" as a guide to identify deficiencies found during the inspection. This document will be signed by both the Project Construction Manager and the Contractor.

If the work is found to be substantially complete, the Project Construction Manager will prepare a Letter of Conditional Approval for signature by the Program Construction Manager and the Contractor.

## **10.3 Final Completion Inspection**

### **10.3.1 Final Completion**

Final completion occurs on the date certified by the Project Construction Manager or in accordance with the Contract Documents. The final completion inspection includes both physical examination of the work and the examination of contract provisions and requirements to establish the Contract has been fully performed.

### **10.3.2 Inspection Participants**

Those participants identified for the substantial completion inspection will be invited to attend and participate in the final completion inspection.

### **10.3.3 Final Completion Guidelines**

Guidelines regarding the final completion inspection include the following:

- Contractor requests Project Construction Manager conduct a final completion inspection.
- If Project Construction Manager finds conditions satisfied, they then notify the participants identified in paragraph 9.2.2 of the time and place of the final inspection.
- During the final inspection, parties will inspect the work and examine applicable portions of the Contract Documents.
- If the inspection is not satisfactory, Project Construction Manager will prepare a final punchlist.
- Contractor will correct items noted on the final punchlist.
- If the inspection is satisfactory, the Program Construction Manager will authorize issuance of the Notice of Final Completion. At that point, Senior Construction Specialist then prepares a memorandum to the C-P/DPW stating that punchlist items have been successfully completed and to recommend issuance of Final Acceptance.

SECTION 11.0

# CH2M HILL Field Safety Instructions

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Field Safety Instructions are attached to this document as Appendix A.

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# Uniform Construction Filing System

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## 12.1 Project Files

### 12.1.1 General

The purpose of the document management file is to provide secure storage and ready retrieval of project records. The project files will contain correspondence and documents pertaining to the administration of the Program contracts. It is intended that one complete set of files reside on Prolog while a duplicate set of hardcopy files may be kept in the Field Office.

Three basic file containers shall be used for the hardcopy files to reside in the Field Office. They include:

- Standard legal four or six drawer, steel, lockable file cabinets.
- Three-ring binders.
- Drawing file or rack.

TABLE 12-1  
Project Filing Index

File Number	File Name
<b>01</b>	<b>Initiation</b>
AJD	Analysis and Justification
CHD	Charter Document
CFM	Configuration Document
FSS	Feasibility Studies
FNA	Financial Analysis
INP	Inspection, Preliminary
OGC	Organizational Chart
PFS	Project Filing System
RIA	Risk Analysis
<b>02</b>	<b>Contract Management</b>
COC	Change Orders, Approved Claims
CLM	Claims
CCO	Contract Close-out
CTD	Contract Documents (specs and drawings)
APO	Notice of Award / Notice to Proceed / Purchase Order
PCC	Pre-Construction Conference
PTR	Program and Project Team Roster

TABLE 12-1  
Project Filing Index

<b>File Number</b>	<b>File Name</b>
<b>03</b>	<b>Planning and Change Control</b>
	CRS Change Requests
	CRL Change Requests Log
	PRO Project Organization: (work orders, statements of work, work breakdown structures)
	RFI RFI's
	RFL RFI Log
	SOV Schedule of Values
<b>04</b>	<b>Regulatory</b>
	CRT Certifications
	COR Correspondence
	LCN Licenses
	PER Permits
<b>05</b>	<b>Communications</b>
	COL Correspondence Logs
	CIC Contractor Incoming Correspondence
	COC Contractor Outgoing Correspondence
	PIC C-P/DPW Incoming Correspondence
	POC C-P/DPW Outgoing Correspondence
	EIC Engineer Incoming Correspondence
	EOC Engineer Outgoing Correspondence
	ICI Interoffice Incoming Correspondence
	ICO Interoffice Outgoing Correspondence
	OIC Other Incoming Correspondence
	OOC Other Outgoing Correspondence
	CIR Customer Relations
	MTM Meetings, Minutes
	MTO Meetings, Other
	MTP Meetings, Progress
	PBR Public Relations
	TRI Transmittals, Incoming
	TRO Transmittals, Outgoing
<b>06</b>	<b>Progress Tracking</b>
	DID Daily Inspection Diaries
	ISP Inspections
	PHG Photographs
	PSR Progress / Status Reports
	PUL Punch Lists
	STL Schedules / Time Lines

TABLE 12-1  
Project Filing Index

<b>File Number</b>	<b>File Name</b>
<b>07</b>	<b>Finance &amp; Insurance</b>
	AUD Audits
	BUD Budget
	INS Insurance
	PRF Program Funding
	SUC Subcontractor Claims (non-payment)
<b>08</b>	<b>Purchasing</b>
	BID Bidding
	CPP COP Program Purchasing
	IVA Invoices and Approvals
	OWS Offsite Warehouse Storage, if needed
	POB Post Bid
	RCC Request for Contract Change
	RCM Recommendations (Bid Certification)
	RFP Request For Proposal
	RFQ Request For Quote
	VDI Vendor Information
<b>09</b>	<b>Environmental and Safety</b>
	ENV Environmental
	EMW Existing Monitoring Well Logs
	PJS Project Security
	SAF Safety
<b>10</b>	<b>Real Estate</b>
	ACQ Acquisitions
	APR Appraisal Reports
	CPO Complaints by Property Owners
	COR Correspondence
	EAS Servitudes/Easements
	SUR Surveys
<b>11</b>	<b>Technical Data</b>
	COS Contractor's Submittals
	DCH Design Changes
	ECC Equipment Checkout/Certification
	MAP Maps (Geologic and Topographic)
	PRD Preliminary Drawings
	PRS Preliminary Specifications
	RPT Reports
	SHL Shop Drawings Log
	SHD Shop Drawings
	OAM Start-up, O&M

**TABLE 12-1**  
Project Filing Index

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<b>File Number</b>	<b>File Name</b>
	PLN Start-up, Plans
	TRN Start-up, Training,
	SUL Submittals Log
	COT Testing, Concrete
	CPQ Testing, C-P/DPW-QA/QC: (lab and field tests)
	EQT Testing, Equipment
	OTT Testing, Other
	SOT Testing, Soil
<b>12</b>	<b>Project Close-out</b>
	ACF Acceptance Certification, Final
	ABD As-built Drawings
	FIS Final Inspection
	PCR Reports, Project Close-out
	FCR Reports, Final Construction
	FER Reports, Final Engineering
<b>13</b>	<b>Collaborative Tools</b>
	RFIs
	Submittals
	Daily Reports
	Photos

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# Construction Program Forms

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## 13.1 Prepared Forms

Included below is a listing of standard C-P/DPW forms, some of which have been identified in the text of this manual. All parties are encouraged to familiarize themselves with all of the prepared forms available and utilize those which are appropriate.

## 13.2 General

Form 001	Transmittal
Form 002	Memorandum
Form 003	Telephone Conversation Record <sup>1</sup>
Form 004	Request for Information <sup>2</sup>
Form 005	Transmittal of Contractor's Submittal
Form 006	Conference Memorandum
Form 007	Daily Construction Report <sup>2</sup>
Form 008	Contractor's Daily Construction Report <sup>2</sup>
Form 009	Pipe Leak Test Record
Form 010	Request for Contract Change
Form 011	Proposal Cost Format
Form 012	Change Order
Form 013	Field Change Directive
Form 014	Daily Time & Material Record\
Form 015	Contract Summary Sheet
Form 016	Spare Parts Transmittal
Form 017	Request for Information Log
Form 018	Submittal Log
Form 019	Pipe Testing Log
Form 020	Request for Contract Change Log
Form 021	Change Order Log
Form 022	Spare Parts Transfer Log
Form 023	Final Inspection/Project Closeout Process

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<sup>1</sup> A Prolog Website form will available and may be used in lieu of the form. If CITY-PARISH form is used, it must be scanned and uploaded to Website.

<sup>2</sup> Electronic submittal through Prolog Website is preferred over the CITY-PARISH standard form.

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**Appendix A**  
**Field Safety Instructions**

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# Field Safety Instructions - Baton Rouge Sewer System Overflow Control and Wastewater Improvement Program

Prepared for  
Department of Public Works  
City of Baton Rouge  
Parish of East Baton Rouge



JUNE 2007

**HSEQ**

Health, Safety, Environment & Quality

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**World Class Performance**



# CH2M HILL FIELD SAFETY INSTRUCTIONS

These Field Safety Instructions (FSI) will be kept onsite during field activities and will be reviewed as necessary. The FSI will be amended or revised as project activities or conditions change or when supplemental information becomes available. The FSI adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, these FSI may adopt procedures from the project Work Plan. The Designated Safety Coordinator (DSC) is to be familiar with these SOPs and the content of these instructions. CH2M HILL's personnel and subcontractors must sign Attachment 1.

## Project Information and Description

**PROJECT NO:** 350589

**CLIENT:** Baton Rouge Louisiana Department of Public Works

**PROJECT/SITE NAME:** BTR Sanitary Sewer Overflow Program Management, Phases 1-8

**SITE ADDRESS:** Multiple locations throughout Baton Rouge, LA (3 WWTPs and lift stations)

South WWTP: 2850 South Gardere Lane; Baton Rouge, LA 70820

**CH2M HILL PROJECT MANAGER:** Jim Hawley

**CH2M HILL OFFICE:** BTR

**DATE FIELD SAFETY INSTRUCTIONS PREPARED:** June 21, 2007

**DATE(S) OF SITE WORK:** June 1, 2007 – December 31, 2014

**SITE DESCRIPTION AND HISTORY:** This is a Capital Improvement Program, with a total cost to the Client of \$1.2B to be completed by December 2014 under a DOE Consent Decree. This project consists of design and construction on 26 rehabilitation projects, 57 capacity improvement projects and four wastewater treatment improvement/storage projects. For further information, refer to the Program Delivery Plan located on the project web-site at <http://www.brprojects.com/sewer/pages/Sewer.htm>.

**DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED BY CH2M HILL:** CH2M HILL will be conducting field investigations (at pump stations and neighborhoods for the rehab of lines) and conducting progress meetings with consultants. This will entail a lot of windshield surveys, and some tours on the ground for visualization. Also during design activities, there will be meetings with the design consultants.

CH2M HILL employees conducting field work for this project include:

Derek Evans/BTR

Ralph Williams/BTR

Desiree Dies/BTR

Steven Bellelo/BTR

Jason Moore/BTR

Joshua Boltz/MGM

Jeremy Fontenot/BTR

Marc Ischen/NWO

Joseph Young/BTR

Louis Jackson/NWO

Michael Ellis/BTR

Rodolfo Valladares/GNV

Obie Watts/BTR  
Tom Ridgik/GNV  
Mike Uchniat/SAN

Hank Postrozny/GNV  
Jim O'Connor/SAN

This project will also include inspections that involve entering wastewater pump stations to install flow monitors. CH2M HILL employees performing this work will be performed by Wade & Associates and include:

Bill Mefford/TUL  
William Burleigh/KCW

This project will also include field surveys of lift stations, which involves visiting Client facilities, opening electrical panels to gather information (which may require attaching a clamp on ammeters to determine electrical load), and potential confined space entry for entering the dry well side of the lift stations. These activities will require Live Electrical NFPA 70E training, Confined Space Entry Training, and Field Awareness Safety Training. The PM for this project is Larry Fettkether/BOI, and the CH2M HILL staff performing this field work includes:

Sai Ho/DFW  
Gerry Gonzalez/FLL  
Shane Mandrell/GNV  
Jim O'Connor/SAN

This project entails occasional site access at this time.

During this phase of the project (assessment, design and construction), CH2M HILL will have three subcontractors (Sigma Consulting Group/Civil Engineering, C-Del/Land Acquisition, and ILSI/Surveying). The Client is not expected to have any subcontractors for this phase of the project.

This project will also include construction management services for the Baton Rouge South WWTP improvements. This project is expected to begin in March 2009 and last through July 2010. The scope of work includes the following projects:

- Screening Improvements (mechanically clean bar screen; removing and replacing two sluice gates; install a new conveyor from the bar screens to the existing conveyor; replace three skylights with roof hatches; related electrical)
- Primary Treatment Improvements (add chemical systems to primary settling tanks (ferric chloride and polymer); install flow measurement and automatic control capabilities of the weir gates on Splitter Box 1 and 2; miscellaneous repairs to the sludge collection equipment in primary settling tanks 1 and 2; replace all Primary Settling Tanks influent plug valves)
- Trickling Filter Improvements (new 119 MGD Trickling Filter Influent Pump Station; new Electrical Building; new flow splitting structure to divide pump station effluent flow among existing clarifiers; new piping, valves, flow meters pipe supports, concrete structures, piping tie-ins and other work related to this work; miscellaneous related work including demolition at the two existing primary effluent pump stations, structural work related to raising the walls at the existing trickling filter splitter structures, piping demolition, abandonment, relocation work, etc.)

- Sludge Handling Improvements (rehabilitation of the existing thickened sludge pump station; rehabilitation of the existing gravity thickeners; rehabilitation of the existing gravity belt thickeners; installation of one new snail shell screen; installation of new sludge piping from Secondary Sludge Pump Station #2; installation of new piping required to isolate Gravity Thickener #1; related construction work)

The CH2M HILL staff performing this field work is to be determined:

TBD/TBD

This project entails frequent access during construction activities.

During this phase of the project CH2M HILL is not planning to have any subcontractors. The Client will contract with a GC, TBD, for the construction work.

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# 1 Project Organization and Responsibilities

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## 1.1 Client

Contact Name: Bryan Harmon

Phone: (225) 389-3186

## 1.2 CH2M HILL

Project Manager: Jim Hawley/BTR

Health and Safety Manager (HSM): Alan Cyrier/ATL

Designated Safety Coordinator (DSC): Mike Uchniat/BTR

The DSC is responsible for verifying that the project is conducted in a safe manner including the following specific obligations:

- Verify these FSI are current and amended when project activities or conditions change;
- Verify CH2M HILL site personnel and subcontractor personnel read these FSI and sign Attachment 1 “Employee Signoff Form” prior to commencing field activities;
- Verify CH2M HILL site personnel and subcontractor personnel have completed any required specialty training (e.g., fall protection, confined space entry) and medical surveillance as identified in Section 2;
- Verify compliance with the requirements of these FSI and applicable subcontractor health and safety plan(s);
- Post OSHA job-site poster; the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established; posters can be obtained by calling 800/548-4776 or 800/999-9111;
- Verify that safety meetings are conducted and documented in the project file initially and as needed throughout the course of the project (e.g., as tasks or hazards change);
- Verify that project H&S forms and permits, found in Attachment 5, are being used as outlined in Section 2;
- Verify that project activity self-assessment checklists, found in Attachment 6, are being used as outlined in Section 2.

## 1.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HS-215, *Contractor, Subcontracts, and HS&E Management Practices*)

**Subcontractor:** Sigma Consulting Group

Subcontractor Contact Name: Miles Williams

Telephone: (225) 298-0800

Subcontractor Task(s): Civil Engineering

**Subcontractor:** C-Del

Subcontractor Contact Name: Corey Delahoussaye

Telephone: (225) 665-5665

Subcontractor Task(s): Land Acquisition

**Subcontractor:** ILSI

Subcontractor Contact Name: Lesley Tabony

Telephone: (504) 455-2090  
Subcontractor Task(s): Survey

The subcontractors listed above are covered by this FSI and must be provided a copy of this plan. However, these instructions do not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work. Subcontractors must comply with the established health and safety plan(s). The CH2M HILL DSC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the DSC is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. Self-assessment checklists contained in Attachment 6 are to be used by the DSC to review subcontractor performance.

Health and safety related communications with CH2M HILL subcontractors should be conducted as follows:

- Brief subcontractors on the provisions of this plan, and require them to sign the Employee Signoff Form included in Attachment 1;
- Request subcontractor(s) to brief project team on the hazards and precautions related to their work;
- When apparent non-compliance/unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions;
- When repeat non-compliance/unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented;
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate;
- Document all oral health and safety related communications in project field logbook, daily reports, or other records;

## 1.4 Contractors

(Reference CH2M HILL SOP HS-215, *Contractor, Subcontracts, and HS&E Management Practices*)

**Contractor:** None at this time  
Contractor Contact Name: NA  
Telephone: NA  
Contractor Task(s): NA

**Contractor:** TBD  
Contractor Contact Name: NA

Telephone: NA  
Contractor Task(s): General Construction, WWTP Improvements

These instructions do not cover contractors that are contracted directly to the client or the owner. CH2M HILL is not responsible for the health and safety or means and methods of the contractor's work, and we must never assume such responsibility through our actions (e.g., advising on H&S issues). In addition to these instructions, CH2M HILL staff should review contractor safety plans so that we remain aware of appropriate precautions that apply to us. Except in unusual situations when conducted by the HSM, CH2M HILL must never comment on or approve contractor safety procedures. In addition to these instructions, CH2M HILL must never comment on or approve contractor safety procedures. Self-assessment checklists contained in Attachment 6 are to be used by the DSC to review the contractor's performance ONLY as it pertains to evaluating our exposure and safety.

Health and safety related communications with contractors should be conducted as follows:

- Request the contractor to brief CH2M HILL employees and subcontractors on the precautions related to the contractor's work;
- When an apparent contractor non-compliance/unsafe condition or practice poses a risk to CH2M HILL employees or subcontractors:
  - Notify the contractor safety representative;
  - Request that the contractor determine and implement corrective actions;
  - If needed, stop affected CH2M HILL work until contractor corrects the condition or practice. Notify the client, Project Manager, and HSM as appropriate.
- If apparent contractor non-compliance/unsafe conditions or when an apparent contractor non-compliance/unsafe condition or practice poses a risk to CH2M HILL employees or subcontractors:
  - Notify the contractor safety representative;
  - Request contractor to determine and implement corrective actions;
  - If needed, stop affected CH2M HILL work until contractor corrects. Notify the client, Project Manager, and Health and Safety Manager as appropriate.
- If apparent contractor non-compliance/unsafe conditions or practices are observed, inform the contractor safety representative. Our obligation is limited strictly to informing the contractor of our observation – the contractor is solely responsible for determining and implementing necessary controls and corrective actions;
- If an apparent imminent danger is observed, immediately warn the contractor employee(s) in danger and notify the contractor safety representative. Our obligation is limited strictly to immediately warning the affected individual(s) and informing the contractor of our observation – the contractor is solely responsible for determining and implementing necessary controls and corrective actions;
- Document all oral health and safety related communications in project field logbook, daily reports, or other records;

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## 2 Hazard Controls

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This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the DSC for clarification.

In addition to the controls specified in this section, there are forms that may need to be completed for specific activities:

- **Task Hazard Analysis (THA) and Safety Pre-Task Planning (SPTP) Forms** are contained in Attachment 9. For certain hazardous activities, the THA and SPTP may be required. In a THA, each basic step of the overall task is examined to identify potential hazards and to determine the preventative measures and the safest way to do the job. The THA must be completed and reviewed by the Project Team prior to performing the hazardous activity. THAs must be submitted to the Safety Coordinator and maintained onsite. A SPTP identifies the day's activities to be performed, the required equipment, tools materials to be used, the potential hazards anticipated and the safety precautions to take to perform the activity safely. The SPTP must be completed and reviewed with the crew before the work begins. Any activity-specific training needed is given at this time. Each work crew's SPTP must be signed by the crew members and the supervisor. The crew supervisor keeps the SPTP in the work area, revises it, and briefs the work crew when additional tasks are to be performed or when unanticipated hazards are encountered that were not listed on that day's SPTP. The crew supervisor monitors the work crew's compliance with the hazard control measures listed in the SPTP.
- **Hazard Communication** forms are contained in Attachments 2, 3 and 7. The **Chemical Product Hazard Communication Form** (Attachment 2) must be completed prior to performing activities that expose personnel to hazardous chemicals or products. Upon completion of this form, the Safety Coordinator will verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained. This training is documented on the **Chemical-Specific Training Form (Attachment 3)**. **Project-Specific Material Safety Data Sheets** (Attachment 7) are also contained in Attachment 4.
- **Confined Space Entry Permits** are contained in Attachment 5. These permits are required to be completed by the entry supervisor and reviewed by the attendant(s) and entrant(s) prior to any confined space entry, including permit-required, alternate and non-permit confined spaces. During the confined space entry, the attendant(s) should document entrants as they enter and exit the space, keeping an accurate log of actual entrants at all times. After the confined space entry, the entry supervisor should review the permit and cancel it. Subcontractors are responsible for completing confined space entry permits for their own entries.
- **Fall Protection Evaluation Form** is contained in Attachment 5. This form is to be completed by CH2M HILL Safety Coordinator prior to performing activities that expose CH2M HILL personnel to fall hazards. CH2M HILL personnel that are exposed to fall hazards must complete CH2M HILL's Initial Fall Protection Training and Project-Specific

Training on the actual fall protection equipment and systems to be used. This training must be documented on the Project Fall Protection Evaluation Form.

- **Energized Electrical Work Permit** is contained in Attachment 5. This permit is to be used when work must be performed on energized electrical equipment, for specific equipment and tasks.
- **Project-Activity Self-Assessment Checklists** are contained in Attachment 6. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records, and be promptly submitted to the HSM. Subcontractors are responsible for completing confined space entry permits for their own entries.

#### **Flow Monitor Installation Activities:**

- **Self-Assessment Checklists:**
  - **Confined Space Entry** - Prior to each entry or use.
- **Confined Space Entry Permits:** Prior to each confined space entry.
- **THA and SPTP:** prior to each confined space entry.

#### **Construction Activities:**

- **Self-Assessment Checklists:**
  - **Confined Space Entry, Excavations, Scaffolding** - Prior to each entry or use.
  - **Fall Protection** - Prior to use when using anything besides guardrails
  - **Earthmoving Equipment, Cranes** - Initially then Quarterly.
- **Confined Space Entry Permits:** Prior to each confined space entry.
- **Fall Protection Evaluation Form:** Prior to using fall protection other than guardrails.
- **THA and SPTP:** prior to each confined space entry and use of fall protection other than guardrails

#### **Project Specific Vaccines**

All site personnel entering confined spaces with waste and storm water must be offered Hepatitis A, B and tetanus vaccinations.

## 2.1 Restricted Areas/Activities & Facility-Specific Requirements

The following areas/activities are not covered and must not be entered or performed under these instructions. If any of these areas/activities must be entered or performed, contact the Regional Health and Safety Manager (Alan Cyrier: (770) 331-2829) for assistance.

- Excavations
- Barricaded areas (unless with prior approval from facility representative)
- Areas presenting exposed energized electrical equipment (unless accompanied by qualified individual)
- Areas exposed to vehicular traffic
- Areas where health hazards exist above action levels (such as Asbestos, Lead)
- Activities requiring respiratory protection
- Activities requiring personal protective equipment that personnel have not been trained to use
- Activities requiring the use of scaffolding, aerial lifts or hoisted personal platforms
- Any other areas where special access requirements exist (training, medical monitoring, security, etc.)

## 2.2 Project-Specific Hazards

### 2.2.1 Aerial Lifts

(Reference CH2M HILL SOP HSE&Q-301, *Aerial Lifts*)

- Only authorized and trained personnel are permitted to operate aerial lifts.
- Inspect aerial lifts and test lift controls prior to use.
- Wear a full body harness with lanyard attached to the boom or platform, with the shortest lanyard possible to prevent being thrown out of the basket. For scissors lifts where a standard guardrail system is installed and you are working within the confines of such a system, full body harness and lanyard are not required.
- Do not attach lanyard to any adjacent structures or equipment while working from an aerial lift.
- Stand firmly on the floor of the platform and do not sit or climb on the railings of the platform or use planks, ladders, or other devices to increase working height.
- Remain in the platform at all times and do not leave the platform to climb to adjacent structures.
- Position aerial lifts on firm, level surfaces when possible, with the brakes set. Use wheel chocks on inclines. If outriggers are provided, position on solid surfaces or cribbing.
- Maintain safe clearance distances between overhead power lines and any part of the aerial lift or conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Do not exceed the boom and basket load limits.
- Do not use aerial lifts as cranes, unless specifically designed and approved by the lift manufacturer.
- Do not work or stand below aerial lift operations.
- Do not use aerial lifts when winds exceed 30 miles per hour.

## 2.2.2 Cement/Lime Dust

(Reference CH2M HILL SOP HSE&Q-302, *Concrete and Masonry*)

- Cement/lime dust may be corrosive to moist, damp skin.
- The routes of entry are: skin contact, inhalation, eyes, ingestion.
- Inhalation of cement/line dust may cause sore throat, coughing, choking and dyspnea.
- Treat mild, acute skin contact with soap and water.
- If clothing becomes saturated with wet cement/lime dust, it should be removed and replaced with clean, dry clothing.
- Gauntlet style work gloves are required to be worn at all times at the site.
- Wear impervious clothing (tyvek or cotton coveralls) with long sleeves and pants to eliminate skin contact. If walking or working in dry or wet cement kiln dust, wear impervious boots taped at the top of the pants let to keep dust or liquids from entering the boot.
- Employees must have medical clearance and training in the proper use of respirators if the PEL and TLC are exceeded.
- Immediately after working with cement kiln dust, workers should clean their skin thoroughly with soap and water.

## 2.2.3 Chlorine

(Reference CH2M HILL SOP HSE&Q-505, *Chlorine Safety*)

CH2M HILL employees who work in proximity to chlorine-related operations must be aware of safe work practices and site-specific emergency procedures, and take all necessary precautions associated with avoiding and minimizing chlorine exposure.

- Chlorine is used as a chlorinating and oxidizing agent, disinfectant, and in water and wastewater treatment. Its appearance is a greenish liquid or gas (it is a gas at normal temperature and pressure) with a characteristic, penetrating odor;
- It is an irritant, highly corrosive and a strong oxidizer. It poses a hazard to the lungs, eyes and skin. It is toxic if inhaled, and it is harmful if swallowed. It causes respiratory tract, eye and skin burns. It can cause lung damage. In extreme cases difficulty in breathing may increase to the point where death can occur from respiratory collapse or lung failure. Liquid chlorine in contact with skin or eyes will cause chemical burns and/or frostbite;
- NFPA Ratings: Health - 4; Flammability - 0; Reactivity - 0; Special Hazard Warning - OXIDIZER;
- The threshold concentrations are (note there are 10,000 ppm in 1% of volume of air):
  - Odor 0.3 ppm;
  - Irritation 0.5 ppm;
  - TLV-8 hours 0.5 ppm;
  - PEL-C 1.0 ppm;
  - IDLH 10 ppm.
- At the Baton Rouge WWTPs scrubbers are installed, and the chlorine alarms are set as follows:

- 0.5 ppm – 1<sup>st</sup> Alarm, amber flashing light;
- 1.0 ppm – 2<sup>nd</sup> Alarm, red flashing light.
- Its vapor density is 2.5 (250% heavier than air), so its tendency is to stay closer to the ground and in low lying areas;
- Precautions for safe handling and storage include: Do not take internally; Avoid contact with skin, eyes and clothing; Upon contact with skin or eyes, wash off with water; Do not breathe gas or vapor. Store in a cool, dry well-ventilated place, and do not store at temperatures above 140°F;
- When working at a facility that uses chlorine, know in advance:
  - The locations where chlorine is stored and used at the facility;
  - The facility alarms for notification of a chlorine leak, and the thresholds at which those alarms operate;
  - The location(s) of wind socks at the facility, to determine the wind direction (always travel perpendicular to the wind direction and avoid low-lying areas, to avoid contact with leaking chlorine gas);
  - The designated assembly area(s) at the facility for a head count in the event of a chlorine leak.
- Signs, Symptoms and Effects of Acute Exposure:
  - Inhaled – Toxic if inhaled. Inhalation of this material is irritating to the nose, mouth, throat and lungs. It may cause inflammation to the respiratory tract with the production of lung edema, which can result in shortness of breath, wheezing, choking chest pain, and impairment of lung function;
  - Eyes – Irritation can occur following eye exposure to the gas with redness, pain, blurred vision, and tearing. Contact with liquid chlorine may cause burns with impairment of vision and corneal damage;
  - Skin – Dermal exposure can cause irritation characterized by redness, swelling and scab formation. Contact with liquid chlorine may cause burns with prolonged contact causing destruction of the dermis with impairment of the skin at site of contact to regenerate;
  - Ingestion – Ingestion is not a major route of exposure because chlorine is a gas at room temperature (see the MSDS for specific effects).
- First aid for exposure to chlorine includes:
  - Inhalation – Move person to fresh air; If person is not breathing, call 911 or local ambulance, then give artificial respiration, preferable by mouth-to-mouth, if possible; Call injury management number for treatment advice (800) 756-1130);
  - Eyes – Hold eyes open and rinse slowly and gently with water for 15-20 minutes; Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes; Call injury management number for treatment advice (800) 756-1130);
  - Skin – Take off contaminated clothing; Rinse skin immediately with plenty of water for 15-20 minutes; Call injury management number for treatment advice (800) 756-1130);
  - Ingestion – Call a poison control center (800-222-1222) immediately for treatment advice (then the injury management number to direct to nearest medical care (800) 756-1130).
- There are respirators available for emergency use for escaping areas where a chlorine leak has occurred. Their use is voluntary. However, if they are used:

- Review and sign Attachment 1 to SOP-121, Respiratory Protection, Information for Voluntary Use of Respirators (Attachment 5);
- Review the proper use (including using the nose clip), limitations, care and the information provided with the respirator;
- Verify the respirator is a NIOSH-approved respirator for emergency escape.
- Verify the respirator is for chlorine gas;
- Verify the respirator is in working order, that the end of service life has not expired (some models have an “End of Service Life” blue dot to indicate if the respirator has not expired);
- Wear goggles, or at least safety glasses with side shields when in areas where chlorine is stored or used;
- Evacuate the area immediately when the first alarm sounds, or when told to do so by plant personnel or others if there is no alarm;
- Proceed directly to the nearest designated assembly area for a head count, moving perpendicular to the wind direction;
- Contact the PM and RHSM if escape respirators are planned to be used.

## 2.2.4 Compressed Gas Cylinders

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knock over; contacting electrical circuits; or exposed to extreme heat sources.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

## 2.2.5 Concrete and Masonry Construction

(Reference CH2M HILL SOP HSE&Q-302, *Concrete and Masonry*)

- Wear appropriate personal protective equipment (eye/face protection, gloves, rubber boots) when in areas where concrete is being poured.
- Protruding reinforcing steel (rebar), onto which personnel could fall, must be guarded to eliminate the hazard of impalement.
- Stay as clear as possible of all hoisting operations. Loads, including concrete buckets, shall not be hoisted overhead of personnel.
- Maintain a safe distance from formwork and shoring being removed from concrete structures.
- Maintain a safe distance from precast and lift-slab concrete being lifted into position until physically secured.
- Do not stand behind the tensioning jacks during post-tensioning.
- Do not ride concrete buckets.
- Do not enter limited access zones during concrete or masonry wall construction.

## 2.2.6 Confined Space Entry

(Reference CH2M HILL SOP HSE&Q-203, *Confined Space Entry*)

The following requirements must be met prior to confined space entry:

- **Confined space entrants, attendants, and entry supervisors must complete the CH2M HILL 8-Hour Confined Space Entry training.**
- **A Confined Space Entry Permit (CSEP), Alternative Procedure Certificate (APC), or Non-permit Certificate (NPC) must be completed and posted near the space entrance point for review. These forms/permits have been included in Attachment 5;**
- Each confined space entrant and attendant must attend a pre-entry briefing conducted by the entry supervisor;
- Each confined space entrant and attendant must verify that the entry supervisor has authorized entry and that all permit or certificate requirements have been satisfied;
- Only individuals listed on the Authorization/Accountability Log are permitted to enter the space;
- Each confined space entrant and attendant must verify that atmospheric monitoring has been conducted at the frequency specified on the permit or certificate and that monitoring results are documented and within acceptable safe levels.

The following requirements must be met during confined space entry:

- Communication must be maintained between the attendant and entrants to enable the attendant to monitor entrant status;
- Entrants must use equipment specified on the permit or certificate accordingly;
- All permit or certificate requirements must be followed;
- Entrants must evacuate the space upon orders of the attendant or entry supervisor, when an alarm is sounded, or when a prohibited condition or dangerous situation is recognized;
- Entrants and attendants must inform the entry supervisor of any hazards confronted or created in the space or any problems encountered during entry.

## 2.2.7 Cranes

(Reference CH2M HILL SOP HSE-303, *Cranes, Hoists, and Rigging*)

- Only certified crane operators are permitted to operate cranes.
- Maintain safe distance from operating cranes and stay alert of crane movement. Avoid positioning between fixed objects and operating cranes and crane pinch points, remain outside of the crane swing and turning radius. Never turn your back on operating cranes.
- Approach cranes only after receiving the operator's attention. The operator shall acknowledge your presence and stop movement of the crane. Never approach operating cranes from the side or rear where the operator's vision is compromised.
- When required to work in proximity to operating cranes, wear high-visibility vests to increase visibility to operators. For work performed after daylight hours, vests shall be made of reflective material or include a reflective stripe or panel.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.

- Cranes shall not be used to lift or lower personnel.
- If crane becomes electrically energized, personnel shall be instructed not to touch any part of the crane or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the crane.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.

## 2.2.8 Demolition

(Reference CH2M HILL SOP HSE&Q-305, *Demolition*)

- Remain a safe distance from the demolition zone to reduce exposure to fragmentation of glass, steel, masonry, and other debris during demolition operations.
- Do not enter the demolition zone unless completely necessary, and only after the competent person has assessed the condition of the structure and has authorized entry.
- Follow all requirements established by the competent person. The competent person shall inform personnel of the areas that are safe to enter and the areas where entry is prohibited. When possible, the competent person should escort CH2M HILL personnel while in the demolition zone.
- All demolition activities that may affect the integrity of the structure or safety of personnel must cease until personnel have exited the demolition zone.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.

## 2.2.9 Driving Safety

- Practice defensive driving:
  - Defensive driving starts from the moment you get behind the wheel;
  - Always be alert to the hazards around you, including changing weather;
  - Driving defensively means taking every possible precaution to avoid an accident, despite the hazards around you;
  - Inspect your vehicle before a trip. Make sure tires are properly inflated, loads are securely tied down, and if trailers are used that they are securely hitched;
  - Anticipate hazards so you can take action before you encounter a hazard. For example, if you are on a wet, slippery road and an upcoming traffic light has been green for some time, assume it will be red by the time you reach the intersection and begin slowing down well in advance;
  - Keep a safe distance from the vehicle in front of you;
  - Let problem drivers move ahead of you. Do not challenge them.
- Car rental must meet the following requirements:
  - Dual air bags;

- Antilock brakes;
- Be midsize or larger.
- Familiarize yourself with rental vehicle features:
  - Mirror adjustments;
  - Seat adjustments;
  - Cruise control features, if offered;
  - Pre-program radio stations.
- Always wear seatbelt while operating vehicle;
- Eliminate or reduce hazards whenever possible. Make sure that no loose items are on the dashboard or by your feet, or that items are not piled too high on seats or floors;
- Bring a mobile phone with you if for no other reason for emergencies;
- Do not use a mobile phone while operating vehicle; pull off the road, put the car in park and turn on flashers before talking on a mobile phone;
- If you must use a mobile phone while driving, be sure to use a hands free device;
- Know that some prescription and over-the-counter medications can make you sleepy behind the wheel; if you are taking medications, read the side effects and recommended precautions carefully, and follow their instructions;
- Avoid distractions such as eating, drinking, or changing CD's;
- Adjust headrest to proper position;
- Tie down loose items if utilizing a van;
- Maintain both a First Aid kit and Fire Extinguisher in the field vehicle at all times;
- Close car doors slowly and carefully. Fingers can get pinched in doors or the truck;
- Take shelter in the field vehicle in the event of rain, especially lightning, if an enclosed structure is not available;
- Listen to car radio for predictions of tornado or lightning;
- Park vehicle in a location where it can be accessed easily in the event of an emergency;
- Always stay alert. If you feel drowsy, pull over and do not attempt to drive;
- All vehicles must be equipped with basic emergency response and safety equipment including:
  - Potable water;
  - First aid kit;
  - Flashlight with extra batteries;
  - Anti-bacterial wipes;
  - Fire extinguisher, and;
  - Minimal personal protective equipment necessary for work at the destination, appropriate for the expected exposures.

## 2.2.10 Earthmoving Equipment

(Reference CH2M HILL SOP HSE&Q-306, *Earthmoving Equipment*)

- Only authorized personnel are permitted to operate earthmoving equipment.

- Maintain safe distance from operating equipment and stay alert of equipment movement. Avoid positioning between fixed objects and operating equipment and equipment pinch points, remain outside of the equipment swing and turning radius. Pay attention to backup alarms, but not rely on them for protection. Never turn your back on operating equipment.
- Approach operating equipment only after receiving the operator's attention. The operator shall acknowledge your presence and stop movement of the equipment. Caution shall be used when standing next to idle equipment; when equipment is placed in gear it can lurch forward or backward. Never approach operating equipment from the side or rear where the operator's vision is compromised.
- When required to work in proximity to operating equipment, wear high-visibility vests to increase visibility to equipment operators. For work performed after daylight hours, vests shall be made of reflective material or include a reflective stripe or panel.
- Do not ride on earthmoving equipment unless it is specifically designed to accommodate passengers. Only ride in seats that are provided for transportation and that are equipped with seat belts.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Earthmoving equipment shall not be used to lift or lower personnel.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.

## 2.2.11 Electrical

(Reference CH2M HILL SOP HS-206, *Electrical*)

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
  - Equipped with third-wire grounding.
  - Covered, elevated, or protected from damage when passing through work areas.
  - Protected from pinching if routed through doorways.
  - Not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.

- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

## 2.2.12 Energized Electrical

(Reference CH2M HILL SOP HSE&Q-221, *Energized Electrical*)

Energized electrical work shall only be performed when the work cannot be conducted while equipment is placed in an electrically safe work condition, (de-energized, locked out, and tagged) and shall be limited to diagnostic and testing capacities. Energized electrical parts shall be de-energized before working on or near them, unless the de-energizing does one of the following: 1) introduces additional or increased hazards or 2) is not feasible due to equipment design or operational limitations.

- Only energized electrical qualified persons are permitted to work on or near electric circuit parts or equipment that have not been properly de-energized, locked out, and tagged.
- For person's that perform energized electrical work, the employees' immediate supervisor is responsible for evaluating the electrical education, experience and training of their employees and designating energized electrical qualified persons to work on or near energized electrical equipment. The supervisor may consult with a qualified Electrical Engineer for their BG, as necessary, to complete this evaluation.
- All electrical systems shall be considered energized until lockout/tagout procedures are implemented.
- Electrical wiring and equipment shall be de-energized prior to conducting work unless it can be demonstrated that de-energizing introduces additional or increased hazards or is unfeasible due to equipment design or operational limitations. If lock out/tag out is not feasible, contact the HSM to develop procedures that are compliant with CH2M HILL's SOP 221 on energized electrical.
- An Energized Electrical Work Permit is required to be completed by the energized electrical qualified persons who enter the Limited Approach Boundary or the Flash Protection Boundary to work on electric circuit parts or equipment that have not been properly de-energized, locked out, and tagged. The permit shall be completed for energized electrical work performed on specific electrical equipment or system.
- In accordance with NFPA 70E (130.1(A)1) and with the concurrence of the employee's supervisor and/or RHSM, energized electrical work performed by qualified persons related to tasks such as; testing, troubleshooting, voltage measuring may be performed without completing an energized electrical work permit, provided appropriate safe work practices and personal protective equipment, in accordance with SOP 221, are provided, documented and used.
- Follow all control measures and procedures identified on the Energized Electrical Work permit.
- Prior to performing energized electrical work, the energized electrical qualified person must determine the boundaries and safe work practices required to be followed to protect personnel from the electric shock hazard posed from contact with live electrical parts and from arc flash

hazard, as specified in the following sections of SOP 221. These safe work practices must be suitable for the conditions under which energized electrical work will be performed and for the voltage level of the live electrical part. An Electrical Hazard Analysis must be performed to identify energized electrical safe work practices before any person approaches exposed live parts within the Limited Approach Boundary (as determined by the shock hazard analysis), by performing both shock hazard analysis and flash hazard analysis, which comprise the electrical analysis.

- A shock hazard analysis is performed to determine the voltage to which personnel will be exposed, boundary requirements and the personal protective equipment necessary to control the shock hazard.
- Once the voltage of the electrical system or equipment in which energized electrical work will be performed is determined, shock protection boundaries must be identified as Limited, Restricted and Prohibited Approach Boundaries using Table 1, “Approach Boundaries to Live Parts for Shock Protection” found in SOP 221.
- PPE shall be used that is designed and constructed for the specific part of the body to be protected and for the work to be performed. PPE shall be maintained in a safe, reliable condition, and shall be physically inspected prior to each use.
- When PPE insulating capability could be subject to damage during use, the insulating material shall be protected (e.g., outer leather to protect inner rubber insulating glove material).
- Employees shall be familiar with the proper care and use of all PPE they are required to use.
- A flash hazard analysis is performed to determine potential exposures to arc flash energy and to protect personnel from the possibility of being injured by arc flash. The analysis determines the Flash Protection Boundary and the personal protective equipment that personnel within the Flash Protection Boundary must use
- Unless the electrical equipment is specifically labeled for its’ Flash Protection Boundary, for systems that are 600 volts or less the Flash Protection Boundary is assumed to be 4 feet and no flash hazard analysis is required to be performed. The 4 feet Flash Protection Boundary is based on the product of clearing time  $s$  of 6 cycles (0.1 second) and the available bolted fault current of 50 kA or any combination not exceeding 300 kA cycles (500 ampere seconds).
- For clearing times and bolted fault currents other than 300 kA or for voltage levels above 600 volts, the Flash Protection Boundary shall be calculated by an electrical engineer, in accordance with NFPA 70E, Article 130.3.
- Unless the equipment is labeled with specific PPE requirements for work to be performed within the Flash Protection Boundary, use Table 2, “Hazard/Risk Category Classification” and Table 4, “Protective Clothing and Personal Protective Equipment Matrix” listed in SOP 221, to determine protective clothing and PPE required to perform energized electrical work within the boundary.

## 2.2.13 Excavation

(Reference CH2M HILL SOP HSE&Q-307, *Excavations*)

- CH2M HILL Staff exposed to excavation hazards must complete initial excavation training by completing either the CH2M HILL 10-Hour Construction Safety Awareness training course or the Excavation Safety computer-based training module.
- Do not enter the excavations unless completely necessary, and only after the competent person has completed the daily inspection and has authorized entry.

- Follow all excavation entry requirements established by the competent person.
- Sloping, benching, shoring, shielding, or other protective systems are required to protect personnel from cave-ins except when the excavation is made entirely in stable rock or is less than 5 feet deep and there is no indication of possible cave-in, as determined by the excavation competent person.
- Trenches greater than 4 feet deep shall be provided with a ladder, stairway, or ramp positioned so that the maximum lateral travel distance is no more than 25 feet.
- Guardrails, fences, or barricades shall be installed at excavations 6 feet or deeper when the excavations are not readily visible because of plant growth or other visual obstruction.
- Do not enter excavations where protective systems are damaged or unstable.
- Do not enter excavations where objects or structures above the work location may become unstable and fall into the excavation.
- Do not enter excavations with the potential for a hazardous atmosphere until the air has been tested and found to be at safe levels.
- Do not enter excavations with accumulated water unless precautions have been taken to prevent excavation cave-in.
- H&S Self-Assessment Checklist – Excavations, found in Attachment 6 of this plan, is an example of the type of evaluation that shall be used to inspect excavation activity prior to entry.

## 2.2.14 Fall Protection

(Reference CH2M HILL SOP HSE&Q-308, *Fall Protection*)

- Fall protection systems must be used to eliminate fall hazards when performing construction activities at a height of 6 feet or greater and when performing general industry activities at a height of 4 feet or greater.
- CH2M HILL Staff exposed to fall hazards must complete initial fall protection training by completing either the CH2M HILL 10-Hour Construction Safety Awareness training course or the Fall Protection computer-based training module. Staff must also receive project-specific fall protection training. Staff shall not use fall protection systems for which they have not been trained.
- The DSC must complete the Project Fall Protection Evaluation Form presented in Attachment 5 of this plan and provide project-specific fall protection training to all CH2M HILL staff exposed to fall hazards.
- When CH2M HILL designs or installs fall protection systems, staff shall be qualified as fall protection competent persons or work directly under the supervision of a CH2M HILL fall protection competent person.
- The company responsible for the fall protection system shall provide a fall protection competent person to inspect and oversee the use of fall protection system. CH2M HILL staff shall be aware of and follow all requirements established by the fall protection competent person for the use and limitation of the fall protection system.
- When horizontal lifelines are used, the company responsible for the lifeline system shall provide a fall protection qualified person to oversee the design, installation, and use of the horizontal lifeline.
- Only one person shall be simultaneously attached to a vertical lifeline and shall also be attached to a separate independent lifeline.

- Fall protection equipment and components shall be used only to protect against falls, not to hoist materials.
- Remain within the guardrail system when provided. Leaning over or stepping across a guardrail system is not permitted.
- Do not stand on objects (boxes, buckets, bricks, blocks, etc.) or ladders to increase working height on top of platforms protected by guardrails.
- Inspect personal fall arrest system components prior to each use. Do not use damaged fall protection system components at any time, or for any reason.
- Personal fall arrest systems shall be configured so that individuals can neither free-fall more than 6 feet, nor contact any lower level.
- Only attach personal fall arrest systems to anchorage points capable of supporting at least 5,000 pounds. Do not attached personal fall arrest systems to guardrail systems or hoists.
- Do not use personal fall arrest systems that have been subjected to impact loading.

## 2.2.15 Forklifts

(Reference CH2M HILL SOP HSE&Q-309, *Forklifts*)

- Only authorized and trained personnel may operate forklifts.
- Forklifts shall be inspected by the operator prior to use.
- No part of a load must pass over any personnel.
- Forklifts left unattended must be immobilized and secured against accidental movement and forks, buckets or other attachments must be in the lowered position or be firmly supported.
- No load may exceed the maximum rated load and loads must be handled in accordance with the height and weight restrictions on the load chart.
- When a load is in the raised position, the controls must be attended by an operator.
- If an operator does not have a clear view of the path, a signaler must be used.
- Loads must be carried as close to the ground or floor as the situation permits.
- Loads that may tip or fall must be secured.
- Where a forklift is required to enter or exit a vehicle to load or unload, the vehicle must be immobilized and secured against accidental movement.
- Forklifts shall not be used to support, raise or lower workers.
- Forklifts operators shall wear seatbelts at all times.
- Concentrations of carbon monoxide created by forklift operation indoors must be monitored when the potential exists for reaching or exceeding permissible exposure limits.
- Barriers, warning signs, designated walkways or other safeguards must be provided where pedestrians are exposed to the risk of collision.

## 2.2.16 Gas Powered Sump Pumps and Generators

- Never refuel a gas engine until it is cooled off! Fires regularly are caused from fueling hot engines.
- Store extra fuel in a metal fuel can.
- Have a fire extinguisher on site.

- If the gas powered equipment is loud wear hearing protection while working near that location.
- Remove rings while starting the pump. There have been cases where someone used his left hand to stabilize a gas engine while starting it and the ignition sparked to his wedding ring and caused 3rd degree burns.
- Never operate in a confined space or area, such as a filter basin.

## 2.2.17 Heat Stress

(Reference CH2M HILL SOP HSE&Q-211, *Heat and Cold Stress*)

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads (e.g., do not begin with extremely demanding activities).
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should consult the SSC/DSC to avoid progression of heat-related illness.

SYMPTOMS AND TREATMENT OF HEAT STRESS					
	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs & Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
Treatment	Remove to cooler area. Rest lying down.	Use mild drying lotions and powders, and keep skin	Remove to cooler area. Rest lying down.	Remove to cooler area. Rest lying down, with head in low position.	Cool rapidly by soaking in cool-but not cold-water. Call

SYMPTOMS AND TREATMENT OF HEAT STRESS					
	Increase fluid intake. Recovery usually is prompt and complete.	clean for drying skin and preventing infection.	Increase fluid intake.	Administer fluids by mouth. Seek medical attention.	ambulance, and get medical attention immediately!

### Monitoring Heat Stress

These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats/minute, or 20 beats/minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 100 beats/minute at the beginning of the next rest period, the work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 100 beats/minute, or 20 beats/minute above resting pulse.

### 2.2.18 Lightning and Thunderstorms

- Monitor the weather to identify potentially hazardous weather approaching the area (TV/cable, radio, etc.).
- Decide when to suspend activities and move to a safe location.
- Know and use the 30-30 Rule (promoted by the National Oceanic and Atmospheric Administration). When the time between lightning and thunder is 30 seconds or less, immediately seek safe shelter.
- Wait at least 30 minutes after hearing the last thunder before leaving safe shelter.
- If the lightning can't be seen, hearing thunder means you should seek safe shelter.
- Note that the 30-30 Rule is best suited for existing thunderstorms moving into the area. It can not protect against the first lightning strike.
- Safe evacuation sites include substantial and enclosed buildings and fully enclosed metal vehicles with the windows up.
- Unsafe shelters include solitary trees, water, metal objects, electrical and electronic equipment, open fields, and high ground.
- If your skin tingles or your hair stands on end, squat low to the ground on the balls of your feet. Place your hands over your ears and your head between your knees. Make yourself the smallest target possible and minimize your contact with the ground. Do not lie down.
- If someone is struck by lightning, call 911 and administer first aid immediately.

### 2.2.19 Lockout/Tagout

(Reference CH2M HILL SOP HSE&Q-310, Lockout/Tagout)

- Do not work on equipment when the unexpected operation could result in injury, unless lockout/tagout procedures are implemented.

- Staff working under a lockout/tagout procedure must complete the CH2M HILL Lockout/Tagout training course. Project-specific training may also be required on site-specific lockout/tagout procedures.
- Standard lockout/tagout procedures include the following six steps:
  - notify all personnel in the affected area of the lockout/tagout,
  - shut down the equipment using normal operating controls,
  - isolate all energy sources,
  - apply individual lock and tag to each energy isolating device,
  - relieve or restrain all potentially hazardous stored or residual energy, and
  - verify that isolation and de-energization of the equipment has been accomplished. Once verified that the equipment is at the zero energy state, work may begin.
- All safe guards must be put back in place, all affected personnel notified that lockout/tagout has been removed, and controls positioned in the safe mode prior to lockout/tagout removal.
- Do not remove another person's lock or tag.
- For new construction, new equipment and processes should not be energized (electrical, hydraulic, pneumatic etc.) until all required inspections have been completed and all affected personnel on the project are informed.

## 2.2.20 Personal Security and Crime Prevention

Remember you are a valuable resource to CH2M HILL. While conducting your work stay alert, become familiar with your surroundings, report any activity/circumstances that you feel are unusual and always stay in frequent contact with other project personnel. Use the following to help protect yourself from danger while in/out of your vehicle, working alone or in an unsafe area:

- Prior to working in a high crime area, contact local law enforcement. Notify them of the work to be performed and duration, and request any specific tips and recommendations they may have;
- Avoid working alone as much as possible;
- When working at night on the project, plan for extra precautions such as additional lighting, security, police presence and escorts when leaving the project;
- If you are a witness or the victim of a crime, an accident or suspicious/threatening circumstances, report it to the Police as soon as possible;
- Always lock your car doors while driving, and roll windows up far enough to keep anyone from reaching inside;
- At stop signs and lights keep the car in gear, windows rolled up, doors locked and stay alert;
- Travel well-lighted, busy streets. You can spare those extra minutes it may take to avoid an unsafe area;
- Keep your wallet/purse, laptop, and other valuable out of sight, even when you are driving in your locked car;
- Park in safe, well-lighted areas near your destination;
- Always let a project member know where you are and your destination if you must travel alone;

- Always lock your car, even for a short absence. And before unlocking your car, quickly check to make sure no one is hiding on your seats or floors of your vehicle;
- If your car should break down:
  - Get off the roadway, out of the path of oncoming traffic, even if you have to drive on a flat tire. The tire is replaceable;
  - Turn on your emergency flashers;
  - If a motorist stops to render assistance, it is better to remain in the car, and ask them to get help.

### 2.2.21 Rigging

(Reference CH2M HILL SOP HSE&Q-303, *Cranes, Hoists and Rigging*)

- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Hoists shall not be used to lift or lower personnel.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.

### 2.2.22 Scaffolds

(Reference CH2M HILL SOP HSE&Q-311, *Scaffolds*)

- CH2M HILL Staff working accessing or working off of scaffolding must complete initial scaffolding training by completing either the CH2M HILL 10-Hour Construction Safety Awareness training course or a scaffold specific training module.
- Do not access scaffolds until the competent person has completed the work shift inspection and has authorized access.
- Follow all requirements established by the competent person or as identified on the scaffold tag.
- Do not access scaffolds that are damaged or unstable at any time and for any reason.
- Only access scaffolds by means of a ladder, stair tower, ladder stand, ramp, integral prefabricated scaffold access, or other equivalent safe means of access. Scaffold crossbracing shall not be used to access scaffold platforms.
- Remain within the scaffold guardrail system when provided. Leaning over or stepping across a guardrail system is not permitted.
- Use personal fall arrest systems when required by the competent person and when working from suspension scaffolds or boatswains' chairs. CH2M HILL's fall protection training must be completed before using personal fall arrest systems.
- Do not stand on objects (boxes, buckets, bricks, blocks, etc.) or ladders on top of scaffold platforms to increase working height unless the platform covers the entire floor area of the room.

- Do not work on scaffolds covered with snow, ice, or other slippery material or work on scaffolds during storms or high winds unless personal fall arrest systems or wind screens are provided and the competent person determines it is safe to remain on the scaffold.

### 2.2.23 Sewage/Biosolids

Although CH2M HILL employees are not expected to come in direct contact with sewage, staff may be downwind from biosolids spraying operations. Biosolids can contain bacteria, viruses, protozoa, and helminthes (parasitic worms), all of which can cause disease. Fecal coliform and other pathogens associated with sewage and biosolids are usually associated with self-limited gastrointestinal illness.

There is also the potential for the presence of Hepatitis A virus. Exposure to Hepatitis A virus through ingestion of dust could occur from high airborne levels of particles, or accumulations of dust on surfaces that are subsequently transferred from hand to mouth.

Employees working on this project will be offered a Hepatitis A vaccination. A Hepatitis A vaccination fact sheet from the CH2M HILL Occupational Physician is included in Attachment 4, and a Hepatitis A fact sheet from the CDC is included in Attachment 5.

Tetanus vaccines are also offered to CH2M HILL employees who work around and are exposed to raw sewage. Therefore, it is recommended that project personnel have a current tetanus vaccination.

The following basic hygiene and safety practices are required for workers handling or exposed to biosolids.

- Wash hands thoroughly with soap and water after contact with biosolids.
- Avoid touching face, mouth, eyes, nose, genitalia, or open sores and cuts while working with biosolids.
- Wash your hands before you eat, drink, smoke and before and after using the bathroom.
- Eat in designated areas away from biosolids handling activities.
- Do not smoke or chew tobacco or gum while working with biosolids.
- Use barriers between skin and surfaces exposed to biosolids.
- Remove excess biosolids from footwear prior to entering a vehicle or a building.
- Keep wounds covered with clean, dry bandages.
- Flush eyes thoroughly, but gently, if biosolids contact eyes.
- Change into clean work clothing on a daily basis and reserve footwear for use at work site or during biosolids transport.
- Do not wear work clothes home or outside the work environment.
- Use gloves to prevent skin abrasion

### 2.2.24 Stairways & Ladders

(Reference CH2M HILL SOP HS-214, *Stairways and Ladders*)

- Stairway or ladder is generally required when a break in elevation of 19 inches or greater exists.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.

- Personnel must not use pan and skeleton metal stairs until permanent or temporary treads and landings are provided the full width and depth of each step and landing.
- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Ladders must be used only for the purpose for which they were designed and shall not be loaded beyond their rated capacity.
- Only one person at a time shall climb on or work from an individual ladder.
- User must face the ladder when climbing; keep belt buckle between side rails
- Ladders shall not be moved, shifted, or extended while in use.
- User must use both hands to climb; use rope to raise and lower equipment and materials
- Straight and extension ladders must be tied off to prevent displacement
- Ladders that may be displaced by work activities or traffic must be secured or barricaded
- Portable ladders must extend at least 3 feet above landing surface
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder
- Stepladders are to be used in the fully opened and locked position
- Users are not to stand on the top two steps of a stepladder; nor are users to sit on top or straddle a stepladder
- Fixed ladders  $\geq$  24 feet in height must be provided with fall protection devices.
- Fall protection should be considered when working from extension, straight, or fixed ladders greater than six feet from lower levels and both hands are needed to perform the work, or when reaching or working outside of the plane of ladder side rails.

## 2.2.25 Ultraviolet Radiation

(Reference CH2M HILL SOP HSE-217, *Ultraviolet Radiation*)

- Sunlight is the most intense source of Ultraviolet Radiation (UV). Welding operations may produce levels of UV radiation that can result in significant health effects, primarily to the eyes (see SOP HSE-314, *Welding and Cutting*).
- Health effects caused by UV radiation are confined to the eyes and skin.
- Overexposure to the skin can result in redness, sunburn, skin rash, premature skin aging, and numerous types of skin cancer (melanoma is the most serious type of skin cancer, and accounts for 75% of skin cancer deaths).
- Overexposure to the eyes may lead to inflammation of the cornea (sunburn to the cornea, also known as snow blindness, which leads to redness and a gritty feeling which progresses to pain and an inability to tolerate any kind of light). Working around or in water, or other natural UV reflectors, can cause a combination of direct and reflected sunlight resulting in double exposure. Long-term exposure to sunlight may also cause cataracts or clouding of the lens of the eye.
- UV exposure can lead to skin cancer, premature aging of the skin, wrinkles, cataracts, and other eye problems. See a health care physician if you find an unusual skin change (spot on the skin changing in size, shape or color over a period of 1 month to 2 years).
- The amount of UV exposure depends on:
  1. The strength of the light;

2. The length of exposure, and;
  3. The protection provided for the skin.
- The skin and eyes are the most susceptible to UV damage. You need to be especially careful in the sun if you have:
    - Numerous moles, irregular moles, or large moles;
    - Freckles or burn before tanning;
    - Fair skin, or blond, red or light brown hair; or
    - Spend a lot of time outdoors.
  - When working outdoors, follow these five steps to protect against UV radiation and the adverse health affects it can cause:
    1. Wear Appropriate Clothing and Protection. Reduce UV radiation damage by wearing proper clothing:
      - Wear long sleeved shirts with collars, and long pants;
      - Wear clothing to protect as much of your skin as possible;
      - Wear clothing that does not allow visible light through it;
      - To determine if the clothing will protect you: Place your hand between the fabric and a light source. If you can see your hand through the fabric, the garment offers little protection against sun exposure;
      - Head protection should be worn to protect the face, ears, and neck. A wide brim hat is ideal because it protects the neck, ears, eyes, forehead, nose and scalp. Pith-style hard hats are available, as well as brim attachments for hard hats for additional protection. A baseball cap may not be appropriate depending on the hazards in the area. Baseball caps provide some protection for the front and top of the head, but not for the back of the neck or the ears where skin cancers commonly develop;
      - Wear UV-absorbent sunglasses or safety glasses. These should fit closely to the face. Wrap-around style glasses provide the best protection. Ideal sunglasses do not have to be expensive, but they should block 99 to 100% of UVA and UVB radiation. Check the label to make sure they do. Darker glasses are not necessarily the best. UV protection comes from an invisible chemical applied to the lenses, not from the color or darkness of the lenses;
      - Use “broad spectrum” sunscreen with at least 15 Sun Protection Factor (SPF). Experts recommend products with a SPF of at least 15. The number of the SPF represents the level of sunburn protection provided by the sunscreen. An SPF 15 blocks out 93% of the UV rays; an SPF 30 blocks out 97% of the UV rays. Products labeled “broad spectrum” block both UVB and UVA radiation. Both UVA and UVB contribute to skin cancer;
      - Apply sunscreen generously to all exposed skin surfaces at least 20 minutes before exposure, allowing time for it to adhere to the skin;
      - Reapply sunscreen at least every 2 hours, and more frequently when sweating or performing activities where sunscreen may be wiped off;
      - Waterproof sunscreens should be selected for use in or near water, and by those who perspire sufficiently to wash off non-waterproof products;
      - Check for expiration dates, because most sunscreens are only good for about 3 years. Store in a cool place out of the sun;

- Remember no sunscreen provides 100% protection against UV radiation; other precautions must be taken to avoid overexposure.
2. Provide Shade:
    - Take lunch and breaks in shaded areas;
    - Use the shade from existing buildings, trees, etc.
  3. Limit Direct Sun Exposure:
    - Rotate staff so the same personnel are not exposed all of the time;
    - Limit exposure time when UV radiation is at peak levels. UV rays are most intense when the sun is high in the sky, between 10 AM and 4 PM. If you are unsure about the sun's intensity, take the shadow test: If your shadow is shorter than you, the sun's rays are the strongest. Seek shade whenever possible. Also, check the UV Index forecasted for your area while working outside (see last bullet under Section 2.2.8);
    - Avoid exposure to the sun, or take extra precautions when the UV index rating is high.
    - The UV Index is used to quantify the forecasted UV intensity. It is based on a scale from 1 (about 60 minutes before the skin will burn) to 10 (about 10 minutes before the skin will burn). The higher the number, the greater the exposure to UV radiation. The UV Index helps determine when to avoid sun exposure and when to take extra protective measures. It is forecasted daily for 58 cities. The UV Index can be found in the local newspaper on the local TV and radio weather broadcasts, or on internet weather forecasts (such as National Weather Service at [www.nws.noaa.ov/om/uvi.htm](http://www.nws.noaa.ov/om/uvi.htm)).

## 2.2.26 Underground Utilities

### Local Utility Mark-Out Service

Name: National Call Before You Dig, Common Ground Alliance

Phone: 811

[www.call811.com](http://www.call811.com)

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change, advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the DSC should confirm that arrangement.

## 2.2.27 Uneven Walking Surfaces

- Employees walking in ditches, swales and other drainage structures adjacent to roads or across undeveloped land must use caution to prevent slips and falls which can result in twisted or sprained ankles, knees, and backs.

- Whenever possible observe the conditions from a flat surface and do not enter a steep ditch or side of a steep road bed.
- If steep terrain must be negotiated, sturdy shoes or boots that provide ankle support should be used. The need for ladders or ropes to provide stability should be evaluated.

## 2.2.28 Vehicular Traffic, Exposure to Public Vehicular Traffic

Reference CH2M HILL SOP HSE&Q-216, *Traffic Control*)

The following precautions must be taken when working around traffic, and in or near an area where traffic controls have been established by a contractor:

- Exercise caution when exiting traveled way or parking along street – avoid sudden stops, use flashers, etc.;
- Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier;
- **All staff working adjacent to traveled way or within work area must wear the appropriate ANSI/ISEA 107-1999 high-visibility safety vests;**
- Eye protection should be worn to protect from flying debris;
- Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc.;
- Always remain aware of an escape route -- behind an established barrier, parked vehicle, guardrail, etc.;
- Always pay attention to moving traffic – never assume drivers are looking out for you;
- Work as far from traveled way as possible to avoid creating confusion for drivers;
- When workers must face away from traffic, a “buddy system” should be used, where one worker is looking towards traffic;
- When working on highway projects, obtain a copy of the contractor’s traffic control plan;
- Work area should be protected by a physical barrier – such as a K-rail or Jersey barrier;
- Review traffic control devices to ensure that they are adequate to protect your work area; Traffic control devices should: 1) convey a clear meaning, 2) command respect of road users, and 3) give adequate time for proper traffic response. The adequacy of these devices are dependent on limited sight distance, proximity to ramps or intersections, restrictive width, duration of job, and traffic volume, speed, and proximity;
- Either a barrier or shadow vehicle should be positioned a considerable distance ahead of the work area. The vehicle should be equipped with a flashing arrow sign and truck-mounted crash cushion (TMCC). All vehicles within 40 feet of traffic should have an orange flashing hazard light atop the vehicle;
- Except on highways, flaggers should be used when 1) two-way traffic is reduced to using one common lane, 2) driver visibility is impaired or limited, 3) project vehicles enter or exit traffic in an unexpected manner, or 4) the use of a flagger enhances established traffic warning systems;
- Lookouts should be used when physical barriers are not available or practical. The lookout continually watches approaching traffic for signs of erratic driver behavior and warns workers. Vehicles should be parked at least 40 feet away from the work zone and traffic. Minimize the amount of time that you will have your back to oncoming traffic.

## 2.2.29 Welding and Cutting

(Reference CH2M HILL SOP HSE&Q-314, *Welding and Cutting*)

- Only authorized and trained personnel are permitted to operate welding/cutting equipment.
- Do not enter areas where welding/cutting operations are taking place unless completely necessary and only after receiving permission from the welding/cutting operator.
- If you must be present in an area during welding/cutting operations, position yourself behind flash screens or wear glasses/goggles with lenses of appropriate darkness.
- Do not look directly at the welding/cutting flash or at reflective surfaces surrounding welding/cutting operations.
- Avoid contacting compressed gas cylinders. Cylinders should be firmly secured in an upright position at all times.
- Be aware of tripping hazards created by welding hoses, power cables, leads, and cords positioned on walking surfaces.

## 2.3 General Hazards

### 2.3.1 Fire Prevention

(Reference CH2M HILL SOP HS-208, *Fire Prevention*)

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - Maintained in a fully charged and operable condition;
  - Visually inspected each month, and;
  - Undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
- Post "Exit" signs over exiting doors, and post "Fire Extinguisher" signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

### 2.3.2 General Practices and Housekeeping

(Reference CH2M HILL SOP HS-209, *General Practices*)

- Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness requires enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all project work areas..
- Common paths of travel should be established and kept free from the accumulation of materials.

- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

### 2.3.3 Hazard Communication

(Reference CH2M HILL SOP HS-107, *Hazard Communication*)

The DSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using Attachment 2.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees who either use or are exposed to hazardous chemicals site-specific HAZCOM training. Record training forms are in Attachment 3.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

### 2.3.4 Manual Lifting

(Reference CH2M HILL SOP HS-112, *Lifting*)

Use proper lifting techniques when lifting any object:

- Plan storage and staging to minimize lifting or carrying distances;
- Split heavy loads into smaller loads;
- Use mechanical lifting aids whenever possible;
- Have someone assist with the lift -- especially for heavy or awkward loads;
- Make sure the path of travel is clear prior to the lift.

## 2.3.5 Shipping and Transportation of Chemical Products

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods*)

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM for additional information.

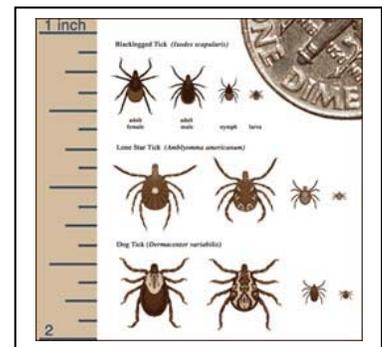
## 2.4 Biological Hazards and Controls

### 2.4.1 Snakes

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. DO NOT apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

### 2.4.2 Poison Ivy and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.



### 2.4.3 Ticks

#### Background

Ticks typically found are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown. They are very small, with adults no larger than one-quarter inch in size. Ticks resemble a flea or a beetle, with a small head and eight legs.

Ticks may carry diseases and pathogenic organisms, and transfer them to people when they bite. Also the bite wounds themselves may become infected.

#### Tick Habitat

Ticks are associated with deciduous forest and habitat containing leaf litter. Leaf litter provides a moist cover from wind, snow and other elements. They may also be found in heavily wooded areas surrounded by tracts of land cleared for agriculture, scrub, high brush, and open grasslands.

#### Illnesses, Signs & Symptoms

The bite site may be red, swollen or develop ulceration or lesions. For Lyme disease, the bite area will sometimes resemble a target pattern.

There are six notable tick-borne pathogens that cause human illness in the United States. These pathogens may be transmitted during a tick bite, normally hours after attachment (a reason to find

tick bites and remove ticks quickly). The illnesses, presented in order of most common to least, include:

- Lyme (bacteria) - To see the Lyme Disease risk for your area: [www.aldf.com/usmap](http://www.aldf.com/usmap)
- RMSF (Rocky Mountain Spotted Fever) (bacteria)
- Ehrlichiosis (bacteria)
- STARI (Southern Tick Associated Rash Illness) (bacteria)
- Tularemia (Rabbit Fever) (bacteria)
- Babesia (protozoan parasite)

Symptoms will vary based on the illness, and may develop in infected individuals typically between 3 and 30 days after transmission. Some infected individuals will not become ill or may develop only mild symptoms.

These illnesses include some or all of the following: fever, headache, muscle aches, chills, stiff neck, joint aches, nausea, vomiting, abdominal pain, bone pain, diarrhea, fatigue, malaise, weakness, small solid ring-like or spotted rashes. If these symptoms appear after a tick bite, seek medical attention immediately (call the injury reporting number, 800-756-1130, see Section 4.6).

A variety of long-term symptoms may result if the illness is left untreated, including debilitating effects and death.

### **Controls**

The methods for controlling exposure to ticks include, in order of most- to least-preferred:

- Avoiding tick habitats, and ceasing operations in heavily infested areas
- Reducing tick abundance through habitat disruption or application of insecticide
- Personal protection through use of protective clothing, repellants (DEET), and contact insecticides (permethrin or permethrin)
- Frequent tick inspections and proper hygiene

Note vaccinations are not available and preventative antibiotic treatment after a bite is generally not recommended.

When avoiding the habitat or reducing tick abundance is not feasible, to prevent tick bites:

- **Clothing:**
  - Wear light-colored clothing so they may be more easily seen before they bite.
  - Wear long sleeves and long pants.
  - Tuck in your clothes (shirt inside your pants, and pants legs inside your socks or boots)
  - Check your clothing frequently for ticks.
- **Repellants and Contact Insecticides:**
  - Use repellents (DEET) on your skin with contact insecticide (permethrin or permethrin) on your clothing only, as directed on the product label; these products are nearly 100% effective in preventing tick bites when used together, and used correctly.
  - Apply repellants to all areas of exposed skin. Insects may only need unprotected skin the size of a quarter, repellant on nearby skin or on clothes will not protect this area of skin.

- Reapply repellants before the duration of protection expires:

<i>DEET Concentration</i>	<i>Hours of Protection</i>
5-10%	2-4 hours
15%	6 hours
25-30%	up to 8 hours
100%	10+ hours

### Tick Check

A tick check should be performed after field activities in potential tick habitats, before entering the field vehicle (you do not want to infest your field vehicle with ticks). Have your field partner check your back; the backs of your legs, arms and neck; and your hairline. Shake off clothing as thoroughly as possible before entering the vehicle. Once the field day is completed, repeat this procedure and perform a thorough self-check.

At the end of the day, search your entire body carefully for ticks, (particularly the groin, armpits, neck and head), and shower.

### Tick Removal

If a tick has embedded itself into the skin, remove the tick as described below. Before performing activities in potential tick habitats, obtain a Tick Removal Kit from the regional warehouse (contact Kevin Mayer/GNV, 352-237-8199). The tick must be removed quickly, cleanly and intact:



- The tick must be removed quickly, the sooner it is removed the less likely the transmission of potentially infectious organisms, if it is carrying them.
  - The tick must be removed cleanly, to prevent the bite wound from becoming infected.
  - The tick must be removed intact, to prevent infecting the ticks fluids into the bite wound which may contain infectious organisms. Also if intact, the tick may be assessed to determine if it is carrying infectious organisms (see procedures below).
1. Use pointed, precision tweezers. Cosmetic tweezers with wide, flat ends may crush the tick, increase the potential of the transmission of potentially infectious organisms if the tick is carrying them, and make the wound worse. Choose unrasped fine-pointed tweezers whose tips align tightly when pressed firmly together.
  2. After disinfecting the area first, grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure.
    - Do not twist or jerk the tick, this may cause the mouth parts to break off and remain in the skin. If this happens, remove mouthparts with tweezers, and consult your healthcare provider if infection occurs.
    - Do not grasp, squeeze, crush, or puncture the body of the tick because its fluids (saliva, hemolymph, gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission.
    - Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin.
  3. Place tick in a zip lock bag.

4. Thoroughly disinfect the bite wound and wash your hands with soap and water.
5. Complete the Clongen *Tick Testing Submission Form* (Attachment 5), and ship the specimen to Clongen according to the shipping instructions on the form. The cost of this analysis is paid through a blanket PO, billed directly to Health Resources for payment. In 1-3 days you will be contacted to discuss the results of your tick testing and any necessary treatment. In the mean time, should your current condition change in any way, please contact the Health Resources Nurse Case Manager you originally spoke with when reporting this incident.

### **Tick Bite Treatment**

Tick bites should always be treated with first aid. Clean and wash hands and disinfect the bite wound site before and after removing the embedded tick.

Monitor the site of the bite for the appearance of a rash or early tick-borne illness symptoms beginning 3 to 30 days after the bite. If infection or symptoms and effects of tick-borne illnesses develop, consult a healthcare professional (call the injury reporting number, 800-756-1130, see Section 4.6).

### **2.4.4 Bees and Other Stinging Insects**

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the DSC and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

### **2.4.5 Mosquito Bites**

Due to the recent detection of the West Nile Virus in the Southeastern United States it is recommended that **preventative measures** be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent:

- Stay indoors at dawn, dusk, and in the early evening;
- Wear long-sleeved shirts and long pants whenever you are outdoors;
- Spray clothing with repellents containing permethrin or DEET since mosquitoes may bite through thin clothing;
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET (N, N-diethyl-meta-toluamide). DEET in high concentrations (greater than 35%) provides no additional protection;
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands;
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product;
- Limit the number of places available for mosquitoes to lay their eggs by eliminating standing water sources.

Note: Vitamin B and "ultrasonic" devices are NOT effective in preventing mosquito bites.

### **Symptoms of Exposure to the West Nile Virus**

Most infections are mild, and symptoms include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands. More severe infection may be marked by headache, high

fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death.

The West Nile Virus incubation period is from 3-15 days.

If you have any questions or to report any suspicious symptoms, contact the HSM or DSC.

## 2.4.6 Fire Ant Bites

Fire ants are common in the southern U.S. These insects typically build mounds on the land surface that are usually easy to identify. Avoid disturbing these mounds. A bite from a fire ant can be painful but rarely is life threatening. However, it is possible that the bite could cause an allergic reaction. If bitten, check for symptoms of an allergic reaction such as weakness, nausea, vomiting, dizziness, or shortness of breath. If symptoms appear, seek medical attention

## 2.4.7 Alligators

Alligator habitat includes large shallow lakes, marshes, ponds, swamps, rivers, creeks, and canals in fresh water. Smaller alligators eat insects, snails and small fish. Larger alligators eat fish, birds, turtles, snakes, and mammals. Adults range in size from six to fourteen feet, and up to 600 pounds. Alligators do attack people. There is an average of over 12,000 alligator complaints a year, with about four attacks on people a year.

Most attacks happen when they have been fed by humans or when they are defending their nests. To be safe, there are precautions to take. One, do not feed alligators. Second, never approach an alligator. Third report nuisance alligators to the Louisiana Department of Wildlife Fisheries, Alligator Program at (504) 568-5885.

Never kill, harass, molest, or attempt to move the animal. State law prohibits such actions, and the potential for being bitten or injured by a thrashing alligator is high. Feeding alligators is a violation of state law and that by feeding alligators; people create problems for others when the alligators lose their natural fear of people. American alligators are listed by the federal government as threatened due to the similarity in appearance to the endangered American Crocodile. It is illegal to feed, tease, harass, molest, capture, or kill alligators. Violations or suspicious activity should be reported.

## 2.4.8 Bloodborne Pathogens

(Reference CH2M HILL SOP HSE&Q-202, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HSE&Q-202, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

- To eliminate or minimize employee exposure to bloodborne pathogens, observe the following engineering and work practice controls, recommended vaccinations, and personal protective equipment.

### 2.4.8.1 Training and Medical Requirements

- All employees covered by this section must complete CH2M HILL's 1-hour bloodborne computer-based training module annually.

- Hepatitis B vaccine (HBV) is offered to employees who may be exposed to potentially infectious materials (PIMs) when they complete training and within 10 working days of assignment. (Note: Employees whose exposure stems only from rendering first aid as a collateral duty receive the vaccine after exposure.)
- Tetanus vaccines are offered to those employees who work around and are exposed to raw sewage.
- Employees who decline the HBV vaccine must sign the declination form (contact DSC) indicating they declined the vaccination. Anyone who declines the vaccination and chooses to receive the vaccination at a later time may still receive the vaccination by contacting the DSC.
- Hepatitis B and tetanus vaccinations can be requested by completing the medical portion of the enrollment form, located under Tools & Forms at the HS&E web page, or by contacting the regional SPA.

#### 2.4.8.2 Work Practice Controls and PPE

- Observe universal precautions to prevent contact with blood or other PIMs. Where differentiation between body fluid types is difficult or impossible, consider all body fluids to be potentially infectious materials.
- Consider all sharps encountered at industrial, medical, dental, or biological waste facilities or sampling locations to be contaminated and PIMs.
- Always wash your hands and face with soap and running water after contacting PIMs. If washing facilities are unavailable, use an antiseptic cleanser with clean paper towels or moist towelettes. These must be provided for employees who have been exposed to PIMs. When antiseptic cleansers or towelettes are used, always rewash your hands and face with soap and running water as soon as available. Do not consume food or beverages until after thoroughly washing your hands and face.
- Decontaminate all potentially contaminated equipment and environmental surfaces with chlorine bleach as soon as possible. Clean and decontaminate on a regular basis (and immediately upon visible contamination) all bins, pails, cans, and other receptacles intended for reuse that have the potential for becoming contaminated.
- Use one part chlorine bleach (5.25 percent sodium hypochlorite solution) diluted with 10 parts water for decontaminating equipment or surfaces after initially removing blood or other PIMs. Remove contaminated PPE as soon as possible before leaving a work area.
- Place regulated waste in containers that are closable; are constructed to contain all contents and prevent leakage of fluids during handling, storage, transport or shipping; are labeled or color-coded; and are tightly closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.
- Employees who participate in waste characterization studies, sort or sample refuse, or contact medical, dental, or biological wastestreams should follow these procedures:
  - If exposure is anticipated, this group of employees should wear safety goggles or glasses, puncture-resistant utility gloves with inner latex glove liners, Tyvek coveralls or cotton coveralls with a rubber apron, and puncture-resistant shoes or boots;
  - If splash potential is present, employees should wear a full-face shield;
  - If a respiratory hazard is present, a full-face respirator with HEPA filters should be worn.

### 2.4.8.3 Post Exposure

CH2M HILL will provide exposed employees with a confidential medical examination. This examination includes the following procedures:

- Documenting the exposure;
- Testing the exposed employee's and the source individual's blood (with consent);
- Administering post-exposure prophylaxis;
- Evaluating any reported illness.

If the exposed employee consents to blood collection but does not give consent for testing, the sample will be preserved for 90 days. The employee can give consent any time during the 90 days.

If the source individual does not consent to testing, CH2M HILL will establish that consent cannot be obtained. If consent to collect the blood is obtained but consent to test is not, the blood sample will be preserved for 90 days. If within 90 days the source individual agrees to testing, the blood will be tested. Results of the source individual's testing are made available to the exposed employee's physician.

Within 15 days of the completed examination, CH2M HILL will verify that the employee has been informed of the results.

## 2.4.9 Untreated Wastewater and Wastewater Treatment Plants

(Reference CH2M HILL SOPs HSE&Q-202, *Bloodborne Pathogens*, HSE&Q 113, *Medical Monitoring*)

Domestic sewage is the used water from a home or community and includes toilet, bath, laundry, and kitchen-sink waste. Sewage from the community may include industrial waste, groundwater, and surface water. Normal sewage from a private sewage disposal system is normally 99.8 percent water and 0.2 percent total mineral and organic solids. Large numbers of disease-producing organisms that can cause diarrhea, bacillary dysentery, infectious hepatitis, and salmonella may be found in excreta. Personnel shall avoid contact to exposed portions of the body and use good personal hygiene practices.

**As a prophylactic protection, all employees with the potential for exposure to untreated wastewater will have, at a minimum, hepatitis A, hepatitis B series (can be in progress) and current tetanus vaccinations.** If an employee is given the opportunity to be vaccinated and desires to decline the vaccination, the Vaccination Declination Form must be signed by the employee and maintained in the employee file.

When working in wastewater treatment plants, employees should exercise the following precautions:

- Do not eat or drink in plant areas;
- Minimize contact with surfaces;
- Don't touch eyes, ears, nose and mouth;
- Wash hands immediately upon leaving the site or going into office areas. Ensure that adequate washing facilities are available for employees. For situations where hand washing facilities are not readily available, antibacterial hand gels can be used to prevent the spread of germs;
- If touching contaminated surfaces is unavoidable, wear surgical-type nitrile gloves. Carefully remove gloves by rolling them inside out, and wash hands immediately;
- Avoid shaking hands with other employees, and maintain a distance of approximately 3 feet during conversations to avoid spread of colds, flu and other contagious diseases;

- Cover nose and mouth when coughing or sneezing;
- Stay at home when sick.

The following is based on information from the American Federation of State, County, and Municipal Employees (AFSCME) guide for water and wastewater workers at the website <http://www.afscme.org/health/riskybtc.htm>.

Along with “good” micro-organisms that treat wastewater at wastewater treatment plants, wastewater contains disease-causing bacteria, viruses, fungi and parasites. Sick and infected individuals or animals routinely shed these organisms into the system; and many of these organisms can thrive or even continue to multiply in wastewater. Most are transmitted to humans by swallowing (due to contaminated food, hands or cigarettes), but some can enter through intact skin (leptospirosis) or damaged skin (tetanus). There is no way to predict if there are dangerous organisms in the wastewater.

The best protection against infection is to avoid direct contact with sewage water, droplets and aerosols.

When workers cannot avoid contact with sewage, the following protective equipment and services should be used:

- elbow-length rubber gloves;
- rubber pants and jackets;
- goggles;
- disposable mask to be worn in dusty sludge areas or areas with heavy aerosols.

Workers should also take the following precautions:

- Wash gloves before removing them;
- Wash hands before smoking and eating; a germicidal (disinfectant) soap should be used;
- Keep protective clothing and equipment out of eating areas;
- If possible keep work clothes and street clothes in separate lockers;
- If available shower and change into street clothes before going home. If this is not possible, shower and change into clean clothes upon arrival at home. Wash this clothing separately from other clothing;
- If possible launder work clothing on-site;
- Consider all cuts or abrasions to be infected. Flush them with large amounts of clean, running water and antiseptic soap, and bandage them with a sterile dressing;
- Workers should have a tetanus booster every 10 years and workers who have never been vaccinated for polio should consult a physician about getting a vaccination. Management should keep track of public health developments in case vaccinations against typhoid, paratyphoid, leptospirosis or diphtheria are needed;
- Workers should receive the hepatitis A vaccination. Workers, who are in sewers that may contain fresh blood or come into regular contact with used syringes or body parts, should receive the hepatitis B vaccination;
- Report any major and minor illnesses and complaints of irritation and discomfort.
- Seek medical attention when you have diarrhea or are ill. Since doctors are often unaware of the connections between occupation and disease, be sure to inform your personal physician of job exposure to sewage.

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# 3 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HSE&Q-117, *Personal Protective Equipment and HSE&Q-121, Respiratory Protection*)

*Note that PPE is required when exposed to the general hazards listed below. Because certain tasks (e.g., welding, energized work, etc.) require specialized PPE, refer to Section 2 for task-specific PPE requirements.*

## PPE Specifications <sup>a</sup>

Hazard	PPE
General entry to active industrial facility or construction site, or when required by client/facility.	ANSI approved steel-toe leather work boots, safety glasses, and hardhat.
Skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes.	ANSI approved hazard specific gloves.  Leather work gloves for protection against cuts and abrasions.  Nitrile, or other appropriate chemical-resistant gloves for protection against contact with chemicals or untreated wastewater.
Working around heavy equipment or other noisy machinery, or if you must raise your voice to be heard while communicating with persons near you, hearing protection is required.	ANSI approved ear plugs or earmuffs.
Danger of foot injuries due to falling or rolling objects, objects piercing the sole, or when the feet are exposed to electrical hazards.	Sturdy footwear or ANSI approved steel-toed leather work boots.
Potential for head injury from impact, falling or flying objects.	ANSI approved hardhat.
Flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.	ANSI approved safety glasses with side shield, safety goggles, face shield, or welding glasses. Face shield may be used only in conjunction with the use of other protective eyewear.
Work involving direct exposure to sewage.	<ul style="list-style-type: none"> <li>- Elbow-length rubber gloves</li> <li>- Rubber pants and jackets</li> <li>- Goggles</li> <li>- Disposable mask to be worn in dusty sludge areas or areas with heavy aerosols;</li> </ul>

Work around vehicular traffic and heavy equipment. High visibility vest

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**Reasons for Upgrading or Downgrading Level of Protection**

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**Upgrade<sup>b</sup>**

**Downgrade**

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Request from individual performing tasks.</li><li>• Change in work tasks that will increase potential for injury.</li><li>• Known or suspected presence of dermal hazards.</li></ul> | <ul style="list-style-type: none"><li>• Situation is less hazardous than originally thought.</li><li>• Changes in site conditions that decrease the hazard.</li><li>• Change in work task that will reduce potential for injury.</li></ul> |
|--|--|

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<sup>a</sup> CH2M HILL will provide PPE only to CH2M HILL employees.

<sup>b</sup> Performing tasks that require respiratory protection is permitted only when the PPE requirements have been approved by the HSM, and a DSC qualified at that level is present.

# 4 Emergency Response

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(Reference CH2M HILL SOP HSE&Q-106, *Emergency Planning*)

## 4.1 Pre-Emergency Planning

The DSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Field Trailers: Post “Exit” signs above exit doors, and post “Fire Extinguisher” signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.

## 4.2 Emergency Equipment and Supplies

The DSC should verify that these supplies are available, as needed, and in proper working order and mark the locations of emergency equipment on the site map, when a map is provided.

<b>Emergency Equipment and Supplies</b>	<b>Location</b>
20 lb (or two 10-lb) fire extinguisher (A, B, and C classes)	Project Trailer
First aid kit	Field Vehicle or Project Trailer
Personal Eye wash	Project Trailer
Potable water	Field Vehicle or Project Trailer
Bloodborne-pathogen kit	Field Vehicle or Project Trailer
Additional equipment (specify):	

## 4.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

## 4.4 Evacuation Procedures

- Evacuation routes and assembly areas will be designated by the DSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The DSC and a “buddy” will remain on the site after the site has been evacuated (if safe) to inform local responders of the nature and location of the incident.
- The DSC will account for all personnel at the assembly area.
- The DSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

## 4.5 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During non-emergencies, follow these procedures as appropriate:

- Notify appropriate emergency response authorities listed in Attachment 4 (e.g., 911);
- The DSC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room;
- Prevent further injury;
- Initiate first aid and CPR where feasible;
- Get medical attention immediately;
- Make certain that the injured person is accompanied to the emergency room;
- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken;
- Report incident as outlined in Section 4.6.

## 4.6 Incident Notification and Reporting

### 4.6.1 General Provisions

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and/or the DSC (the PM or DSC will notify the HSM).
- For CH2M HILL subcontractor incidents, complete and incident report form and submit to the HSM.
- For CH2M HILL work-related injuries or illnesses, follow the procedures detailed in Section 4.6.2 below.
- Notify and submit reports to CH2M HILL and to the client as required in the contract.

### 4.6.2 Incidents that Involve CH2M HILL Staff Only - Injury Management/Return-to-Work (Reference CH2M HILL, SOP HSE&Q-124, *Injury Management/Return-to-Work*)

### Background & Benefits:

The Injury Management Program has been established to provide orderly, effective and timely medical treatment and return-to-work transition for an employee who sustains a work-related injury or illness. It also provides guidance and assistance with obtaining appropriate treatment to aid recovery, keep supervisors informed of employee status, and to quickly report and investigate work-related injury/illnesses to prevent recurrence.

### How it works:

All non-emergency work-related injuries and illnesses to a CH2M HILL employee within the United States and Puerto Rico must be reported immediately. This includes even minor injuries. In the case of an emergency, call 911 immediately.

- **Employees**, if you are injured:
  1. Notify your supervisor immediately
  2. Call the Injury Management number – **(866) 893-2514**
  3. Obtain medical treatment as directed, and follow the medical providers directions
  
- **Supervisors**, if your employee is injured:
  1. Ensure they have called the Injury Management number – **(866) 893-2514**, and are obtaining proper medical treatment. Make the call for them if they are not able to do so.
  2. Complete the incident report form (Hours and Incident Tracking System, HITS) on the VO, with as much information as you know at that time (<https://www.int.ch2m.com/hits>).
  3. Provide transitional duty when necessary, and ensure the restrictions given by the medical provider are followed.

## 4.6.3 Serious Incident Reporting

(Reference CH2M HILL, SOP HSE&Q-111, *Incident Notification, Reporting, and Investigation*)

Serious Incidents must be reported in accordance with CH2M HILL Standard of Practice, *Serious Incident Reporting Process*, immediately. Serious incidents are those that involve any of the following:

- Work related death, or life threatening injury or illness of a CH2M HILL employee, subcontractor, or member of the public
- Kidnap/missing person
- Acts or threats of terrorism
- Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 in damage.
- Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community or the environment.

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# 5 Approval

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This FSI has been written for use by CH2M HILL and their subcontractors only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The FSI is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

## 5.1 Original Plan

**Written By:** Alan Cyrier

**Date:** June 21, 2007

**Approved By:** Alan Cyrier

**Date:** June 21, 2007

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## 5.2 Revisions

**Revisions Made By:** Jeff Duplantis

**Date:** August 17, 2007

**Revisions Made By:** Karen Johnson

**Date:** August 27, 2007

**Revisions to Plan:** Updated new project number, Added new staff members, corrected some typos.

**Revisions Approved By:** Alan Cyrier

**Date:** August 17, 2007

**Revisions Approved By:** Alan Cyrier

**Date:** August 27, 2007

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**Revisions Made By:** Alan Cyrier

**Date:** September 25, 2007

**Revisions to Plan:** Added pump station flow monitoring work to the scope, and Confined Space Entry, Fall Protection provisions (Section 2.1, Attachment 5, Attachment 6).

**Revisions Approved By:** Alan Cyrier

**Date:** September 25, 2007

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**Revisions Made By:** Alan Cyrier

**Date:** September 28, 2007

**Revisions to Plan:** Added safety planning provisions to Section 2 and Attachment 9

**Revisions Approved By:** Alan Cyrier

**Date:** September 28, 2007

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**Revisions Made By:** Alan Cyrier

**Date:** January 31, 2008

**Revisions to Plan:** Updated CH2M HILL staff list; Added Section 2.1.1, Chlorine; Added a form to Attachment 5, Voluntary Use of Respirators; Added MSDS for Chlorine, Attachment 7; added Mike Uchniat as the alternate Safety Coordinator.

**Revisions Approved By: Alan Cyrier**

**Date: January 31, 2008**

**Revisions Made By: Alan Cyrier**

**Date: July 1, 2008**

**Revisions to Plan:** Updated project dates (through July 2008); replaced Jeff Duplantis with Mike Uchniat as the Safety Coordinator.

**Revisions Approved By: Alan Cyrier**

**Date: July 1, 2008**

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**Revisions Made By: Alan Cyrier**

**Date: December 4, 2008**

**Revisions to Plan:** Updated project scope to include the lift station field surveys; Added 2.1.4, Energized Electrical; Added Attachment 5 Energized Electrical Permit

**Revisions Approved By: Alan Cyrier**

**Date: December 4, 2008**

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**Revisions Made By: Kristie Musial, Alan Cyrier**    **Date: January 7, 2009**

**Revisions to Plan:** Updated project information and description, added and removed project personnel, corrected charge numbers, removed reference to Hazard Communication Coordinator and Emergency Response Coordinator (replaced with DSC). Revised formatting, bullets and outline numbering.

Updated FSI to include provisions for construction (WWTP Project):

- Added WWTP Project to scope of work
- Updated contractor information (Section 1.1.4)
- Updated Documentation Requirements (Section 2)
- Updated Hazard Section for Construction Exposures (Section 2.2)
- Updated Tick Procedures (Section 2.4.3)
- Updated Equipment and Supplies Table (Section 4.2)
- Added Tick Testing Form (Attachment 5)
- Added Checklists for Construction (Attachment 6)

**Revisions Approved By: Alan Cyrier**

**Date: January 15, 2009**

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**Revisions Made By: Alan Cyrier**    **Date: March 16, 2009**

**Revisions to Plan:**

- Updated Injury Reporting Procedures (Section 4.6, Attachment 8)
- Plant-Specific Emergency Procedures (Attachment 4)
- New HR Contacts, and their information (Attachment 4)
- New Environmental Manager Contact Information (Attachment 4)
- WWTP Plant Manager Contact Information (Attachment 4)

**Revisions Approved By: Alan Cyrier**

**Date: March 16, 2009**

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## 6 Attachments

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- Attachment 1: **Employee Signoff Form - Field Safety Instructions**
- Attachment 2: **Project-Specific Chemical Hazard Communication Form**
- Attachment 3: **Chemical-Specific Training Form**
- Attachment 4: **Emergency Contacts**
- Attachment 5: **Project H&S Forms/Permits**
- Attachment 6: **Project Activity Self-Assessment Checklists**
- Attachment 7: **Applicable Material Safety Data Sheets**
- Attachment 8: **Injury Management Poster and Medical Treatment Form**
- Attachment 9: **Safety Planning Forms**
- Attachment 10: **Project FSI Change Management Form**

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**CHEMICAL-SPECIFIC TRAINING FORM**

Location:	Project #: 350589
HCC:	Trainer:

**TRAINING PARTICIPANTS:**

NAME	SIGNATURE	NAME	SIGNATURE

**REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:**


The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

- Physical and health hazards
- Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL’s written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

## 24-hour CH2M HILL Emergency Beeper – (720) 286-4911

### Medical Emergency – 911

Facility Medical Response #: NA  
 Local Ambulance #: 911

### CH2M HILL Medical Consultant

Health Resources  
 Dr. Jerry H. Berke, M.D., M.P.H.  
 600 West Cummings Park, Suite 3400  
 Woburn, MA 01801-6350  
 (781) 938-4653 After Hours: (800) 350-4511  
 (After hours calls will be returned within 20 minutes)

### Poison Control Center

Phone: (800) 222-1222

### Local Occupational Physician

#### Concentra Medical Clinic

3235 Perkins Road  
 Baton Rouge, LA 70808  
 (225) 387-3030  
 Hours: 8AM – 5PM (Mon-Fri)

### Local Hospital

#### Our Lady of the Lake Regional Medical Center

5000 Hennessy Boulevard  
 Baton Rouge, LA 7008-4398  
 (225) 765-6565

### Security & Police – 911

Facility Security #: NA  
 Local Police #: 911

### CH2M HILL Director Security Operations

Thomas Horton/DEN  
**(720) 273-3100 (cell) or (720) 286-0022**

### Fire/Spill Emergency -- 911

Facility Fire Response #: NA  
 Local Fire Dept #: 911

### Utilities Emergency – Notify Hugh Taylor, Plant Manager – (225) 389-3136.

Water: (225) 389-4858; 3PM-11PM and weekends, holiday call (225) 389-4603  
 Gas: 911  
 Electric: 911

### Workers' Compensation

Notify your supervisor immediately, then call the Injury Management number at (800) 756-1130 for further assistance. Supervisor to complete the "Authorization to Treat" form for employee to take to medical provider, complete the Incident Report Form (IRF), and notify the PM and HSM immediately.

### Health and Safety Manager (HSM)

Name: Alan Cyrier, CSP  
 Phone: (770) 331-2829

### Designated Safety Coordinator (DSC)

Name: Mike Uchniat  
 Phone: (210) 377-3085

### Regional Human Resources Department

CMS: Nancy Orr/DEN (720) 286-2397, x 62369  
 INC/WBG: Cindy Bauder/WDC (703) 376-5027

### Project Manager/Construction Manager

Name: Jim Hawley  
 Phone: (225) 381-8455; (865) 765-1613

### Corporate Human Resources Department

Name: John Monark/COR  
 Phone: 303/771-0900

### Federal Express Dangerous Goods Shipping

Phone: (800) 238-5355

### Automobile Accidents

Rental: Lisa Anderson/COR (720) 286-2401

### CH2M HILL Emergency Number for Shipping Dangerous Goods

Phone: (800) 255-3924

CH2M HILL Vehicle: Zurich Insurance (800) 987-3373

Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.

**Facility Alarms: Plant alarms**, or verbal/mobile phone notification by plant personnel.

Be sure to sign in with the secretary when arriving onsite – this sign-in sheet will be used for a roll call at the assembly area.

### Evacuation Assembly Area(s):

Chlorine Release: By main gate at the front of the plant; if the wind is blowing towards the main gate people will be moved when they reach the main gate.

Weather: Proceed to nearest solid, enclosed shelter.

**Facility/Site Evacuation Route(s): Chlorine – Check wind direction and proceed directly to the main gate (if wind is blowing toward main gate, evacuees will be redirected when they arrive at the main gate).**

**Weather – Proceed directly to the nearest solid, enclosed structure.**



### Directions to Medical Clinic

From I-10, take Exit 157B (Acadian THWY) toward Hospital/University of Phoenix.

Take the Acadian THWY ramp toward LSU, and turn slight right onto South Acadian TRWY/LA-427.

Turn right onto Perkins Road, go 0.2 miles to the Concentra Medical Clinic (3235 Perkins Road).

### Directions to Hospital

From I-10, take Exit 160 (Essen Lane/LA-3064 West), go 0.7 miles.

Turn right onto Hennessy Boulevard, go 0.1 miles to hospital (5000 Hennessy Boulevard).

**PROJECT CONTACTS LIST**

This form shall be completed and updated as necessary by the Safety Coordinator. A copy of the completed form shall be posted in a prominent location onsite and/or attached to the CH2M HILL HSE plan.

**Client: Baton Rouge Louisiana Department of Public Works**

**Project/Site Name: Sanitary Sewer Overflow, Phase 2**

**Project Number: 350589**

Project Contacts	Name	Phone Number	Cell Number
Client	Bryan Harmon	(225) 389-3186	
	Hugh Taylor, Plant Manager	(225) 389-3136	
CH2M Hill Project Manager	Jim Hawley	(225) 381-8455	(865) 765-1613
CH2M HILL Safety Coordinator	Mike Uchniat	(225) 381-8455	(210) 377-3085
CH2M Hill HS&E Manager	Alan Cyrier		(770) 331-2829
CH2M HILL Environmental Compliance Coordinator (ECC)	Meg Morrison	(720) 286-0125	(850) 261-4296

**CH2M HILL Subcontractors Contact List**

Subcontractor	Primary Task	Site Manager	Phone	Safety Rep.	Phone
Sigma Consulting Group	Civil Engineering			Miles Williams	(225) 298-0800
C-Del	Land Acquisition			Cory Delahoussaye	(225) 665-5665
ILSI	Surveying			Lesley Tabony	TBD

**Client Contractors Contact List**

Contractor Name	Primary Task	Contact	Phone
None			

**Project Staff:**

Staff Name	Role	Mobile Number	Emergency Contact	
			Name Relationship	Number
Jim Hawley	Project Manager	(865) 765-1613		
Derek Evans				
Ralph Williams				
Marc Ischen				
Joshua Boltz				
Desiree Dies				
Michael Ellis				
Louis Jackson				

Jeremy Fontenot				
Jason Moore				
Bill Mefford				
William Burleigh				
Mike Uchniat	Safety Coordinator	(210) 377-3085		
Rodolfo Valladares				
Hank Postrozny				
Jim O'Connor				
Tom Ridgik				
Steven Bellelo				
Joe Young				
Obie Watts				

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# **CH2M HILL FIELD SAFETY INSTRUCTIONS**

## **Attachment 5**

### **Project H&S Forms and Permits**

**Internal Use Only**  
**SAMPLE SUBMISSION FORM**  
Client ID \_\_\_\_\_  
Job # \_\_\_\_\_

Date Received: \_\_\_\_\_  
Logged by: \_\_\_\_\_



### Tick Testing (For Lyme's Disease) Submission Form

Please complete the form below. All ticks should be sent to:

**Clongen Laboratories, LLC; 12321 Middlebrook Road, Suite 120, Germantown, MD 20874**

Patient's Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Your E-mail: \_\_\_\_\_  
Daytime Phone: \_\_\_\_\_  
(Office or Cell)

Fax: \_\_\_\_\_  
(Optional)

Secondary Contact Information  
Supervisor's Phone Number (Office or Cell)  
\_\_\_\_\_  
Supervisor's E-mail: \_\_\_\_\_

Physician's Name: **Dr. Brian Morris**  
Physician's Phone: **800-350-4511 Ext 4696**  
Physician's Fax (Optional): \_\_\_\_\_

Purchase Order Number: **8242**

#### Shipping Instructions

- If the tick is alive, please make sure that you use two zip lock bags or a solid container with a tight seal to prevent losing the tick in transit. It is highly recommended to wear gloves when removing the tick from the skin to avoid infection by infected ticks. Follow instructions provided by your employer for tick removal.
- Do not use tape to immobilize the tick or ticks you captured
- Do not use formalin to preserve captured ticks as it will have a negative impact on polymerase chain reaction (PCR) test results
- Send in express mail service package or envelope (FED-X, UPS, DHL) for next morning delivery to Clongen. Use project number provided by your employer for express mailing.

#### Frequently Asked Questions:

Q: I removed a tick one week ago and it has been stored at room temperature. Would the test still be valid?  
A: Yes. Our assay tests DNA and DNA is stable at room temperature. The results will not be impacted.

Q: I stored the tick in alcohol. Would the test still be valid?  
A: Yes. Alcohol is a preservative and the tick can be tested.

Q: While removing the tick, I lost the body and trunk of the tick and have only the legs left. Would that be good enough for the test?  
A: No. The bacteria is usually in the digestive tract and it is necessary that we receive the entire tick in order to get reliable results.

Q: I was bitten by a tick and there is a red spot/rash. What do I do?  
A: See your doctor immediately.

Q: What is the turnaround time for test 124C?  
A: Turnaround time is 1-3 days. We usually send results by e-mail as soon as they become available and hard copies along with a receipt follow two to three days later.

**Thank you for Choosing Clongen – We appreciate your business.**

(Respirator Protection: Page 1 of 1)

## **CH2MHILL**

### **Respiratory Protection**

#### **Standard Operating Procedure HSEQ-121**

### **Attachment 1: Information for Voluntary Use of Respirators**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take the following precautions to be sure that the respirator itself does not present a hazard.

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. This label will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants that your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not use someone else's respirator by mistake.

# CH2MHILL Confined-Space Entry Permit

1.0 GENERAL INFORMATION							
Project:		Project #:		PM:			
Date of Entry:		Duration of Entry:		Permit Expiration Date:			
Space Location:							
Description of Space:							
Purpose of Entry:							
<b>Hazards Expected:</b> <input type="checkbox"/> Oxygen Deficiency <input type="checkbox"/> Oxygen Enrichment <input type="checkbox"/> Flammable Vapors <input type="checkbox"/> Temperature Extremes <input type="checkbox"/> Entrapment <input type="checkbox"/> Engulfment <input type="checkbox"/> Fall <input type="checkbox"/> Electrical <input type="checkbox"/> Mechanical <input type="checkbox"/> Chemical <input type="checkbox"/> Pressure <input type="checkbox"/> Combustible Dust <input type="checkbox"/> Toxics (specify): _____ <input type="checkbox"/> Others (specify): _____							
Entry Supervisor (ES):			Attendant(s):				
2.0 CONTROL MEASURE REQUIREMENTS							
<b>Communication:</b> <input type="checkbox"/> Visual <input type="checkbox"/> Voice <input type="checkbox"/> Radio <input type="checkbox"/> Cell Phone <input type="checkbox"/> Other (specify): _____							
<b>Cleaning:</b> <input type="checkbox"/> None <input type="checkbox"/> Purging <input type="checkbox"/> Inerting <input type="checkbox"/> Flushing					Date/Time Completed:		
<b>Isolation:</b> <input type="checkbox"/> None <input type="checkbox"/> Lockout/Tagout <input type="checkbox"/> Line Breaking <input type="checkbox"/> Blinding/Blanking <input type="checkbox"/> Double Block & Bleed					Date/Time Completed:		
<b>Ventilation:</b> <input type="checkbox"/> None <input type="checkbox"/> Prior to Entry <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic (specify frequency): _____					Date/Time Completed:		
<input type="checkbox"/> Type (specify): _____					Date/Time Completed:		
<b>Protective Equipment:</b> <input type="checkbox"/> GFCI <input type="checkbox"/> Low-voltage Lighting: <input type="checkbox"/> Fire Extinguisher <input type="checkbox"/> Fall Protection <input type="checkbox"/> First Aid Kit							
<input type="checkbox"/> Respirators (specify): _____			Other (specify): _____				
<b>Rescue Equipment:</b> <input type="checkbox"/> Harness <input type="checkbox"/> Lifeline <input type="checkbox"/> Tripod <input type="checkbox"/> Retrieval Device <input type="checkbox"/> Other (specify): _____							
<b>Other Requirements:</b> <input type="checkbox"/> Hot Work Permit <input type="checkbox"/> Other (specify): _____							
3.0 RESCUE AND EMERGENCY PROCEDURES							
4.0 ATMOSPHERIC MONITORING							
<b>Frequency:</b> <input type="checkbox"/> Prior to Each Entry <input type="checkbox"/> Prior to Shift <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic (specify): _____							
<b>Instruments:</b> <input type="checkbox"/> Combustible Gas Indicator <input type="checkbox"/> FID <input type="checkbox"/> PID <input type="checkbox"/> Colorimetric Tubes <input type="checkbox"/> CO Monitor <input type="checkbox"/> H <sub>2</sub> S Monitor							
<input type="checkbox"/> Other(specify): _____							
<b>Substances Monitored:</b> <input type="checkbox"/> Oxygen <input type="checkbox"/> Flammables <input type="checkbox"/> CO <input type="checkbox"/> H <sub>2</sub> S <input type="checkbox"/> Other (specify): _____							
Monitoring Results		Oxygen		Flammability	Toxicity		
Monitors	Limits		19.5 – 23.5 %	< 10 % of LEL	< PEL/TLV		
Initials	Date	Time	%	% of LEL	Substance	Level	Limit
		Signature			Employee Number	Date	Time
HS&E Approval							
ES Permit Authorized							
ES Permit Canceled							
Problems Encountered During Entry							



Alternative procedures may be used for permit-required confined-space entry if the only hazard within the space is an atmospheric hazard and the hazard can be controlled to acceptable safe levels solely by forced-air ventilation. If the space must be entered to determine hazards, the initial entry must be done in full compliance with the requirements of a confined-space entry permit.

These alternative procedures are valid as long as the atmospheric hazards are controlled by forced-air ventilation. If additional hazards arise within the space, or the forced-air ventilation is inadequate in controlling the atmospheric hazard, personnel must exit the space immediately and the space must be reevaluated.

1.0 GENERAL INFORMATION							
Project:			Project #:			PM:	
Date of Entry:		Duration of Entry:			Certification Expiration Date:		
Space Location:							
Description of Space:							
Purpose of Entry:							
<b>Atmospheric Hazards Expected:</b> <input type="checkbox"/> Oxygen Deficiency <input type="checkbox"/> Oxygen Enrichment <input type="checkbox"/> Flammable Vapors <input type="checkbox"/> Toxics (specify)::							
Entry Supervisor (ES):				Attendant(s):			
2.0 CERTIFICATE REQUIREMENTS							
<input type="checkbox"/> Nonatmospheric hazards do not exist in this space <input type="checkbox"/> Communication methods established between entrants and the attendant <input type="checkbox"/> Covers can be removed safely <input type="checkbox"/> Space openings guarded from fall hazards and falling objects <input type="checkbox"/> Continuous forced-air ventilation from a clean air source is positioned in the immediate area where entrants are working and continue until they have left the space							
3.0 ATMOSPHERIC MONITORING							
<b>Frequency:</b> <input type="checkbox"/> Prior to Entry <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic (specify):							
<b>Instruments:</b> <input type="checkbox"/> Combustible Gas Indicator <input type="checkbox"/> FID <input type="checkbox"/> PID <input type="checkbox"/> Colorimetric Tubes <input type="checkbox"/> CO Monitor <input type="checkbox"/> H <sub>2</sub> S Monitor <input type="checkbox"/> Other(specify):							
<b>Substances Monitored:</b> <input type="checkbox"/> Oxygen <input type="checkbox"/> Flammables <input type="checkbox"/> CO <input type="checkbox"/> H <sub>2</sub> S <input type="checkbox"/> Other (specify):							
Monitoring Results		Oxygen		Flammability		Toxicity	
Monitors	Limits	19.5 – 23.5 %		< 10 % of LEL		< PEL/TLV	
Initials	Date	Time	%	% of LEL	Substance	Level	Limit
4.0 CERTIFICATE AUTHORIZATION AND CANCELLATION							
		Entry Supervisor Signature			Employee Number	Date	Time
Entry Authorized							
Entry Canceled							
Problems Encountered During Entry							

Rev.3





This form is to be completed by CH2M HILL project SSC or DSC prior to performing activities that expose CH2M HILL personnel to fall hazards.

The form is used to: 1) identify project fall hazards and determine fall protection systems available to mitigate the hazards, 2) identify personal fall arrest system equipment required, and 3) provide project-specific fall protection training. Activities and work locations must be evaluated to determine potential fall hazards. If personnel are exposed to fall hazards greater than 6' during construction activities or 4' during general industry activities, fall protection systems must be used.

<b>PROJECT INFORMATION</b>	
Project Name: _____	Project Number: _____ Date: _____
Scope of Work: _____	
Work Area: _____	Maximum Working Height: _____
Describe fall hazard activities: _____	

<b>FALL HAZARD DETERMINATION &amp; FALL PROTECTION SYSTEMS</b>									
	CONVENTIONAL SYSTEMS				ALTERNATIVE SYSTEMS				
	Guardrail	Safety Net	PFAS	Cover	Positioning Device	Warning Line	Controlled Access Zone	Safety Monitoring	Fall Protection Plan
<b>FALL HAZARD</b>									
Unprotected sides & edges									
Leading edges									*
Holes									
Wall openings									
Ramps, runways & walkways									
Hoist areas									
Excavations									
Wells, pits & shafts									
Dangerous equipment									
Formwork & reinforcing steel work									
Precast concrete erection									*
Overhand bricklaying									
Low-slope roofing work									
Steep roof									
Residential construction									*
Other surfaces									

\*Fall protection plans may only be used if conventional systems are determined to be infeasible or would create a greater hazard. Contact HS&E Staff for plan development.

<b>PERSONAL FALL ARREST SYSTEM EQUIPMENT REQUIRED</b>			
Full body harness		Lanyard, standard	Lifeline, horizontal
Boatswain's chair		Lanyard, shock-absorbing	Lifeline, vertical
Descent system		Lanyard, ripstitch	Lifeline, self-retracting
Rope grab		Lanyard, self-retracting	Winch
Other equipment:			

<b>TRAINING REQUIREMENTS</b>
The SSC or DSC shall use this form to inform project staff of the potential fall hazards and specific fall protection systems to be used to control the hazards. SSC or DSC shall instruct staff on the proper use, limitations, and inspection procedures for each fall protection component and system.

\_\_\_\_\_  
SSC or DSC Signature

\_\_\_\_\_  
Date





**PERSONAL PROTECTIVE EQUIPMENT**

Hazard/Risk Category Classification (Table 2):	0	1	2	3	4	
PPE to be used (Table 4):	<input type="checkbox"/> Safety glasses	<input type="checkbox"/> Face shield	<input type="checkbox"/> Insulated boots	<input type="checkbox"/> Non-conductive head protection		
Voltage Rated Gloves to be used:	00	0	1	2	3	4
	<input type="checkbox"/> Insulated sleeves	<input type="checkbox"/> Leather glove protectors	<input type="checkbox"/> Fire resistant (FR) clothing	<input type="checkbox"/> Specify (Table 6):		
<hr/>						
<hr/>						
Voltage Rated Tools required:	Y	N				

**OTHER EQUIPMENT**

(Energized Electrical Work Permit: Page 1 of 2)

<p><b>Isolation and shielding materials:</b> <input type="checkbox"/> Safety grounding cables <input type="checkbox"/> Insulated mats <input type="checkbox"/> Insulated blankets <input type="checkbox"/> Voltage-rated ground equipment <input type="checkbox"/> Other: _____</p> <p><b>Tools:</b> <input type="checkbox"/> Insulated voltage-rated tools <input type="checkbox"/> Isolating/operating sticks <input type="checkbox"/> Fuse handling equipment <input type="checkbox"/> Other: _____</p> <p><b>Testing equipment:</b> _____</p> <p><b>Other equipment:</b> <input type="checkbox"/> Auxiliary lighting <input type="checkbox"/> Non-conductive ladders <input type="checkbox"/> Non-conductive ropes/handlines <input type="checkbox"/> Safety signs, tags, barricades <input type="checkbox"/> Fire extinguisher</p> <p><input type="checkbox"/> Other: _____</p>
--

**APPROVALS TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED**

Signature-Lead Qualified Person: \_\_\_\_\_ Date: \_\_\_\_\_

Signature Qualified Person: \_\_\_\_\_ Date: \_\_\_\_\_

Signature Qualified Person \_\_\_\_\_ Date: \_\_\_\_\_

Signature Responsible HSM \_\_\_\_\_ Date: \_\_\_\_\_

**Job Briefing and Planning Checklist:**

- |   |   |   |
|---|---|---|
| 1. Has hazards been identified?   | Y | N |
| 2. Have the voltages been identified?                                       | Y | N |
| 3. Has any foreign (secondary source) voltages been identified?             | Y | N |
| 4. Unusual work conditions been reviewed?                                   | Y | N |
| 5. Have flash protection boundaries been identified and implemented?        | Y | N |
| 6. Is a standby person required and available?                              | Y | N |
| 7. Has proper PPE been inspected and donned by all persons performing work? | Y | N |
| 8. Is the location of the nearest fire extinguisher known?                  | Y | N |
| 9. Is the location of the telephone known?                                  | Y | N |
| 10. Has the equipment shut off in been located?                             | Y | N |

Completed by (signature) \_\_\_\_\_ Date: \_\_\_\_\_

<b>TABLE 1</b>			
<b>Hazard/Risk Category Classifications</b>			
<b>Task (Assumes Equipment is Energized, and Work is done Within the Flash Protection Boundary)</b>	<b>Hazard/Risk Category</b>	<b>V-rated Gloves</b>	<b>V-rated Tools</b>
<b>Panelboards Rated 240 V and Below – Notes 1 and 3</b>			
Circuit breaker (CB) or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	0	N	N
Work on energized parts, including voltage testing	1	Y	Y
Remove/install CBs or fused switches	1	Y	Y
Removal of bolted covers (to expose bare, energized parts)	1	N	N
Opening hinged covers (to expose bare, energized parts)	0	N	N
<b>Panelboards or Switchboards Rated &gt;240V and up to 600 V (with molded case or insulated case circuit breakers) – Notes 1 and 3</b>			
CB or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
<b>600 V Class Motor Control Centers (MCCs) – Notes 2 (except as indicated) and 3</b>			
CB or fused switch or starter operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch or starter operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal of individual starter “buckets” from MCC – Note 4	3	Y	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N
<b>600 V Class Switchgear (with power circuit breakers or fused switches) – Notes 5 and 6</b>			
CB or fused switch operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	3	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	3	N	N
Opening hinged covers (to expose bare, energized parts)	2	N	N
<b>Other 600 V Class (277 V through 600 V, nominal) Equipment – Note 3</b>			
Lighting or small power transformers (600 V, maximum)	-	-	-
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
Revenue meters (kW-hour, at primary voltage and current)	-	-	-
Insertion or removal	2*	Y	N
Cable trough or tray cover removal or installation	1	N	N
Miscellaneous equipment cover removal or installation	1	N	N
Work on energized parts, including voltage testing	2*	N	Y
Application of safety grounds, after voltage test	2*	Y	N

**TABLE 1**

Hazard/Risk Category Classifications

<b>Task (Assumes Equipment is Energized, and Work is done Within the Flash Protection Boundary)</b>	<b>Hazard/Risk Category</b>	<b>V-rated Gloves</b>	<b>V-rated Tools</b>
<b>NEMA E2 (fused contactor) Motor Starters, 2.3 kV through 7.2 kV</b>			
Contactor operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
Contactor operation with enclosure doors open	2*	N	N
Work on energized parts, including voltage testing	3	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	3	Y	Y
Insertion or removal (racking) of starters from cubicles, doors open	3	N	N
Insertion or removal (racking) of starters from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	3	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
<b>Metal Clad Switchgear, 1 kV and Above</b>			
CB or fused switch operation with enclosure doors closed	2	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	4	N	N
Work on energized parts, including voltage testing	4	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	2	Y	Y
Work on control circuits with energized parts >120 V, exposed	4	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	4	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	4	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Opening voltage transformer or control power transformer compartments	4	N	N
<b>Other Equipment 1 kV and Above</b>			
Metal clad load interrupter switches, fused or unfused	-	-	-
Switch operation, doors closed	2	N	N
Work on energized parts, including voltage testing	4	Y	Y
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Outdoor disconnect switch operation (hookstick operated)	3	Y	Y
Outdoor disconnect switch operation (gang-operated, from grade)	2	N	N
Insulated cable examination, in manhole or other confined space	4	Y	N
Insulated cable examination, in open area	12	Y	N
<p><i>V-rated Gloves</i> are gloves rated and tested for the maximum line-to-line voltage upon which work will be done.  <i>V-rated Tools</i> are tools rated and tested for the maximum line-to-line voltage upon which work will be done.                      2* means that a double-layer switching hood and hearing protection are required for this task in addition to the other Hazard/Risk Category 2 requirements of Table 3.                      Y = yes (required)                      N = no (not required)</p> <p>Notes:                      1. 25 kA short circuit available, 0.03 second (2 cycle) fault clearing time.                      2. 65 kA short circuit available, 0.03 second (2 cycle) fault clearing time.                      3. For &lt;10 kA short circuit available, the hazard/risk category required may be reduced by one number.                      4. 65 kA short circuit available, 0.33 second (20 cycle) fault clearing time.                      5. 65 kA short circuit available, up to 1.0 second (60 cycle) fault clearing time.                      6. For &lt;25 kA short circuit available, the hazard/risk category required may be reduced by one number.</p>			

**TABLE 2**

Protective Clothing and Personal Protective Equipment (PPE) Matrix

Protective Clothing and Equipment	Protective Systems for Hazard/Risk Category						
	Hazard/Risk Category	-1 (Note 3)	0	1	2	3	4
<b>Non-melting (according to ASTM F 1506-00) or Untreated Natural Fiber</b>							
a. T-shirt (short-sleeve)	X				X	X	X
b. Shirt (long-sleeve)		X					
c. Pants (long)	X	X	X (Note 4)		X (Note 6)	X	X
<b>FR Clothing (Note 1)</b>							
a. Long-sleeve shirt			X	X		X (Note 9)	X
b. Pants			X (Note 4)	X (Note 6)		X (Note 9)	X
c. Coverall			X (Note 5)	X (Note 7)		X (Note 9)	X (Note 5)
d. Jacket, parka, or rainwear			AN	AN		AN	AN
<b>FR Protective Equipment</b>							
a. Flash suit jacket (multilayer)							X
b. Flash suit pants (multilayer)							X
c. Head protection							
1. Hard hat			X	X		X	X
2. FR hard hat liner						AR	AR
d. Eye protection							
1. Safety glasses	X	X	X	AL		AL	AL
2. Safety goggles						AL	AL
e. Face and head area protection							
1. Arc-rated face shield, or flash suit hood				X (Note 8)			
2. Flash suit hood						X	X
3. Hearing protection (ear canal inserts)				X (Note 8)		X	X
f. Hand protection							
Leather gloves (Note 2)			AN	X		X	X
g. Foot protection							
Leather work shoes			AN	X		X	X
AN = As needed AL = Select one in group AR – As required X = Minimum required  Notes: 1. See table 5. Arc rating for a garment is expressed in cal/cm <sup>2</sup> . 2. If voltage-rated gloves are required, the leather protectors worn external to the rubber gloves satisfy this requirement. 3. Hazard/Risk Category Number “-1” is only defined if determined by Notes 3 or 6 of Table 2. 4. Regular weight (minimum 12 oz/yd <sup>2</sup> fabric weight), untreated, denim cotton blue jeans are acceptable in lieu of FR pants. The FR pants used for Hazard/Risk Category 1 shall have a minimum arc rating of 4. 5. Alternate is to use FR coveralls (minimum arc rating of 4) instead of FR shirt and FR pants. 6. If the FR pants have a minimum arc rating of 8, long pants on non-melting or untreated natural fiber are not required beneath the FR pants. 7. Alternate is to use FR coveralls (minimum arc rating of 4) over non-melting or untreated natural fiber pants and T-shirt. 8. A faceshield with a minimum arc rating of 8, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or, alternatively, a flash suit hood), is required. 9. Alternate is to use two sets of FR coveralls (the inner with a minimum arc rating of 4 and outer coverall with a minimum arc rating of 5) over non-melting or untreated natural fiber clothing, instead of FR coveralls over FR shirt and FR pants over non-melting or untreated natural fiber clothing.							

**TABLE 3**  
Simplified, Two-Category, Flame-Resistant Clothing System

Clothing*	Applicable Tasks
<p align="center"><b>Technician Everyday Clothing</b></p>	<p align="center">All Hazard/Risk Category 0 tasks listed in Table 4</p>
<p>Long-sleeve shirt (untreated cotton, wool, rayon or silk, or blends of these materials and long pants (regular weight, untreated, denim cotton blue jeans)</p>	
<p align="center"><b>Electrician Everyday Working Clothing</b></p> <p>FR long-sleeve shirt (minimum arc rating of 4) worn over an untreated cotton T-shirt with FR pants (minimum arc rating of 8)</p> <p align="center"><i>or</i></p> <p>FR coveralls (minimum arc rating of 4) worn over an untreated cotton T-shirt (or an untreated natural fiber long-sleeve shirt) with untreated natural fiber pants.</p> <p align="center"><b>Electrical “Switching” Clothing</b></p> <p>Multilayer FR flash jacket and FR bib overalls worn over either FR coveralls (minimum arc rating of 4) or FR long-sleeve shirt and FR pants (minimum arc rating of 4), worn over untreated natural fiber long-sleeve shirt and pants, worn over an untreated cotton T-shirt.</p> <p align="center"><i>or</i></p> <p>Insulated FR coveralls (with a minimum arc of 25, independent of other layers) worn over untreated natural fiber long-sleeve shirt with untreated denim cotton blue jeans (“regular weight,” minimum 12 oz/yd<sup>2</sup> fabric weight), worn over an untreated cotton T-shirt.</p>	<p>All Hazard/Risk Category 1 and 2 tasks listed in Table 4</p> <p>On systems operating at less than 1000 volts, these tasks include work on all equipment</p> <ul style="list-style-type: none"> <li>• <i>except</i></li> <li>• Insertion or removal of low-voltage motor starter “buckets,”</li> <li>• Insertion or removal of power circuit breakers from switchgear cubicles or</li> <li>• Removal of bolted covers from switchgear</li> </ul> <p>On systems operating at 1000 volts or greater, tasks also include the operation of switching devices <i>with equipment enclosure doors closed.</i></p> <p>All Hazard/Risk Category 3 and 4 tasks listed in Table 4</p> <p>On systems operating at 1000 volts or greater, these tasks include work on exposed live parts of all equipment.</p> <p>On systems of less than 1000 volts, tasks include insertion or removal of low-voltage motor starter MCC “buckets,” insertion or removal of plug-in devices into or from busway, insertion or removal of power circuit breakers and removal of bolted covers from switchgear.</p>
<p>*Note: Other PPE required for the specific tasks listed in Tables 2 and 4, which include arc-rated face shields or flash suit hoods, FR hard hat liners, safety glasses or safety goggles, hard hat, hearing protection, leather gloves, voltage-rated gloves, and voltage-rated tools.</p>	

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# **CH2M HILL FIELD SAFETY INSTRUCTIONS**

## **Attachment 6**

### **Project Activity Self-Assessment Checklists**

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## H&S Self-Assessment Checklist: CONFINED-SPACE ENTRY

This checklist is provided as a method of verifying compliance with the OSHA confined-space entry standard. It shall be used at locations where CH2M HILL employees enter confined spaces, or are required to perform oversight of subcontractor personnel entering confined spaces, or both.

CH2M HILL staff shall not direct the means and methods of subcontractor confined space operations nor direct the details of corrective actions. The subcontractor must determine how to correct deficiencies and CH2M HILL staff must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) must be corrected immediately or all exposed personnel must be removed from the hazard until corrected.

Completed checklists must be sent to the appropriate Regional Health and Safety Program Manager (RHSPM) for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to (check only one of the boxes below):

Evaluate CH2M HILL compliance with its confined-space entry program (SOP HS-17)  
 Evaluate a CH2M HILL subcontractor's compliance with its confined-space entry program  
 Subcontractor's Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete or correct.
  - Check "No" if an item is incomplete or deficient. Section 2 must be completed for all items checked "No."
  - Check "N/A" if an item is not applicable.
  - Check "N/O" if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-17.

<u>SECTION 1</u>	Yes	No	N/A	N/O
<b>CONFINED SPACE EVALUATION (6.1)</b>				
1. Staff informed of location and hazards of existing confined spaces (danger signs, verbal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Determination made that work can not be completed without entering the confined space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Information obtained regarding the space (blue prints, potential hazards, energy sources)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Spaces classified as permit-required, alternative procedure, or nonpermit confined spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TRAINING (6.2)</b>				
5. Entrants, Attendants, and Entry Supervisor have completed confined-space entry training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Employees performing lockout/tagout procedures have completed LOTO training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Employees required to wear respirators have completed respiratory protection training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CONFINED-SPACE ENTRY (6.3)</b>				
8. Completed permit or certificate posted at space entrance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Preentry briefing conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Entrants/Attendants verify that entry supervisor has authorized entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Entrants/Attendants verify that all requirements of the permit or certificate have been satisfied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Atmospheric monitoring is conducted at frequency provided on the permit or certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Entry not permitted if an atmospheric hazard is detected above acceptable safe levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Entrants evacuate space upon orders of the attendant or entry supervisor, when an alarm is sounded, or when a prohibited condition or dangerous situation is recognized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Entrants/Attendant informs entry supervisor of hazards confronted or created in the space or any problems encountered during entry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Entry supervisor informs the owner of such issues in item 15 above	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Ladder or other safe means of access provided if greater than 4 feet deep.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>ENTRY UNDER A CONFINED-SPACE ENTRY PERMIT (CSEP) (6.4)</b>				
17. CSEP completed by entry supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. All expected hazards listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Entry supervisor and Attendant assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Communication methods established between entrants and the attendant (6.7.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Cleaning requirements identified (6.7.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Isolation requirements identified (6.7.3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Ventilation requirements identified (6.7.4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Protective equipment requirements identified (6.7.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Rescue equipment requirements identified (6.7.6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Other requirements identified (6.7.7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Rescue and emergency procedures identified (6.8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Atmospheric monitoring requirements identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. HS&E manager approve use by signing (CH2M HILL CSEP only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Entry supervisor authorized entry by signing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Authorized entrants have completed CSE training and attended preentry briefing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Only authorized entrants permitted to enter the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Entry supervisor sign the CSEP indicating its cancellation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Problems encountered during the entry listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ENTRY UNDER AN ALTERNATIVE PROCEDURE CERTIFICATE (APC) (6.5)</b>				
35. APC completed by entry supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. All expected atmospheric hazards listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Entry supervisor and Attendant assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Entry supervisor verifies that nonatmospheric hazards do not exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Communication methods established between entrants and the attendant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Covers removed safely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Openings guarded from both fall hazards and from objects entering the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Continuous forced-air ventilation positioned to ventilate the immediate areas where employees are working and continue until they have left the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Ventilation from a clean source of air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Atmospheric monitoring requirements identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Entry supervisor authorize entry by signing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Authorized entrants have completed CSE training and attended preentry briefing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Only authorized entrants permitted to enter the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Entry supervisor sign the APC indicating its cancellation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Problems encountered during the entry listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ENTRY UNDER A NONPERMIT CERTIFICATE (NPC) (6.6)</b>				
50. NPC completed by entry supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Entry supervisor assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Attendant or buddy assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Buddy remains in the space with the entrant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Entry supervisor verifies nonatmospheric hazards do not exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Communication methods established between entrants and attendant or buddy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Entrants informed to exit the space immediately if hazards are observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Atmospheric monitoring requirements identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Entry supervisor authorizes entry by signing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Authorized entrants have completed CSE training and attended preentry briefing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Only authorized entrants permitted to enter the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Entry supervisor shall sign the NPC indicating its cancellation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. Problems encountered during the entry shall be listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>RESCUE (6.8)</b>				
63. Entrants wearing body harness with attached retrieval line (lifeline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. Other end of lifeline attached to retrieval device (when required) or fixed point outside space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. Mechanical retrieval device positioned at access point for vertical-type spaces > 5 feet deep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. Rescue team established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. Team members have completed confined-space entry training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Team members informed of the hazards that they may confront during rescue operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. PPE & rescue equipment necessary to conduct safe entry-rescue provided & readily available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. Team members trained on rescue duties and proper use of PPE and rescue equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. All team members trained in first aid & CPR, at least one member holding a current certification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. Team has made simulated rescue from a space of similar configuration within last 12 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. Communication established & tested between the team & entrants, and emergency provider	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Local emergency medical provider notified in advance of entries into PRCS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ATMOSPHERIC MONITORING (6.9)</b>				
75. Qualified individual conducts atmospheric monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. Monitoring results documented on permit or certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Entrants do not enter until all monitoring requirements are completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. Monitoring equipment calibrated prior to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. Monitoring conducted for oxygen, flammability, and toxic air contaminants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Monitoring conducted bottom to top at five foot intervals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PREENTRY BRIEFING (6.10)</b>				
81. Entry supervisor conducts the briefing and discusses the follow items:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82. Explanation of the work to be performed and limitations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. Explanation of actual and potential hazards, including the possible behavioral effects and signs, symptoms, and consequences of exposure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. Review of the control measure and atmospheric monitoring requirements, as specified on permit or certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. Review of entrant and attendant responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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# H&S Self-Assessment Checklist—CRANES, HOISTS AND RIGGING

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Field Safety Instructions. This checklist is to be used at locations where CH2M HILL employees are exposed to crane, hoist and rigging hazards.

Designated Safety Coordinator (DSC) may consult with subcontractors when completing this checklist, but shall not direct the means and methods of crane, hoist and rigging operations nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to crane, hoist and rigging hazards

- Check “Yes” if an assessment item is complete/correct.
  - Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 2 must be completed for all items checked “No.”
  - Check “N/A” if an item is not applicable.
  - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-44.

<u><b>SECTION 1</b></u>		<u><b>Yes</b></u>	<u><b>No</b></u>	<u><b>N/A</b></u>	<u><b>N/O</b></u>
<b>SAFE WORK PRACTICES (3.1)</b>					
1.	Individuals operating cranes and hoists of any type are certified operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Cranes have current annual inspection and operations manual with load charts on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Swing radius of cranes are guarded and barricaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Competent person inspects crane daily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Pre-lift meetings conducted with all parties involved in crane operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Cranes used to lift vertically only	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Adequate distance maintained between cranes parts and overhead power lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Dedicated signal person assigned to signal operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Cranes do not swing over live roadways, railways, processes, or occupied buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Critical lifts have written lifting/rigging plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	No personnel permitted on or under loads lifted by crane. Tag lines used to control load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Manufacturers specifications and limitations for hoists followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Personnel not permitted to ride on material hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Weather conditions considered when lifting operations performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	All rigging used as intended, inspected, stored, protected and supervised.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	No fabrication, modifications, or additions to rigging made without testing and approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Field Safety Instructions (FSI). This checklist is to be used at locations where CH2M HILL employees are potentially exposed to hazards associated with earthmoving equipment.

Designated Safety Coordinator (DSC) may consult with earthmoving equipment contractors when completing this checklist, but shall not direct the means and methods of equipment operations nor direct the details of corrective actions. Earthmoving equipment contractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to earthmoving equipment hazards  
 Evaluate a CH2M HILL subcontractor’s compliance with earthmoving equipment H&S requirements  
 Subcontractors Name: \_\_\_\_\_

- Check “Yes” if an assessment item is complete/correct.
  - Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the earthmoving equipment subcontractor. Section 3 must be completed for all items checked “No.”
  - Check “N/A” if an item is not applicable.
  - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-27.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>PERSONNEL SAFE WORK PRACTICES (3.1)</b>				
1. Only authorized personnel operating earthmoving equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel maintaining safe distance from operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel and equipment operator in close communication when personnel must be in proximity of operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel approach operating equipment safely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Personnel wearing high-visibility and/or reflective vests when close to operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel riding only in seats of equipment cab and using seat belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Personnel not positioned under hoisted loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel not hoisted by equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. Personnel instructed not to approach equipment that has become electrically energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Personnel wearing appropriate PPE, per HSP/FSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Field Safety Instructions. This checklist is to be used at locations where CH2M HILL employees enter excavations.

Designated Safety Coordinator may consult with excavation contractors when completing this checklist, but shall not direct the means and methods of excavation operations nor direct the details of corrective actions. Excavation contractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to excavation hazards

- Check “Yes” if an assessment item is complete/correct.
  - Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the excavation subcontractor. Section 3 must be completed for all items checked “No.”
  - Check “N/A” if an item is not applicable.
  - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-32.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>PERSONNEL SAFE WORK PRACTICES (3.1)</b>				
1. Competent person has completed daily inspection and has authorized entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel aware of entry requirements established by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Protective systems are free from damage and in stable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Surface objects/structures secured from falling into excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Potential hazardous atmospheres have been tested and found to be at safe levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Precautions have been taken to prevent cave-in from water accumulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Personnel wearing appropriate PPE, per HSP/FSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EXCAVATION ENTRY (3.2.4)</b>				
8. Trenches > 4’ deep provided with safe means of egress within 25’	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Structure ramps designed and approved by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Potential hazardous atmospheres tested prior to entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Rescue equipment provided where potential for hazardous atmospheres exists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Ventilation used to control hazardous atmospheres and air tested frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Appropriate respiratory protection used when ventilation does not control hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Precautions taken to prevent cave-in from water accumulation in the excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Precautions taken to prevent surface water from entering excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Protection provided from falling/rolling material from excavation face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Spoil piles, equipment, materials restrained or kept at least 2’ from excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Field Safety Instructions (FSI). This checklist is to be used at locations where: 1) CH2M HILL employees are exposed to fall hazards and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to fall hazards.

Designated Safety Coordinator (DSC) may consult with subcontractors when completing this checklist, but shall not direct the means and methods of fall protection operations nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the HS&E Staff for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to fall hazards

Evaluate a CH2M HILL subcontractor’s compliance with fall protection requirements

Subcontractors Name: \_\_\_\_\_

- Check “Yes” if an assessment item is complete/correct.
  - Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked “No.”
  - Check “N/A” if an item is not applicable.
  - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-31.

<b><u>SECTION 1</u></b>		<b><u>Yes</u></b>	<b><u>No</u></b>	<b><u>N/A</u></b>	<b><u>N/O</u></b>
<b>PERSONNEL SAFE WORK PRACTICES (3.1)</b>					
1.	CH2M HILL employees have completed initial fall protection training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Project Fall Protection Evaluation Form completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	CH2M HILL employees have complete project-specific fall protection training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Fall protection systems used to eliminate construction fall hazards $\geq 6'$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Fall protection systems used to eliminate general industry fall hazards $\geq 4'$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Personnel aware of and follow requirements established by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Personal fall arrest systems (PFAS) inspected prior to each use for defects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Personnel remaining within guardrails, when provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Fall protection systems constructed and used according to requirements of Section 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>GUARDRAILS (3.2.2)</b>				
10. Top rails positioned 39-45" above the walking/working level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Midrails, screen, or other barrier between the top rail and the walking/working surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Wood construction: 2"x4" top rails, 1"x6" mid rails, and 2"x4" posts spaced every 8'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Pipe construction: 1 1/2" nominal diameter with posts spaced every 8'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Structural steel construction: 2"x2"x3/8" angles with posts spaced every 8'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Other construction: pass a 200 lb. load test, no deflection < 39"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Natural or synthetic rope top rails/midrails inspected frequently & pass 200 lb. load test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Wire rope top rails/midrails ≥ 1/4" nominal diameter and flagged every 6'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Points of access (ladderways) provided with gate or offset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SAFETY NETS (3.2.3)</b>				
19. Nets installed as close as practicable under the walking/working surface, < 30'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Potential fall area from bridge surfaces to net unobstructed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Nets extend outward from the work surface based on the vertical fall distance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Nets pass drop test or competent person certifies nets are in compliance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Nets installed with sufficient clearance underneath to prevent contact with the surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Nets inspected at least once a week and after any occurrence that could affect integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Objects in net removed as soon as possible, at least before the next work shift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Mesh openings ≤ 6" in length on any side	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Border ropes have a minimum breaking strength of 5,000 pounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Safety net panel connections as strong as net components and spaced ≤ 6' apart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PERSONAL FALL ARREST SYSTEMS (3.2.4)</b>				
29. PFAS components meet or exceed OSHA strength criteria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. PFAS rigged such that personnel can neither free-fall more than 6', nor contact any lower level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Body harness back dee-ring used as attachment point	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Only locking type snaphooks are used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Horizontal lifelines used under supervision of qualified person with safety factor of ≥ 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. When vertical lifelines are used, each employee attached to a separate lifeline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. PFAS anchorages independent of anchorages used to support or suspend platforms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Anchorages capable of supporting ≥ 5,000 lbs. per person or used under supervision of qualified person with safety factor of ≥ 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. PFAS components used only for fall protection and not to hoist materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. PFAS components subjected to impact loading immediately removed from service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. PFAS not be attached to guardrail systems or hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Method of rescue provided in the event of a fall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>POSITIONING DEVICES (3.2.5)</b>				
41. Components meet or exceed OSHA PFAS construction and strength criteria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Components inspected prior to each use and defective components removed from service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Positioning devices rigged such that personnel cannot free-fall more than 2'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Anchorages capable of supporting ≥ 2 times potential impact load of fall or 3,000 pounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**WARNING LINES (3.2.6)**

- 45. Warning lines 34-39" from the walking/working surface
- 46. Warning lines flagged at  $\leq 6'$  intervals with high-visibility material
- 47. Warning lines attached at stanchions capable of resisting 16 lb. force without tipping
- 48. Warning lines erected  $\geq 6'$  from each roof edge
- 49. Warning lines erected  $\geq 10'$  from roof edge perpendicular to mechanical equipment travel
- 50. Warning line placed across the access points when not in use
- 51. Only personnel performing roof work between a roof edge and a warning line

**CONTROLLED ACCESS ZONE (3.2.7)**

- 52. Control lines enclose controlled access zones
- 53. Only personnel engaged in related work permitted in the controlled access zone
- 54. Control lines 30-45" from the walking/working surface
- 55. Control lines flagged at  $\leq 6'$  intervals with high-visibility material
- 56. Overhand bricklaying control lines positioned 10-15' from working edge
- 57. Leading edge control lines positioned 6-25' from leading edge
- 58. Precast concrete control lines positioned 6-60' or half the length of the erected member

**SAFETY MONITORING SYSTEM (3.2.8)**

- 59. Safety Monitor designated to observe and warn personnel
- 60. Safety monitor not distracted from the monitoring function
- 61. Safety monitor on the same working surface within sight and voice communication
- 62. Only personnel necessary for work in safety monitoring zone
- 63. Personnel adhere to the safety monitors instructions

**FALL PROTECTION PLAN (3.2.9)**

- 64. Plan prepared by qualified person and specifically for site work being performed
- 65. Plan maintained current with changes approved by a qualified person
- 66. Plan maintained at the job site and implemented by competent person
- 67. Plan documents why fall protection systems are infeasible or would create a greater hazard
- 68. Plan discusses measures taken to reduce or eliminate the fall hazards
- 69. Plan discusses when scaffolds, ladders, or vehicle mounted work platforms shall be used
- 70. Locations cover by plan identified and classified as controlled access zones
- 71. Entry into controlled access zone limited to personnel designated in plan
- 72. Safety monitoring system used when no other alternative measure implemented

**COVERS (3.2.10)**

- 73. Covers capable of supporting 2x the maximum weight imposed on the cover at any one time
- 74. Covers secured prevent accidental displacement
- 75. Covers color coded or marked "HOLE" or "COVER"

**FALLING OBJECT PROTECTION (3.2.11)**

- 76. Personnel exposed to falling objects wearing hard hats
- 77. Objects on elevated surfaces position away from surface edge
- 78. Toeboards, screens, guardrails, or canopies used or area barricaded below
- 79. Toeboards, when used, erected along the edge of the overhead walking/working surface
- 80. Toeboards 3 1/2" high,  $\leq 1/4"$  clearance above the surface, and no openings  $> 1"$
- 81. Screening/paneling provided where equipment or materials are piled above toeboards
- 82. Guardrails, when used, no openings small enough to prevent passage of falling objects



This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Field Safety Instructions. This checklist is to be used at locations where CH2M HILL employees work from scaffolds.

Designated Safety Coordinator may consult with scaffold contractors when completing this checklist, but shall not direct the means and methods of scaffold operations nor direct the details of corrective actions. Scaffold contractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to scaffold hazards

- Check “Yes” if an assessment item is complete/correct.
  - Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the scaffold subcontractor. Section 3 must be completed for all items checked “No.”
  - Check “N/A” if an item is not applicable.
  - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-73.

	<u><b>SECTION 1</b></u>			
	<u><b>Yes</b></u>	<u><b>No</b></u>	<u><b>N/A</b></u>	<u><b>N/O</b></u>
<b>PERSONNEL SAFE WORK PRACTICES (3.1)</b>				
1. Competent person has completed work shift inspection and has authorized scaffold access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel aware of and following access requirements established by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Scaffold free from damage and in stable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Safe means of access provided to scaffold platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Personnel remaining within guardrail system when provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel using personal fall arrest systems (PFAS) when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Personnel working from suspension scaffolds or boatswains’ chairs using PFAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. CH2M HILL personnel have completed CH2M fall protection training when PFAS use required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Personnel not standing on objects or ladders on top of scaffold platforms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Personnel not using ladders on top of scaffold platforms unless platform covers the entire floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Personnel not working on scaffolds covered with snow or ice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Personnel not work on scaffolds during storms/high winds unless adequate protection provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Rev.0



# **CH2M HILL FIELD SAFETY INSTRUCTIONS**

## **Attachment 7**

### **Applicable Material Safety Data Sheets**

1. Chlorine
2. Ferric Chloride
3. Polymer



Product Name: Chlorine  
Revision Date: 4/14/06  
Revision No. 7

OCEAN NETWORK EMERGENCY PHONE 1-888-2891-911

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC.I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

## I - PRODUCT IDENTIFICATION

Product Name:	<b>Chlorine</b>
Synonyms:	None
Chemical Family:	Halogen
Formula:	Cl <sub>2</sub>
Use Description:	Chlorinating and oxidizing agent, disinfectant, organic synthesis, water and wastewater treatment, plastics, pharmaceuticals
Hazard Classification:	Irritant or corrosive; skin, eye and lung hazard; toxic by inhalation; compressed gas; oxidizer
Product Codes:	105015, 105189
File No.:	MSDS0100

## II - COMPONENT DATA

*This Product Composition information presented here describes the major components and their concentrations found in this product and other information as required by OSHA. This is not, and should not be interpreted, or used as, a Product Specification or a detailed chemical analysis.*

*Established Federal OSHA PEL is provided. OSHA Agreement State PEL may be different.*

### Product Composition

CAS or Chemical Name:	Chlorine				
CAS Number:	7782-50-5				
Percentage Range:	98-100 Volume percent				
Hazardous Per 29 CFR 1910.1200:	Yes				
Exposure Standards:	OSHA (PEL)		ACGIH (TLV)		
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
	TWA:	None	None	0.5	1.5
	CEILING:	1	3	None	None
	STEL:	None	None	1	2.9

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### III - PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY. AVOID CONTACT WITH SKIN, EYES AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER. DO NOT BREATHE GAS OR VAPOR.

#### STORAGE CONDITIONS:

Store in a cool, dry, well-ventilated place. DO NOT STORE AT TEMPERATURES ABOVE: 59 Deg.C (140 Deg.F)

#### PRODUCT STABILITY AND COMPATIBILITY:

SHELF LIFE LIMITATIONS:	Indefinite
INCOMPATIBLE MATERIALS FOR PACKAGING:	NOTICE - Should not be repackaged except by qualified and trained personnel.
INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT:	Alkalis, reducing agents, organic materials

### IV - PHYSICAL DATA

Appearance:	Greenish liquid or gas
Melting Point:	-101 Deg.C (-149 Deg.F)
Freezing Point:	
Boiling Point:	-34 Deg.C (-29 Deg.F)
Decomposition Temperature:	None
Specific Gravity:	Not applicable
Bulk Density:	88.4 lb. per cubic feet at 63 Deg.F
pH @ 25° C:	Not applicable
Vapor Pressure @ 25° C:	114 psi
Solubility in Water:	Miscible
Volatiles, Percent by Volume:	100
Evaporation Rate:	Heat of Vaporization: 123.67 BTU per pound
Vapor Density:	Approximately 2.5 (0.7537 lb. per cubic feet at 32 Deg.F)
Molecular Weight:	71
Product is:	A compressed gas
Odor:	Acrid
Coefficient of Oil/Water Distribution:	No Data

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**V - PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

*Personal Protection for Routine Use of Product:*

Respiratory Protection:	If air concentrations above the TLV are possible, wear a NIOSH approved respirator
Ventilation:	Use local exhaust ventilation to maintain levels to below the TLV.
Skin and Eye Protection:	Wear gloves, boots, apron and a face shield with safety glasses. A full impermeable suit is recommended if exposure is possible to large portion of body.
Other:	Emergency eye wash and safety showers must be provided in the immediate work area.

*Equipment Specifications (When Applicable):*

Respirator Type:	Wear NIOSH approved full-face respirator equipped with chemical cartridges for chlorine gas.
Protective Clothing Type: (This includes: gloves, boots, apron, protective suit.)	GLOVE TYPE: Neoprene, or butyl rubber BOOT TYPE: Neoprene, or butyl rubber APRON TYPE: Neoprene, or butyl rubber PROTECTIVE SUIT: see Section XI. for additional information

**VI - FIRE AND EXPLOSION HAZARD INFORMATION**

*Flammability Data:*

Explosive:	N/A
Flammable:	No
Combustible:	No
Pyrophoric:	No
Flash Point:	Not Applicable
Autoignition Temperature:	Not Applicable
Flammable Limits at Normal Atmospheric Temperature and Pressure (Percent Volume in Air):	LEL - Not Applicable UEL - Not Applicable

*NFPA Ratings:*

Health:	4
Flammability:	0
Reactivity:	0
Special Hazard Warning	OXIDIZER

*HMIS Ratings:*

Health:	3
Flammability:	0
Reactivity:	0

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**Extinguishing Media:**

Use extinguishing media compatible to surrounding materials.

**Fire Fighting Techniques and Comments:**

Use water to cool containers exposed to fire, however, direct spray between fire and containers. DO NOT spray directly on container unless absolutely necessary. Water reactive material; DO NOT spray with water. Contact with reactive metals e.g., aluminum may result in the generation of flammable hydrogen gas. See Section 11 for protective equipment for fire fighting.

**VII - REACTIVITY INFORMATION**

**Conditions Under Which This Product May Be Unstable:**

Temperatures Above:	None
Mechanical Shock or Impact:	No
Electrical (Static) Discharge:	No
Other:	Reacts vigorously with titanium, zinc, tin
Hazardous Polymerization:	Will not occur
Incompatible Materials:	Alkalies, reducing agents, organic materials
Hazardous Decomposition:	Hydrochloric acid, hypochlorous acid
Other:	Titanium will react vigorously, resulting in spontaneous ignition, when contacted by DRY Chlorine.  Combustion will be supported in carbon steel systems and equipment containing a Chlorine environment at temperatures greater than 480 Deg. F. Properly purge systems and equipment PRIOR to conducting Hot Work.

**Summary of Reactivity:**

Explosive:	N/A
Oxidizer:	Yes
Pyrophoric:	No
Organic Peroxide:	No
Water Reactive:	No (See Precautions under XI, Spill & Leakage Mitigation Procedures)
Corrosive:	Yes

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## VIII - FIRST AID

### *Eyes*

- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

### *Skin*

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

### *Ingestion*

- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by the poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

### *Inhalation*

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.
- Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

**NOTE TO PHYSICIAN** - Probable mucosal damage may contraindicate the use of gastric lavage.

## IX - TOXICOLOGY AND HEALTH INFORMATION

### *Routes of Absorption*

Inhalation, skin, eye, ingestion

### *Warning Statements and Warning Properties*

HARMFUL IF INHALED. CAUSES EYE, SKIN AND RESPIRATORY TRACT BURNS. CAN CAUSE LUNG DAMAGE.

### *Human Threshold Response Data*

Odor Threshold:	Approximately 1.7 mg/m <sup>3</sup> (0.3 ppm).
Irritation Threshold:	The irritation threshold is approximately 0.5 ppm.
Immediately Dangerous to Life or Health:	10.0 ppm

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***Signs, Symptoms and Effects of Exposure***

**Inhalation**

Acute:	Toxic if inhaled. Inhalation of this material is irritating to the nose, mouth, throat and lungs. It may cause inflammation to the respiratory tract with the production of lung edema, which can result in shortness of breath, wheezing, choking, chest pain, and impairment of lung function. The inflammation of the respiratory tract is most evident in the upper portions, but bronchioles, alveolar ducts, and alveoli may also be affected.  There is no evidence that acute inhalation of chlorine at low to moderate levels will cause permanent lung damage. At high levels, chlorine is corrosive to the respiratory tract and may cause lung damage.
Chronic:	Repeated inhalation exposure may cause impairment of lung function and permanent lung damage. It may contribute to the development of bronchitis.

**Skin**

Acute:	Dermal exposure can cause irritation characterized by redness, swelling and scab formation. Contact with liquid chlorine may cause burns with prolonged contact causing destruction of the dermis with impairment of the skin at site of contact to regenerate.
Chronic:	Effects from chronic skin exposure would be similar to those from single exposure except for effects secondary to tissue destruction

**Eye**

Irritation can occur following eye exposure to the gas with redness, pain, blurred vision, and tearing. Contact with liquid chlorine may cause burns with impairment of vision and corneal damage.
--

**Ingestion**

Acute:	If liquid is swallowed, irritation and/or burns can occur to the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, bleeding, and/or tissue ulceration. Ingestion is not a major route of exposure because chlorine is a gas at room temperature.
Chronic:	There are no known or reported effects from chronic exposure.

***Medical Conditions Aggravated by Exposure***

Asthma, respiratory and cardiovascular disease.
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***Interactions With Other Chemicals Which Enhance Toxicity***

None known or reported.
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Animal Toxicology

Acute Target Organ Toxicity

Inhalation LC 50: 293 ppm (1 hour, rat)  
Oral LD 50: Not applicable. Product is a gas at room temperature.  
Dermal LD 50: Not applicable. Product is a gas at room temperature.  
Severe irritant to eyes and skin. Contact with the liquid chlorine may cause burns to eyes and skin. Contact with chlorine vapor may cause severe eye irritation.

Reproductive and Developmental Toxicity

There are no known or reported effects on reproductive function or fetal development.

Carcinogenicity

This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

Mutagenicity

This product is not known or reported to be mutagenic.

Aquatic Toxicity

LC 50 Bluegill: 0.44 mg/l/96 hours  
LC 50 Yellow perch: 0.88 mg/l/1 hr.  
LC 50 Channel catfish (fingerling): 0.07 mg/l/96 hrs  
LC 50 Daphnia magna: 0.017 mg/l/46 hrs

CHRONIC TARGET ORGAN EFFECTS IN LABORATORY ANIMALS

Inhalation exposure has produced pathological change in the lungs and nasal passages of monkeys and rats characterized by inflammation, epithelial hyperplasia of loss of cilia. In addition, damage was observed in liver and kidneys from treated rats. These effects were seen at concentrations much higher than those expected from occupational exposure.

**X - TRANSPORTATION INFORMATION**

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

**DOT Description from the Hazardous Materials Table 49 CFR 172.101:**

Land (U.S. DOT):	Chlorine, 2.3, UN1017, Poison Inhalation Hazard - Hazard Zone B - Marine Pollutant
Water (IMO):	Same as LAND above
Air (IATA/ICAO):	FORBIDDEN
Hazard Label/Placard:	Poison Gas, Corrosive
Reportable Quantity:	10 lbs. (Per 49 CFR 172.101, Appendix)
Emergency Guide:	124

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**XI - SPILL AND LEAKAGE PROCEDURES**

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.	
Reportable Quantity:	This product is subject to a Reportable Quantity with respect to chlorine. RQs are subject to change and reference should be made to 40 CFR 302.4 for the current requirements.

**Spill Mitigation Procedures:**

Hazardous concentrations in air may be found in local spill area and immediately downwind. Do not put water directly on this product as gas evolution may increase. Water should not be used directly on a chlorine leak. Chlorine and water react forming acids and the leak quickly will get worse. Water provides a heat source for vaporizing liquid Chlorine. Water should be prevented from coming into contact with a liquid Chlorine spill, and liquid chlorine should be prevented from flowing into water drains or bodies of water in the close proximity. This product may represent an explosion hazard, if in contact with incompatible materials. Remove all sources of ignition.	
Air Release:	This material is heavier than air and may concentrate in low areas. Ambient air and water temperature must be considered if a water fog is used to attempt absorption or dispersion. It must be understood that very little vapor may actually be absorbed and the gas may be dispersed to other areas. Contain all fog water for neutralization and treatment.
Water Release:	This material is heavier than water. Chlorine will sink and bubble into water to form a hypochlorous acid, which will later self-decompose to various materials. Stop flow of material and divert water to a holding area for treatment and neutralization.
Land Spill:	Dike area of spill and stop flow if safe to do so. Cover area of spill with foam to reduce air contamination. Begin treatment to neutralize material as soon as possible.

**Spill Residues:**

Dispose of per guidelines under Section 12, WASTE DISPOSAL.	
This material may be neutralized for disposal; you are requested to contact OCEAN at 888-289-1911 before beginning any such operation.	

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***Personal Protection for Emergency Spill and Firefighting Situations:***

In case of fire, use normal fire fighting equipment.

For response to Chlorine gas it is recommended to use as a minimum level "B" protection that is compatible to Chlorine and for Liquid spills it is recommended to utilize as a minimum enhanced level "B" (Enhanced level "B" is the addition of a splash hood). Responders can reference Chlorine Institute pamphlet #65 on PPE.

Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots, gloves, hard hat, splash-proof goggles, full face shield and impervious clothing, i.e., chemically impermeable suit.

Compatible materials for response to this material are neoprene and butyl rubber.

Protection concerns must also address the potential of the physical characteristics of this product as a compressed gas, corrosive and a poison.

**XII - WASTE DISPOSAL**

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste number: D003, D001.

If this product becomes a hazardous waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly.

As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by treatment.

Chlorine can exist in a gaseous state, and controlled evaporation may be warranted.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

**XIII - ADDITIONAL REGULATORY STATUS INFORMATION**

**TOXIC SUBSTANCES CONTROL ACT:**

This product is listed on the Toxic Substances Control Act inventory.

NSF/ANSI 60 LIMITS: NSF Maximum Drinking Water Use Concentration - 30 mg/l as chlorine

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FEDERAL INSECTICIDE FUNGICIDE RODENTICIDE ACT (FIFRA): This substance is registered for use as a disinfectant or sanitizer. Re-formulators and re-packagers of this product must obtain their own registration from the Environmental Protection Agency. EPA Registration Number: 72315-1.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT TITLE III:

HAZARD CATEGORIES, PER 40 CFR 370.2:

HEALTH:

Immediate (Acute)  
Delayed (Chronic)

PHYSICAL:

Sudden release of pressure  
Reactivity

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:

EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:

100 lbs.

SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:

This mixture or tradename product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

CHEMICALS LISTED ARE: Chlorine

#### XIV - ADDITIONAL INFORMATION

MSDS REVISION STATUS: The Chlor/Alkali MSDS Control Group updated this MSDS April 2006

First Aid Statements and Additional Regulatory Information updated April 2006

#### XV - MAJOR REFERENCES

Major References furnished upon request

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MATERIAL SAFETY DATA SHEET IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT OLIN AT THE PHONE NUMBER LISTED BELOW TO MAKE CERTAIN THAT THIS SHEET IS CURRENT.

ORC MSDS CONTROL GROUP  
Olin Chlor Alkali  
1186 Lower River Road  
P.O. Box 248  
Charleston, TN 37310  
Phone Number: (888)-658-MSDS (6737)



Health	3
Fire	0
Reactivity	2
Personal Protection	J

## Material Safety Data Sheet Ferric chloride MSDS

Section 1: Chemical Product and Company Identification	
<b>Product Name:</b> Ferric chloride <b>Catalog Codes:</b> SLF1675, SLF2188 <b>CAS#:</b> 7705-08-0 <b>RTECS:</b> LJ9100000 <b>TSCA:</b> TSCA 8(b) inventory: Ferric chloride <b>CI#:</b> Not available. <b>Synonym:</b> <b>Chemical Formula:</b> FeCl <sub>3</sub>	<b>Contact Information:</b> <b>Sciencelab.com, Inc.</b> 14025 Smith Rd. Houston, Texas 77396 <b>US Sales: 1-800-901-7247</b> <b>International Sales: 1-281-441-4400</b> <b>Order Online: <a href="http://ScienceLab.com">ScienceLab.com</a></b> <b>CHEMTREC (24HR Emergency Telephone), call:</b> 1-800-424-9300 <b>International CHEMTREC, call: 1-703-527-3887</b> <b>For non-emergency assistance, call: 1-281-441-4400</b>

Section 2: Composition and Information on Ingredients		
<b>Composition:</b>		
<b>Name</b>	<b>CAS #</b>	<b>% by Weight</b>
Ferric chloride	7705-08-0	100
<b>Toxicological Data on Ingredients:</b> Ferric chloride: ORAL (LD50): Acute: 900 mg/kg [Rat]. 1278 mg/kg [Mouse].		

Section 3: Hazards Identification
<p><b>Potential Acute Health Effects:</b>            Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator). Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death.</p> <p><b>Potential Chronic Health Effects:</b>            CARCINOGENIC EFFECTS: Not available.            MUTAGENIC EFFECTS: Not available.            TERATOGENIC EFFECTS: Not available.            DEVELOPMENTAL TOXICITY: Not available.            The substance is toxic to lungs, mucous membranes.            Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction.</p>

or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**Ingestion:**

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

#### Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

**Large Spill:**

Corrosive solid.

Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep locked up Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from direct sunlight or strong incandescent light. Do not ingest. Do not breathe dust. Never add water to this product Avoid shock and friction. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

**Storage:** Corrosive materials should be stored in a separate safety storage cabinet or room.

### Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 1 CEIL: 2 (mg/m<sup>3</sup>)

Consult local authorities for acceptable exposure limits.

### Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 162.21 g/mole

**Color:** Not available.

**pH (1% soln/water):** 2 [Acidic.]

**Boiling Point:** 316°C (600.8°F)

**Melting Point:** 306°C (582.8°F)  
**Critical Temperature:** Not available.  
**Specific Gravity:** 2.9 (Water = 1)  
**Vapor Pressure:** Not applicable.  
**Vapor Density:** 5.61 (Air = 1)  
**Volatility:** Not available.  
**Odor Threshold:** Not available.  
**Water/Oil Dist. Coeff.:** Not available.  
**Ionicity (in Water):** Not available.  
**Dispersion Properties:** See solubility in water.  
**Solubility:** Soluble in cold water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.  
**Instability Temperature:** Not available.  
**Conditions of Instability:** Not available.  
**Incompatibility with various substances:**  
The product may undergo hazardous decomposition, condensation or polymerization, it may react violently with water to emit toxic gases or it may become self-reactive under conditions of shock or increase in temperature or pressure.  
**Corrosivity:** Non-corrosive in presence of glass.  
**Special Remarks on Reactivity:** Not available.  
**Special Remarks on Corrosivity:** Not available.  
**Polymerization:** No.

**Section 11: Toxicological Information**

**Routes of Entry:** Eye contact. Inhalation. Ingestion.  
**Toxicity to Animals:** Acute oral toxicity (LD50): 900 mg/kg [Rat].  
**Chronic Effects on Humans:** The substance is toxic to lungs, mucous membranes.  
**Other Toxic Effects on Humans:**  
Very hazardous in case of ingestion.  
Hazardous in case of skin contact (irritant), of inhalation.  
Slightly hazardous in case of skin contact (permeator).  
**Special Remarks on Toxicity to Animals:** Not available.  
**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** CLASS 8: Corrosive solid.

**Identification:** : Ferric chloride, anhydrous : UN1773 PG: III

**Special Provisions for Transport:** Not available.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Ferric chloride

Massachusetts RTK: Ferric chloride

TSCA 8(b) inventory: Ferric chloride

CERCLA: Hazardous substances.: Ferric chloride

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):**

CLASS E: Corrosive solid.

CLASS F: Dangerously reactive material.

**DSCL (EEC):** R36/38- Irritating to eyes and skin.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 0

**Reactivity:** 2

**Personal Protection:** j

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 0

**Reactivity:** 2

**Specific hazard:**

**Protective Equipment:**

Gloves.

Synthetic apron.

Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

### Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:32 PM

**Last Updated:** 10/09/2005 05:32 PM

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# Walla Walla Environmental, Inc.

## MATERIAL SAFETY DATA SHEET

WALLA WALLA ENVIRONMENTAL, INC.  
P.O. BOX 1298  
WALLA WALLA, WA 99362  
Emergency Telephone: 509-522-0490

PRODUCT NAME: W2E CAT-90 COAGULANT

Revision Date: January 3, 2006

### PRODUCT IDENTIFICATION

SUBSTANCE: Aluminum Chloride, solution  
FORMULA : Proprietary  
CHEMICAL FAMILY: Organic / Inorganic blend, coagulant and polymer

### INGREDIENTS

INGREDIENTS	CAS #
Al Cl <sub>3</sub>	7446 - 70 - 0
Al (CH) <sub>5</sub> Cl	12042 - 91 - 0
H <sub>2</sub> O	7732 - 18 - 5

All Ingredients Are Listed On The TSCA Chemical Substance Inventory

### PHYSICAL DATA

BOILING POINT:	110 C (230 F)
pH:	0.5 to 1.5
MELTING POINT:	- 34 C (-30 F)
SOLUBILITY IN WATER:	Complete
SPECIFIC GRAVITY:	1.2800
VAPOR PRESSURE:	< 5mm Hg @ 20 C
% VOLATILE:	20% (water)
EVAPORATION RATE:	None Found
FORM :	Liquid
COLOR:	Colorless to dark yellow
ODOR:	Slightly acid
MOLECULAR WEIGHT:	133.35

### FIRE AND EXPLOSION HAZARDS

FLASH POINT:	Not Applicable
FLAMMABLE LIMITS IN AIR: (% by Volume)	UFL : Not Applicable      LFL : Not Applicable
EXTINGUISHING MEDIA:	Will not burn; use materials appropriate for surrounding fire.
SPECIAL FIRE FIGHTING INSTRUCTIONS:	Cool exposed tanks with water

SPECIAL FIRE AND EXPLOSION HAZARDS: When subjected to high temperatures prevalent in a fire, aluminum chloride may decompose and release aluminum hydrate, hydrochloric acid and possibly hydrogen. Hydrochloric acid is corrosive and extremely irritating to respiratory tract; Self-contained breathing apparatus should be worn. Hydrogen is flammable and potentially explosive; appropriate precautions should be taken.

### REACTIVITY

STABILITY : Stable at ambient temperatures.

**DECOMPOSITION** : At elevated temperatures prevalent in a fire, product will decompose to aluminum hydrate, hydrochloric acid and possibly hydrogen.  
**POLYMERIZATION** : Will not occur.  
**INCOMPATIBILITY** : Rapidly corrodes most metals; may generate flammable, potentially explosive hydrogen gas.

#### **HEALTH HAZARDS**

**EXPOSURE LIMITS** : Not specifically regulated as toxic or hazardous by OSHA. The ACGIH TLV for mists and dusts of soluble aluminum salts is 2mg/m<sup>3</sup> as Al ( 8 hour time weighted average.)  
**CARCINOGENICITY** : None of the components of this material are listed as a carcinogen by LARC, NTP, OSHA or ACGIH.

#### **TOXICOLOGY**

**INGESTION** : When aluminum chloride is swallowed, it caused acute irritation and burns to the mucous membranes of the mouth, trachea, esophagus and stomach. There may be difficulty in swallowing and breathing due to acidic and astringent nature of material.  
**EYE CONTACT** : Eye contact results in severe irritation and painful burns of eyes and eyelids. If material is not removed by copious irrigation with water at room temperature, visual impairment or total loss of vision could result.  
**SKIN CONTACT** : Skin contact may cause irritation or mild chemical burns. Skin may dry or crack due to astringent nature of material. Repeated skin contact may lead to development of dermatitis.  
**INHALATION** : Inhalation results in coughing, burning of nose and throat and a choking sensation. Reactions are usually limited to inflammation and occasional ulceration of mucosa.

#### **FIRST AID**

**EYE** : Immediately flush eyes for 15 minutes with plenty of water. Call a physician.  
**SKIN** : Flush skin with water. Remove contaminated clothing; wash before reuse.  
**INHALATION** : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.  
**INGESTION** : DO NOT INDUCE VOMITING. Give large quantities of water, then an antacid. Never give anything by mouth to an unconscious person. Call a physician.

#### **PERSONAL PROTECTION**

Adequate general ventilation should be provided to keep vapor and mists below exposure limits.

Wear safety glasses with side shields. Wear a face shield if possibility of material splashing or spraying exists. Where there is possibility of skin contact, use the following as appropriate: gloves impervious to material, apron, boots, hood, pants and jacket. Wear a NIOSH/OSHA approved respirator with a dust/mist cartridge if there is potential of exposure to mists in excess of applicable limits.

#### **SPILL/LEAK PROCEDURE**

Review safety precautions before proceeding with cleanup. Use appropriate personal protection equipment. Neutralize spill with lime (calcium hydroxide), limestone(calcium carbonate) or soda ash(sodium carbonate)

**CAUTION** : limestone and soda ash will evolve CO<sub>2</sub>; ventilation should be provided in enclosed areas. Dike area around spill to prevent spreading, and use absorbent material to pick up spill.

**DISPOSAL** : Under the Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user to determine whether a substance should be classified as a hazardous waste at the time of disposal. This is due to the fact that product use, transformation, synthesis, mixtures, etc. may change the nature of the product. Dispose of waste in accordance with applicable federal, state and local laws. CATIONIC POLYMERS ARE TOXIC TO FISH.

**SHIPPING INFORMATION**

DOT  
PROPER SHIPPING NAME : Aluminum Chloride, solution.  
HAZARD CLASS : Corrosive material.  
UN/NA # : UN 2581.  
DOT LABELS : Corrosive  
DOT PLACARDS : Corrosive  
PACKAGING GROUP : III  
REPORTABLE QUANTITY : Not Applicable

STORAGE CONDITIONS : Keep containers closed.

**TITLE III HAZARD CLASSIFICATIONS**

ACUTE : No  
CHRONIC : No  
FIRE : No  
REACTIVITY : No  
PRESSURE : No

EXTREMELY HAZARDOUS SUBSTANCE : No  
TOXIC CHEMICAL : No

NFPA/HMIS RATINGS : HEALTH : 2  
FLAMMABILITY : 0  
REACTIVITY : 0  
Personal protection rating to be supplied by user depending on use conditions.

**ADDITIONAL INFORMATION AND REFERENCES**

This Material Safety Data Sheet refers only to the specific material designated herein, and does not relate to use in combination with any other material or in any process.



**CH2M HILL FIELD SAFETY INSTRUCTIONS**  
**Attachment 8**

**Injury Management Poster and Medical Treatment Form**



**1-866-893-2514**

*24/7 physician access*

## **Injured on the job— who do you call?**

**The Injury Management/Return to Work program has a different hotline number—and some improvements:**

- Direct access is available with a nurse and physician—24/7
- The physician coordinates the employee's visit to the clinic for treatment and follow-up

Look for your Injury Management/Return to Work card at your office or project site—keep yours with you wherever you go.

**Remember—if you get injured or sick on the job, report to your supervisor and call the number!**

**For more information please visit us on the VO at:**

**Company Resources |  
Corporate Groups | Health,  
Safety, Security, and  
Environment**

**HSSE**

82-00000-MET

# **CH2M HILL FIELD SAFETY INSTRUCTIONS**

## **Attachment 9**

### **Safety Planning Forms (Task Hazard Analysis and Safety Pre-Task Plan)**









# SAFETY PRE-TASK PLANNING

Pre-Task Planning Form: Page 1 of 3

**PROJECT:** \_\_\_\_\_ **LOCATION:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**SUPERVISOR:** \_\_\_\_\_ **JOB ACTIVITY:** \_\_\_\_\_

**EMERGENCY NUMBER(S):** \_\_\_\_\_ **ALARMS/SIGNALS:** \_\_\_\_\_

**TASK PERSONNEL NAME:**

_____
_____
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**TASK PERSONNEL SIGNATURE:**

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## LIST TASKS

- |    |
|----|
| 1. |
| 2. |
| 3. |
| 4. |

## TOOLS/EQUIPMENT REQUIRED FOR TASKS

*(LADDERS, SCAFFOLDS, FALL PROTECTION, CRANES/RIGGING, HEAVY EQUIPMENT, POWER TOOLS, ETC.):*

1.	2.	3.	4.

# SAFETY PRE-TASK PLANNING

Pre-Task Planning Form: Page 2 of 3

**POTENTIAL H&S HAZARDS, INCLUDING CHEMICAL, PHYSICAL, SAFETY, BIOLOGICAL AND ENVIRONMENTAL (CHECK ALL THAT APPLY):**

<input type="checkbox"/> Chemical burns/contact	<input type="checkbox"/> Trench, excavations, cave-ins	<input type="checkbox"/> Ergonomics
<input type="checkbox"/> Pressurized lines/equipment	<input type="checkbox"/> Overexertion	<input type="checkbox"/> Chemical splash
<input type="checkbox"/> Thermal burns	<input type="checkbox"/> Pinch points	<input type="checkbox"/> Poisonous plants/insects
<input type="checkbox"/> Electrical	<input type="checkbox"/> Cuts/abrasions	<input type="checkbox"/> Eye hazards/flying projectile
<input type="checkbox"/> Weather conditions	<input type="checkbox"/> Spills	<input type="checkbox"/> Inhalation hazard
<input type="checkbox"/> Heights/fall > 6'	<input type="checkbox"/> Overhead Electrical hazards	<input type="checkbox"/> Heat/cold stress
<input type="checkbox"/> Noise	<input type="checkbox"/> Elevated loads	<input type="checkbox"/> Water/drowning hazard
<input type="checkbox"/> Explosion/fire	<input type="checkbox"/> Slips, trip and falls	<input type="checkbox"/> Heavy equipment
<input type="checkbox"/> Radiation	<input type="checkbox"/> Manual lifting	<input type="checkbox"/> Aerial lifts/platforms
<input type="checkbox"/> Confined space entry	<input type="checkbox"/> Welding/cutting	<input type="checkbox"/> Demolition

**OTHER POTENTIAL HAZARDS (DESCRIBE):**

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**HAZARD CONTROL MEASURES (CHECK ALL THAT APPLY):**

PPE	PROTECTIVE SYSTEMS	FIRE PROTECTION	ELECTRICAL
<input type="checkbox"/> Head	<input type="checkbox"/> Sloping	<input type="checkbox"/> Fire extinguishers	<input type="checkbox"/> Lockout/tagout
<input type="checkbox"/> Eye	<input type="checkbox"/> Shoring	<input type="checkbox"/> Fire watch	<input type="checkbox"/> Grounded
<input type="checkbox"/> Hand	<input type="checkbox"/> Trench box	<input type="checkbox"/> Non-spark tools	<input type="checkbox"/> Panels covered
<input type="checkbox"/> Foot	<input type="checkbox"/> Barricades	<input type="checkbox"/> Grounding/bonding	<input type="checkbox"/> GFCI/extension cords
<input type="checkbox"/> Respiratory	<input type="checkbox"/> Competent person	<input type="checkbox"/> Intrinsically safe equipment	<input type="checkbox"/> Power tools/cord inspected
<input type="checkbox"/> Reflective vests	<input type="checkbox"/> Locate buried utilities	<input type="checkbox"/> Other	<input type="checkbox"/> Other
<input type="checkbox"/> Hearing	<input type="checkbox"/> Daily inspections		
<input type="checkbox"/> Other	<input type="checkbox"/> Other		

# SAFETY PRE-TASK PLANNING

Pre-Task Planning Form: Page 3 of 3

<b>FALL PROTECTION</b> <input type="checkbox"/> Harness/lanyards <input type="checkbox"/> Adequate anchorage <input type="checkbox"/> Guardrail system <input type="checkbox"/> Covered opening <input type="checkbox"/> Fixed barricades <input type="checkbox"/> Warning system <input type="checkbox"/> Other	<b>AIR MONITORING</b> <input type="checkbox"/> PID/FID <input type="checkbox"/> Detector tubes <input type="checkbox"/> Radiation <input type="checkbox"/> Personnel sampling <input type="checkbox"/> LEL/O2 <input type="checkbox"/> Other	<b>PROPER EQUIPMENT</b> <input type="checkbox"/> Aerial lift/ladders/scaffolds <input type="checkbox"/> Forklift/ Heavy equipment <input type="checkbox"/> Backup alarms <input type="checkbox"/> Hand/power tools <input type="checkbox"/> Crane w/current inspection <input type="checkbox"/> Proper rigging <input type="checkbox"/> Operator qualified <input type="checkbox"/> Other	<b>WELDING &amp; CUTTING</b> <input type="checkbox"/> Cylinders secured/capped <input type="checkbox"/> Cylinders separated/upright <input type="checkbox"/> Flash-back arrestors <input type="checkbox"/> No cylinders in CSE <input type="checkbox"/> Flame retardant clothing <input type="checkbox"/> Appropriate goggles <input type="checkbox"/> Other
<b>CONFINED SPACE ENTRY</b> <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue <input type="checkbox"/> Other	<b>MEDICAL/ER</b> <input type="checkbox"/> First-aid kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR trained personnel <input type="checkbox"/> Route to hospital <input type="checkbox"/> Other	<b>HEAT/COLD STRESS</b> <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training <input type="checkbox"/> Other	<b>VEHICLE/TRAFFIC</b> <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs <input type="checkbox"/> Other
<b>PERMITS</b> <input type="checkbox"/> Hot work <input type="checkbox"/> Confined space <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Excavation <input type="checkbox"/> Demolition <input type="checkbox"/> Energized work <input type="checkbox"/> Other	<b>DEMOLITION</b> <input type="checkbox"/> Pre-demolition survey <input type="checkbox"/> Structure condition <input type="checkbox"/> Isolate area/utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Hazmat present <input type="checkbox"/> Other	<b>INSPECTIONS:</b> <input type="checkbox"/> Ladders/aerial lifts <input type="checkbox"/> Lanyards/harness <input type="checkbox"/> Scaffolds <input type="checkbox"/> Heavy equipment <input type="checkbox"/> Cranes and rigging <input type="checkbox"/> Other	<b>Training:</b> <input type="checkbox"/> Hazwaste <input type="checkbox"/> Construction <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific (THA) <input type="checkbox"/> Hazcom <input type="checkbox"/> Other

**ADDITIONAL HAZARD CONTROL MEASURES:**

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**FIELD NOTES:**

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**Supervisor signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**CH2M HILL FIELD SAFETY INSTRUCTIONS**  
**Attachment 10**

**Project FSI Change Management Form**

## Project Field Safety Instructions (FSI) Change Management Form

*This evaluation form should be reviewed on a **continuous** basis to determine if the current site health and safety plan adequately addresses ongoing project work, and should be completed whenever new tasks are contemplated or changed conditions are encountered.*

Project Task:

Project Number:

Name:

Project/Task Manager:

Employee #:

### Evaluation Checklist

		Yes	No
1.	Has the CH2MHILL staff listed in the original HSP/FSI changed?		
2.	Has a new subcontractor been added to the project?		
3.	Is any chemical or product to be used that is not listed in Attachment 2 of the plan?		
4.	Have additional tasks been added to the project which were not originally addressed in the plan?		
5.	Have new contaminants or higher than anticipated levels of original contaminants been encountered?		
6.	Have other safety, equipment, activity or environmental hazards been encountered that are not addressed in the plan?		

***If the answer is “YES” to Question 3, an HSP/FSI revision is NOT needed. Please take the following actions:***

- ◆ Add the chemical to Attachment 2, and ensure employees handling the chemical are trained, and training documentation is added to Attachment 3.

***If the answer is “YES” to Questions 1, 2 or 4-6, an HSP/FSI revision MAY BE NEEDED. Please contact HSE&Q directly.***

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