BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	)	IN THE OFFICE OF THE SOUTH DISTRICT
vs.	)	OGC FILE NO. 89-0466
CITY OF KEY WEST	)	

CONSENT ORDER AMENDMENT NO. 3

This Consent Order Amendment No. 3 ("Order") is entered into between the State of Florida Department of Environmental Protection ("Department") and the City of Key West ("Respondent") to modify certain terms and conditions of a Consent Order previously entered into between the parties.

The Department and the Respondent agree:

1. The Department and Respondent previously entered into a Consent Order to allow the continued operation of the Stock Island Landfill, to include the Long-term Care Period which is scheduled to end on April 24, 2016. The Consent Order ("1989 Order"), with the same caption and OGC number as is set forth above, was filed with the Clerk of the Department on July 27, 1989 and amended on August 1, 1991, entitled "Consent Order Amendment 1" and on July 10, 1992, entitled "Consent Order Amendment 2" (collectively referred to as "Amendments"). The 1989 Order and its subsequent Amendments are attached as Exhibit I and incorporated herein.

2. The Department is the administrative agency of the State of Florida having the power and duty to administer and enforce the provisions of the Florida Resource Recovery and Management Act, Sections 403.702, et seq., Florida Statutes ("F.S."), and the rules promulgated and authorized in Title 62, Florida Administrative Code ("F.A.C."). The Department has jurisdiction over the matters addressed in this Order.

3. Respondent is a "person" within the meaning of Sections 403.031(5) and 403.703(22), F.S.

3. Respondent is responsible for the long-term care, monitoring, and maintenance of a Class I Sanitary Landfill, known as the Stock Island Landfill ("Landfill"), located at 5701 West Junior College Road, Stock Island, in Monroe County, Florida ("Facility"). The Facility's Facility ID Number is WACS #79636.

4. Respondent operates the long-term care plan for the Facility under Permit No. 89-0466 which expires on April 24, 2016.

5. The Department and Respondent agree to repair the closed landfill, due to subsidence of waste and erosion of cover, in accordance with the CH2MHILL Repair Submittal ("Submittal") of March 5, 2009. A copy of the Submittal is attached as Exhibit II.

Having reached a resolution of the matter Respondent and the Department mutually agree and it is

ORDERED:

7. Respondent shall comply with the following corrective actions within the stated time periods:

a) By June 1, 2010, Respondent shall complete all repairs to the landfill cap addressed in the Submittal to the Department's satisfaction.

b) Respondent shall notify the Department's Marathon Branch Office one week prior to starting the repairs.

c) Respondent shall submit weekly reports to the Department's Marathon Branch Office each Friday, by fax to (305) 289-2314, or by email to Barbara.Nevins@dep.state.fl.us summarizing all repair work done, all repair work anticipated to be done for the following week, and completion of the project.

d) By June 30, 2010, Respondent shall submit a certification of completion of construction signed and sealed by a Professional Engineer, licensed in the state of Florida. The form for this submittal is attached in Exhibit I. The completed form shall be sent to the Department of Environmental Protection, Post Office Box 2549, Fort Myers, Florida 33902.

8. Within 20 days of the effective date of this Order, Respondent shall pay the Department $ 500.00 for costs and expenses incurred by the Department during the investigation of this matter and the preparation and tracking of this Order.

9. Respondent agrees to pay the Department stipulated penalties in the amount of $ 100.00 per day for each and every day Respondent fails to timely comply with any of the requirements of paragraph(s) 7 of this Order. The Department may demand stipulated penalties at any time after violations occur. Respondent shall pay stipulated penalties owed within 30 days of the Department's issuance of written demand for payment, and shall do so as further described in paragraphs 10 and 11, below. Nothing in this paragraph shall prevent the Department from filing suit to specifically enforce any terms of this Order.

10. Respondent shall make all payments required by this Order by cashier's check or money order. Payment instruments shall be made payable to the "Department of Environmental Protection" and shall include both the OGC number assigned to this Order and the notation "Ecosystem Management and Restoration Trust Fund."

11. Except as otherwise provided, all submittals and payments required by this Order shall be sent to Department of Environmental Protection, Post Office Box 2549, Fort Myers, Florida 33902**.**

12. Respondent shall allow all authorized representatives of the Department access to the Facility and the Property at reasonable times for the purpose of determining compliance with the terms of this Order and the rules and statutes administered by the Department.

13. In the event of a sale or conveyance of the Facility or of the Property upon which the Facility is located, if all of the requirements of this Order have not been fully satisfied, Respondent shall, at least 30 days prior to the sale or conveyance of the Facility or Property, (a) notify the Department of such sale or conveyance, (b) provide the name and address of the purchaser, operator, or person(s) in control of the Facility, and (c) provide a copy of this Order with all attachments to the purchaser, operator, or person(s) in control of the Facility. The sale or conveyance of the Facility or the Property does not relieve Respondent of the obligations imposed in this Order.

14. If any event, including administrative or judicial challenges by third parties unrelated to Respondent, occurs which causes delay or the reasonable likelihood of delay in complying with the requirements of this Order, Respondent shall have the burden of proving the delay was or will be caused by circumstances beyond the reasonable control of Respondent and could not have been or cannot be overcome by Respondent's due diligence. Neither economic circumstances nor the failure of a contractor, subcontractor, materialman, or other agent (collectively referred to as "contractor") to whom responsibility for performance is delegated to meet contractually imposed deadlines shall be considered circumstances beyond the control of Respondent (unless the cause of the contractor's late performance was also beyond the contractor's control). Upon occurrence of an event causing delay, or upon becoming aware of a potential for delay, Respondent shall notify the Department by the next working day and shall, within seven calendar days notify the Department in writing of (a) the anticipated length and cause of the delay, (b) the measures taken or to be taken to prevent or minimize the delay, and (c) the timetable by which Respondent intends to implement these measures. If the parties can agree that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of Respondent, the time for performance hereunder shall be extended. The agreement to extend compliance must identify the provision or provisions extended, the new compliance date or dates, and the additional measures Respondent must take to avoid or minimize the delay, if any. Failure of Respondent to comply with the notice requirements of this paragraph in a timely manner constitutes a waiver of Respondent's right to request an extension of time for compliance for those circumstances.

15. The Department, for and in consideration of the complete and timely performance by Respondent of the obligations agreed to in this Order, hereby conditionally waives its right to seek judicial imposition of damages or civil penalties for violations outlined in this Order. This waiver is conditioned upon (a) Respondent's complete compliance with all of the terms of this Order, and (b) the remediation of contaminated areas to the applicable site rehabilitation levels. The Department's cause of action for damages accrues when the

Department concludes that remediation of contaminated areas to the applicable site rehabilitation levels is not feasible or that the Respondent failed to completely implement the Department-approved remedial or corrective action plan (however designated). If the Department and Respondent fail to reach agreement on the payment of the damages, the Department may initiate appropriate legal action to recover the damages as provided by law.

16. This Order is a settlement of the Department's civil and administrative authority arising under Florida law to resolve the matters addressed herein. This Order is not a settlement of any criminal liabilities which may arise under Florida law, nor is it a settlement of any violation which may be prosecuted criminally or civilly under federal law. Entry of this Order does not relieve Respondent of the need to comply with applicable federal, state, or local laws, rules, or ordinances.

17. The Department hereby expressly reserves the right to initiate appropriate legal action to address any violations of statutes or rules administered by the Department that are not specifically resolved by this Order.

18. Respondent is fully aware that a violation of the terms of this Order may subject Respondent to judicial imposition of damages, civil penalties up to $10,000.00 per day per violation, and criminal penalties.

19. Respondent acknowledges and waives its right to an administrative hearing pursuant to sections 120.569 and 120.57, F.S., on the terms of this Order. Respondent also acknowledges and waives its right to appeal the terms of this Order pursuant to section 120.68, F.S.

20. No modifications of the terms of this Order will be effective until reduced to writing, executed by both Respondent and the Department, and filed with the clerk of the Department.

21. The terms and conditions set forth in this Order may be enforced in a court of competent jurisdiction pursuant to sections 120.69 and 403.121, F.S. Failure to comply with the terms of this Order constitutes a violation of section 403.161(1)(b), F.S.

22. This Consent Order is a final order of the Department pursuant to section 120.52(7), F.S., and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, F.S. Upon the timely filing of a petition, this Consent Order will not be effective until further order of the Department.

23. Persons who are not parties to this Consent Order, but whose substantial interests are affected by it, have a right to petition for an administrative hearing under sections 120.569 and 120.57, Florida Statutes. Because the administrative hearing process is designed to formulate final agency action, the filing of a petition concerning this Consent Order means that the Department's final action may be different from the position it has taken in the Consent Order.

The petition for administrative hearing must contain all of the following information:

a) The OGC Number assigned to this Consent Order;

b) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding;

c) An explanation of how the petitioner's substantial interests will be affected by the Consent Order;

d) A statement of when and how the petitioner received notice of the Consent Order;

e) Either a statement of all material facts disputed by the petitioner or a statement that the petitioner does not dispute any material facts;

f) A statement of the specific facts the petitioner contends warrant reversal or modification of the Consent Order;

g) A statement of the rules or statutes the petitioner contends require reversal or modification of the Consent Order; and

h) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Consent Order.

The petition must be filed (received) at the Department's Office of General Counsel, 3900 Commonwealth Boulevard, MS# 35, Tallahassee, Florida 32399-3000 within 21 days of receipt of this notice. A copy of the petition must also be mailed at the time of filing to the District Office at Department of Environmental Protection, Post Office Box 2549, Fort Myers, Florida 33902. Failure to file a petition within the 21-day period constitutes a person's waiver of the right to request an administrative hearing and to participate as a party to this proceeding under sections 120.569 and 120.57, Florida Statutes. Before the deadline for filing a petition, a person whose substantial interests are affected by this Consent Order may choose to pursue mediation as an alternative remedy under section 120.573, Florida Statutes. Choosing mediation will not adversely affect such person's right to request an administrative hearing if mediation does not result in a settlement. Additional information about mediation is provided in section 120.573, Florida Statutes and Rule 62-110.106(12), Florida Administrative Code.

24. Rules referenced in this Order are available at http://www.dep.state.fl.us/legal/Rules/rulelistnum.htm.

25. Except as expressly provided in this Order, all terms of the original 1989 Order and Amendments described in Paragraph 1 of this Order shall remain in full force and effect.

26. The date of filing this Order remains July 27, 1989.

FOR THE RESPONDENT:

_____ _____

Craig Cates, Mayor Date
City of Key West

DONE AND ORDERED this ____ day of _____, 2010, in Lee County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

_____
Jon M. Iglehart
District Director
South District

Filed, on this date, pursuant to section 120.52, F.S., with the designated Department Clerk, receipt of which is hereby acknowledged.

_____ _____
Clerk Date

Copies furnished to:

Lea Crandall, Agency Clerk
Mail Station 35

SW_CO (REV. 06/09)

EXHIBIT I

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE OFFICE OF THE
SOUTH FLORIDA DISTRICT

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Complainant,

vs.

CITY OF KEY WEST

Respondent

OGC Case No. 89-0466

CONSENT ORDER

This Consent Order is entered into between the State of Florida, Department of Environmental Regulation (hereinafter "Department") and the City of Key West (hereinafter "Respondent").

The Department finds and Respondent admits the following:

1. The Department of Environmental Regulation is the administrative agency of the State of Florida charged with the authority to administer and enforce Chapter 403, Florida Statutes (F.S.), and the rules promulgated thereunder in Florida Administrative Code Chapters 17-3, 17-4, 17-6, and 17.701.

2. Respondent, is a municipal corporation of the State of Florida and is a person within the meaning of Section 403.031(5), Florida Statutes.

3. Respondent, owns and operates a Class I Sanitary Landfill, known as the Stock Island Landfill (herein after Landfill) located on 5701 West Junior College Road, Stock Island in Monroe County, Latitude 24° 34'42" N, Longitude 81° 44'49" W, Section 27, Township 67S, Range 35E.

4. On May 28, 1985, the Department issued to Respondent a permit (S044-085293) to operate the Landfill. The permit was due to expire initially on May 28, 1987, however the Department granted extensions through February 1, 1989.

5. On February 8, 1988, Respondent timely submitted a permit application (S044-145007) in accordance with FAC rule 17-4.090 to vertically expand the existing Landfill. A topographic survey was performed in June, 1987 and showed the elevation height of the landfill to be approximately eighty-six feet. As of February 8, 1988, the elevation height is over 90 feet. The submitted permit application (SO44-145OO7) includes revisions to the originally proposed closure plan to provide a vertical landfill expansion to one hundred ten feet elevation height. Another proposed revision included the relocation of the perimeter road which in part would encroach on jurisdictional wetlands. As such, Respondent submitted a wetland resource regulation (WRR) permit application (441534639) for Department review. As the final landfill design is dependent on the Department's final action on the WRR permit application and the final action on the Corps of Engineers' permit application (88IPG-21015), the Department suggested to Respondent that the final engineering drawings and other pertinent information, to support solid waste permit application S044-145007, be submitted after the Department's final action on the WRR permit application and the Corps of Engineers' final action.

6. In order to continue operating, the Landfill must meet current requirements of the Florida Administrative Code (FAC) Rules. The Landfill must have a liner and leachate collection

system as specified in F.A.C. Rules 17-701.050(3) through 17-701.050(4). Based upon the submitted plans, the Respondent may not be able to satisfy these requirements. In accordance with F.A.C. Rule 17-701.050(1) and current Department policy, a landfill may not be issued a construction or operation permit for lateral or vertical expansion after January 1, 1987 without meeting the current requirements of Chapter 17-701, F.A.C.

7. Respondent presently has a technical consulting engineering firm on contract for the purpose of investigating, advising, proposing, planning and engineering solutions for the waste management functions of the Respondent.

8. The Landfill is the principal facility utilized at present by the City of Key West for solid waste disposal.

9. In view of the imminent closure of the Landfill and the scarcity of land available to site another sanitary landfill it is imperative that the city immediately initiate steps which will result in the availability of facilities for solid waste disposal and resource recovery which comply with the provisions and requirements of Chapter 403, Florida Statutes, and Rules of the Department, including Florida Administrative Rules 17-2, 17-3, 17-4 and 17-701.

10. The Department and the Respondent have discussed this matter and have agreed upon a mutually acceptable course of action.

THEREFORE, having reached a resolution of the matter pursuant to Florida Administrative Code Rule 17-103.110(3), the Department and the Respondent mutually agree and it is

ORDERED:

11. Respondent shall publish the following notice in a

newspaper of general circulation in Monroe County, Florida. The notice shall be published one time only within 14 days after execution of the Consent Order by the Department. Respondent shall submit an affidavit to the Department as proof of publication.

State of Florida Department of Environmental Regulation

Notice of Proposed Agency Action

The Department of Environmental Regulation gives notice of agency action of entering into a Consent Order with City of Key West pursuant to Rule 17-103.110(3), Florida Administrative Code. The Consent Order addresses the continued operation of the Stock Island Landfill while the process of selecting, acquiring, permitting and constructing a new landfill site is finalized. The Consent Order is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the South Florida District Office, Department of Environmental Regulation, 2269 Bay Street, Fort Myers, Florida 33901, and the South Florida District Branch Office located at 11400 Overseas Highway, Suite 123, Marathon, Florida 33050.

Persons whose substantial interests are affected by the Department's proposed Consent Order decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code (F.A.C.), and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within twenty-one (21) days of publication of this notice. Failure to file a petition within the twenty-one (21) days constitutes a waiver of any right such person has to an

administrative determination (hearing) pursuant to Section 120.57, F.S.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, F.A.C., at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009 Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene with the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S.

12. Respondent shall submit completed engineering plans (plot plans and cross-sectional views) with associated supportive information describing the proposed revisions to permit S044-085293 within ninety days of receiving final agency action on the WRR permit application No. 441534639 and final agency action by the COE on permit application No. 88IPG-21015.

13. Respondent shall complete phase I closure of the Landfill within eighteen (18) months of the effective date of this Order.

14. Respondent, by official action of its City Commission, shall within eighteen (18) months of the effective

date of this order hear presentations on the method or methods by which it proposes to replace the functions provided by the landfill.

15. A selection of the method to be used will be made within twenty-four (24) months after the effective date of this order. The method or methods selected shall comply with Department standards, as set forth in Chapter 403, Florida Statutes and Florida Administrative Rules 17-2, 17-3, 17-4 and 17-701. In the event that the method selected does not require construction of a waste disposal facility by the Respondent, paragraph Nos. 16, 17, 18, and 19 shall not remain in effect.

16. Within twenty-four months of the effective date of this Order Respondent shall have purchased land or have an option to purchase property sufficient to accommodate the methods selected in paragraph No. 15. Land condemnation procedures outside the control of Respondent may necessitate additional time to satisfy the requirements of this order upon approval by the Department. If this occurs, the conditions of this Order shall be amended accordingly.

17. The Respondent shall submit necessary applications for the construction of the facility identified in Paragraph No. 15 above, within twenty-six (26) months from the effective date of this Order.

18. Respondent and its engineer shall attend technical advisory committee meetings (TAC) with the Department as necessary to discuss the proposed plan.

19. Respondent shall advertise for bids for construction of the facilities referred to in paragraph No. 16

above within six (6) weeks of receipt of all necessary permits, licenses, and authorizations from local, State, and Federal agencies. Bid openings shall be 6 weeks after the bid advertisement. The construction contract shall be executed within three (3) months of the bid opening.

20. Respondent shall complete phase II closure within fifteen (15) months after the execution of contracts specified in paragraph 19 above, or within fifteen (15) months of the implementation of an alternative procedure for solid waste disposal, if such alternative does not require construction of a facility by the Respondent.

21. Respondent shall submit progress reports to the Department quarterly. These reports shall outline the occurrence of events in compliance with this Consent Order.

22. The Department authorizes the Respondent to operate the Landfill subject to the following thirteen (13) general conditions and twenty nine (29) specific conditions. The Landfill shall be authorized to serve its current functions which include the codisposal of Class I solid waste, Class III solid waste, construction/demolition debris, and combustor ash.

I. GENERAL CONDITIONS:

A. The terms, conditions, requirements, limitations, and restrictions set forth herein are binding upon the Respondent and enforceable pursuant to the authority of Section 403.161, 403.727, or 403.859 through 403.861, Florida Statutes (F.S.). The Respondent is hereby placed on notice that the

Department will review this authorization periodically and may initiate enforcement action for any violation of the conditions by the Respondent, its agent, employees, servants or representatives.

B. This order is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this Order may constitute grounds for revocation and enforcement action by the Department.

C. As provided in Subsections 403.087(6) and 403.722(5) F.S., the issuance of this Order does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This Order does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

D. This Order conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state

opinion as to title.

E. This Order does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the Respondent to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by any order from the Department.

F. The Respondent shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the Respondent to achieve compliance with the conditions of this Order, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the Order and when required by Department rules.

G. The Respondent, by accepting this Order, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the described activity is located or conducted for the purpose of:

1. Having access to and copying any records that must be kept under the conditions of the Order;
2. Inspecting the facility, equipment, practices,

or operations regulated or required under this Order; and

3. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this Order or Department rules. Reasonable time may depend on the nature of the concern being investigated.

H. If, for any reason, the Respondent does not comply with or will be unable to comply with any condition or limitation specified in this Order, the Respondent shall immediately notify and provide the Department with the following information:

1. a description of and cause of non-compliance; and
2. the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The Respondent shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or revocation of this Order.

I. In accepting this Order, the Respondent understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this facility, which are

submitted to the Department, may be used by the Department as evidence in any enforcement case arising under the Florida Statutes or Department rules, except where such use is prescribed by Section 403.73 and 403.111, F.S.

J. The Respondent agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided however, the Respondent does not waive any other rights granted by Florida Statutes or Department rules.

K. This Order is required to be kept at the work site of the facility during the entire period of construction or operation.

L. The Respondent shall comply with the following monitoring and record keeping requirements:

1. Upon request, the Respondent shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.
2. The Respondent shall retain at the facility or other location designated by this Order records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this Order, and records of

all data used to complete the application for this Order. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

3. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurement;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

M. When requested by the Department, the Respondent shall within a reasonable time furnish any information required by law which is needed to determine compliance with the Order. If the Respondent becomes aware that relevant facts were not submitted or were incorrect in this Order or in any report to the Department, such facts or information shall be submitted or corrected promptly.

II. SPECIFIC CONDITIONS:

A. The Respondent shall provide for the collection, control and treatment of surface runoff from the site as necessary to meet the water quality

standards of Chapters 17-3 and 17-4, Florida Administrative Code (F.A.C.), for the receiving waters at the boundary of the "site". The "site" is defined as the waste disposal area and not the total property area.

B. All solid waste other than combustor ash, white goods, tire stock piles, and Class III wastes, shall be spread in layers of approximately two (2) feet in thickness and compacted to approximately one (1) foot in thickness before the next layer is applied.

C. All compacted solid waste shall be formed into cells with working face and side grades at a slope no steeper than three (3) feet horizontal to one (1) foot vertical.

D. The working face of a cell shall be kept as narrow as is consistent with the proper operation of trucks and equipment to minimize exposed areas.

E. Fugitive dust shall be controlled.

F. All waste other than combustor ash, white goods, tire stockpiles and Class III waste shall receive initial cover at the end of each working day. If the application of water is ineffective in controlling fugitive dust, initial cover shall be applied to the combustor ash.

G. Pesticides used to control rodents, flies, and other insects shall be as specified by the Florida Department of Agriculture and Consumer Services (Chapter 5E-2, Florida Administrative Code), and be available on site for use as necessary.

H. Uncontrolled and unauthorized scavenging shall not be permitted at the sanitary landfill site. Controlled salvaging may be permitted by the local authority responsible for the facility.

I. All records and data relating to the operation of the solid waste control facility shall be made available for inspection by the DER's staff in the offices of the Respondent. The landfill site shall be open for inspection by Department employees during normal hours of operation.

J. No open burning is permitted at this site.

K. No waste shall be disposed of in the water.

L. Signs indicating operating agent, hours of operation, traffic flow, user charges and other pertinent information shall be posted at the entrance to the landfill. A sign indicating that the facility does not accept hazardous and bio-hazardous wastes shall also be posted at the landfill entrance.

M. The solid waste control facility and the immediate area thereof shall be maintained in a clean condition.

N. The site of operations shall be easily accessible by trucks and cars, with all-weather access roads maintained in a dust free condition.

O. Gas generation from waste decomposition shall be controlled.

P. Operation and maintenance of the site shall be

under the direction of a qualified person. After January 1, 1990, landfill operator(s) must satisfactorily complete an operator training course approved by the Department.

Q. Portable litter fences shall be installed as needed downwind of the working face to help control blowing papers and litter.

R. Ground litter shall be collected periodically and transferred to the working face for proper disposal.

S. Respondent shall contact the DER District Office in Fort Myers or the local office in Marathon prior to accepting asbestos wastes.

T. White goods shall be stockpiled at a designated area of the landfill for monthly collection by a contracted hauler. Respondent shall by the fifteenth of each month submit a receipt to the DER District Office in Fort Myers acknowledging the quantity of white goods removed by the hauler for the preceding month.

U. Respondent shall submit a report quarterly to the Department's office in Fort Myers indicating the quantity of waste disposed of at the Landfill each month during that period. If possible the waste should be categorized as combustor ash, construction/demolition debris, Class I waste or Class III waste.

V. Respondent shall maintain at least two (2) water pumps and hoses "operation-ready" on site at all times. These pumps must be of suitable size and design to extinguish landfill fires.

W. Respondent shall maintain a berm on the waterward side of the perimeter access road to prevent direct surface stormwater discharge to State waters.

X. Respondent shall maintain the mangrove fringe along the waterward side of the perimeter berm along the canal and gulf sides in the following manner: Mangroves shall be maintained viable on two (2) foot centers. Two rows, two feet apart, shall be maintained. All areas requiring additional plantings shall be performed timely as needed. Respondent shall thereafter inspect the fringe monthly and perform any required maintenance.

Y. Monitoring Requirements: All three ground water monitoring wells shall be sampled and analyzed quarterly for the following parameters:

1. Total Dissolved Solids
2. Lead
3. Mercury
4. Chromium
5. Cadmium
6. Zinc

A copy of the monitoring report shall be sent to the Marathon and Fort Myers D.E.R. offices within fifteen (15) days after it is received by the Respondent.

Z. Respondent shall submit evidence of financial responsibility in accordance with FAC rule 17-701.076 within thirty (30) days of the effective date of this Order.

AA. Closure Schedule: The Respondent shall at least one year prior to the projected date when wastes will no longer be accepted at the site under this Order, provide written notice to the Department District office with a

schedule for cessation of waste acceptance and landfill closure in accordance with guidelines set forth in Chapter 17-701 Florida Administrative Code.

BB. Closure Plan Submittal: At least 90 days prior to the date when wastes will not longer be accepted at the site under this Order, the Respondent shall submit a closure plan in accordance with the requirements of Florida Administrative Code Rule 17-701.073. Upon approval by the Department., the Closure Plan shall become an addendum to this Consent Order.

CC. These conditions do not exempt the Respondent from complying with requirements of other state; municipal, county or regional pollution control rules, regulations, ordinances or codes.

23. Respondent shall submit a written request withdrawing solid waste permit application number S044-145007 within fourteen (14) days of the effective date of this Order.

24. The Department, for and in consideration of the complete and timely performance by Respondent of the duties and obligations set forth in paragraphs 1 through 20 of this Consent Order, hereby waives its right to seek judicial imposition of damages, penalties or other relief for the alleged violations outlined in this Consent Order. The aforementioned waiver shall become null and void in the event the Respondent fails to comply with the time periods specified herein, absent written authorization from the Department except for circumstances beyond the control of the Respondent as set forth in Paragraphs 16

and 30.

25. Respondent has the right to petition for a variance to the closure rules of F.A.C. 17-701.070 as it applies to the Stock Island Landfill.

26. Except as provided below in paragraph No. 27, the Respondent waives its right to an administrative hearing on the terms of this Consent Order under Section 120.57, Florida Statutes, and its right to appeal this Consent Order pursuant to Section 120.68, Florida Statutes.

27. If the Respondent objects to any determination made by the Department regarding the Respondent's responses to this Order or compliance with the terms of this Order, the Respondent may file a Petition for Formal or Informal Administrative Hearing Proceedings. The burden of proof is on the Respondent herein to prove that the Department's determination is unreasonable. The Petition must conform with the requirements of Florida Administrative Code Rule 28-5.201, and must be received by the Department Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301, within fourteen (14) days after receipt of notice from the Department of any determination the Respondent wishes to challenge. Failure to file a Petition within this time period shall constitute a waiver by Respondent of its right ot request an administrative proceeding under Section 120.57, Florida Statutes.

28. Entry of this Consent Order does not exempt Respondent from complying with other federal, state or local laws, regulations, or ordinances.

29. The terms and conditions set forth in this

Consent Order may be enforced in a court of competent jurisdiction pursuant to Sections 120.69 and 403.121, Florida Statutes. Failure to comply with the terms of this Consent Order shall constitute a violation of Section 403.161(1)(b), Florida Statutes.

30. In the event the Respondent is temporarily unable to comply with any of the conditions of this Order, he shall notify the District Office of the DER immediately. Notification shall include pertinent information as to cause of problem and what corrective measures are being taken to prevent its reoccurrence. If the problem is due to circumstances beyond the control of the Respondent, the conditions of this Order shall be amended accordingly.

31. Respondent shall pay $250.00 for each day of each violation of the requirements of paragraphs 13, 15, 17 and 20.

32. Respondent is fully aware that a violation of the terms of this Consent Order may subject Respondent to judicial imposition of damages, civil penalties up to $10,000. per offense and criminal penalties.

33. Respondent shall allow all authorized representatives of the Department access to the property at reasonable times for the purpose of determining compliance with the terms of this Consent Order and the rules of the Department.

34. The Department hereby expressly reserves the right to initiate appropriate legal action to prevent or prohibit future violations of applicable statutes or the rules promulgated thereunder not covered by the terms of this Consent Order.

35. No modification of the terms of this Consent Order shall be effective until reduced to writing and executed by

both the Respondent and the Department.

36. This Consent Order is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely filing of a petition this Consent Order will not be effective until further order of the Department.

For the Respondent:

July 20, 1989
Date

Richard H. Witker
City Manager

DONE AND ORDERED THIS 27Th day of July, 1989, in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Philip R. Edwards
Deputy Assistant Secretary
South Florida District
2269 Bay Street
Fort Myers, Florida 33901
Telephone: (813) 332-2667

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to S 120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Vanessa Olivieu
CLERK

7-27-89
DATE

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the following was furnished by U.S. Mail to Richard H. Witker this 27th day of July, 1989.

Ronald D. Blackburn
Environmental Administrator

6/9

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE OFFICE OF THE
SOUTH FLORIDA DISTRICT

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Complainant

vs.

CITY OF KEY WEST

Respondent

OGC Case No. 89-0466

CONSENT ORDER AMENDMENT NO. 1

This first amendment to Consent Order is entered into, between the State of Florida, Department of Environmental Regulation (hereinafter "Department") and the City of Key West (hereinafter "Respondent).

WITNESSETH:

WHEREAS, the parties hereto previously entered into a Consent Order (OGC Case No. 89-0466) dated July 27, 1989, and the parties wish to amend said Consent Order;

NOW, THEREFORE, in consideration of the findings and orders contained herein and in the original Consent Order dated July 27, 1989, the parties agree as follows:

1. Paragraph No. 17 of the original Consent Order between the parties is amended in its entirety to read as follows:

17. The Respondent shall submit necessary applications for the construction of the facility identified in Paragraph No. 15 above, within twenty-six (26) months from the effective date of this order. "Facility" as referenced in the previous sentence shall be limited to a replacement landfill or other disposal option for the ultimate disposal of ash and/or solid waste. Applications for transfer stations and other storage and handling facilities for ash and/or solid waste are not included.

2. Paragraph No. 20 of the original Consent Order between the parties is amended in its entirety to read as follows:

20. Respondent shall complete Phase II closure within fifteen (15) months after the execution of contracts specified in Paragraph No. 19 above, or by November 30, 1993, if the disposal alternative selected under Paragraph No. 15 above does not require construction of a solid waste disposal facility by the Respondent.

3. Add a new Paragraph No. 20A to the original Consent Order between the parties, which paragraph shall read as follows:

20A. The Respondent shall submit necessary applications for construction of a solid waste transfer station at least eighteen (18) months prior to the completion date for Phase II closure.

4. Add a new Paragraph No. 20B to the original Consent Order between the parties, which paragraph shall read as follows:

20B. The Respondent shall establish a closure/post-closure escrow account pursuant to FAC 17-701.076. The account shall be established and funded as follows:

- The estimated cost of Phase II closure shall be deposited to the account in equal monthly increments between October 1990 and November 1993.

- The estimated post-closure cost shall be deposited to the account in equal monthly increments between October 1990 and September 1996.

7/9

5. Add a new Paragraph No. 37 to the original Consent Order between the parties, which paragraph shall read as follows:

37. This Consent Order Amendment No. 1 is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely filing of a petition this Consent Order Amendment No. 1 will not be effective until further order of the Department.

For the Respondent:

May 8, 1991
Date

G. Felix Cooper
City Manager
City of Key West

DONE AND ORDERED THIS 1st day of August, 1991, in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to § 120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Vanessa Oliveira 8-1-91
CLERK DATE

Phillip R. Edwards
Deputy Assistant Secretary
South Florida District
2269 Bay Street
Fort Myers, Florida 33901
Telephone: (813) 332-2667

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the following was furnished by U.S. Mail to G. Felix Cooper this 1st day of August, 1991.

Ronald D. Blackburn
Environmental Administrator

RESOLUTION NO. 92-280

A RESOLUTION APPROVING AND AUTHORIZING EXECUTION OF ATTACHED CONSENT ORDER AMENDMENT NO. 2 BETWEEN THE CITY OF KEY WEST AND STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION; PROVIDING AN EFFECTIVE DATE.

BE IT RESOLVED by the City Commission of the City of Key West, Florida as follows that the attached Consent Order Amendment No. 2 between the City of Key West and State of Florida, Department of Environmental Regulation is hereby approved. The City Manager is hereby authorized to execute said Consent Order Amendment No. 2 on behalf of the City of Key West, and the City Clerk is hereby authorized to attest to his signature and affix the Seal of the City thereto.

This Resolution shall go into effect immediately upon its passage and adoption and authentication by the signatures of the presiding officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held this 7th day of July, 1992.

DENNIS J. WARDLOW, MAYOR

ATTEST:

THE CITY OF KEY WEST
POST OFFICE BOX 1409
KEY WEST, FLORIDA 33041

July 10, 1992

Mr. Philip R. Edwards
Florida Department of Environmental Reg.
2295 Victoria Avenue, Suite 364
Fort Myers, Fl., 33901

Dear Mr. Edwards:

Enclosed is a certified copy of Resolution No. 92-280 approving and authorizing execution of Consent Order Amendment No. 2 between the City of Key West and State of Florida, Department of Environmental Regulation. Also enclosed is Consent Order Amendment No. 2 executed by the City of Key West. Please send this office a fully executed copy for our files.

This Resolution was passed and adopted by the City Commission of the City of Key West at a meeting held July 7, 1992.

Sincerely,

Josephine Parker
City Clerk

jp

Enclosures

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE OFFICE OF THE
SOUTH FLORIDA DISTRICT

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Complainant

vs.

CITY OF KEY WEST

Respondent

OGC Case No. 89-0466

CONSENT ORDER AMENDMENT NO. 2

This second amendment to Consent Order is entered into, between the State of Florida, Department of Environmental Regulation (hereinafter "Department") and the City of Key West (hereinafter "Respondent).

WITNESSETH:

WHEREAS, the parties hereto previously entered into a Consent Order (OGC Case No. 89-0466) dated July 27, 1989 amended August 1, 1991, and the parties wish to amend said Consent Order;

NOW, THEREFORE, in consideration of the findings and orders contained herein and in the amended Consent Order dated August 1, 1991, the parties agree as follows:

1. Paragraph No. 20B of the amended Consent Order between the parties is amended in its entirety to read as follows:

20B. The Respondent shall establish a closure escrow account pursuant to FAC 17-701.076. The estimated cost of Phase II closure shall be deposited to the account in equal monthly increments between October 1990 and November 1993.

2. Add a new Paragraph No. 20C to the amended Consent Order between the parties, which paragraph shall read as follows:

20C. At the time of closing, and each year thereafter, the Respondent shall deposit into a long-term care escrow account sufficient funds to cover the following year's long-term care costs. The long-term care costs of the landfill shall be paid from the solid waste enterprise fund.

3. Add a new Paragraph No. 38 to the amended Consent Order between the parties, which paragraph shall read as follows:

38. This Consent Order Amendment No. 2 is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely filing of a petition this Consent Order Amendment No. 2 will not be effective until further order of the Department.

For the Respondent:

July 10, 1992
Date

G. Felix Cooper
City Manager
City of Key West

Attest:

Josephine Parker, City Clerk.

10012E8B.GNV-1

DONE AND ORDERED THIS ____ day of _____, 1992, in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____

Philip R. Edwards
Director of District Management
South Florida District
2295 Victoria Avenue
Suite 364
Fort Myers, Florida 33901
Telephone: (813) 332-6975

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the following was furnished by U.S. Mail to G. Felix Cooper this ____ day of _____, 1992.

_____

Ronald D. Blackburn
Environmental Administrator

EXHIBIT II

CH2M HILL
6410 5th Street
Suite 2-A
Key West, FL 33040-5835
Tel 305.294.1645
Fax 305.294.4913

CH2MHILL

March 5, 2009

Mr. Charles Emery, III
Environmental Administrator
Solid Waste Section
Florida Department of Environmental Protection
South District Office
P.O. Box 2549
Fort Myers, FL 33902-2549

Subject: Monroe County - SW
Stock Island Landfill
OGC Case No. 89-0466
Long-Term Care Period
Erosion of Cover and Subsidence of Waste

Dear Mr. Emery:

This letter serves as a response to your letter dated February 12, 2009 regarding the long-term care of cover erosion and subsidence at the Stock Island Landfill. Your comments are typed below in **bold**, followed by City of Key West responses:

Item No. 5, Water Quality Monitoring – Due to the projects minimal disturbance of the landfill, no additional ground or surface water sampling will be required provided leachate is not discharged outside of the original landfill footprint. Please provide assurances that all leachate generated by the repair project will be contained within the landfill footprint.

Response: During the repair of the liner system, temporary earthen berms will be constructed around the areas to be repaired to contain leachate should any be generated or seep out of the landfill during the repair activities. Any collected leachate will be disposed at the wastewater treatment plan. The radar images from local weather station will be monitored closely during the repair. Two hours before a rainstorm predicted arrival at Stock Island, repair work will be stopped and the exposed areas will be covered the thin PVC liner to prevent direct contact of rainwater with waste.

Item No. 8, Site Plan and Pertinent Cross Sections to Indicate the Vertical and Horizontal Extent of the Repair along with a Narrative – It is understood that a final report will not be possible until completion of all subsidence and geomembrane repairs. However, a preliminary report is requested.

Response: Figures 1 through 5 show the approximate location and details of the proposed liner system repairs. At the completion of the repair work, the location and extent of each repair will be shown on a site plan.

Item No. 9, Address Expense from Financial Assurance Escrow Account and the City's Arrangement to Bring the Balance to the Required Level – Please be aware that this item should be addressed in your next Financial Estimate.

Response: Typically, the City does not pay for long-term care expenses from their escrow account. Long-term care expenses for repairs, maintenance and monitoring are paid for annually from the City's solid waste operating budget, which is funded from solid waste rates. The escrow account is held in reserve as a restricted cash account on the City's balance sheet.

Item No. 10, A Time Schedule for Completion of the Repair – Please submit a tentative schedule for completion of the repairs.

Response: Repair work is tentatively scheduled for May 2009 pending Department approval of the repair plan. The exact date of the repair work will be provided to the Department at least one week prior to the initiation of the repair activity

It is understood that signed and sealed copies for the Repair Operations Plan will be submitted to the Department.

Response: Acknowledged. A signed and sealed copy of the previously submitted Repair Operations Plan is included with this submittal.

Sincerely,

CH2M HILL

R. J. Bruner III, P.E.
Sr. Project Manager

Enclosures

City of Key West

Gary Bowman
Director of General Services

cc: Andy Smyth/KWF
Barbara Nevins/FDEP Marathon

RECEIVED - D.E.P.
APR 01 2009
SOUTH DISTRICT

Operation Plan

Repair of Subsidence and PVC Geomembrane Cover at Stock Island landfill, City of Key West

Prepared for:
City of Key West

Prepared by:

CH2MHILL

December 2008

Background

The stock Island landfill was closed in two phases; Phase I was closed in 1990 and Phase II was closed in 1992. The landfill was closed by placing 18 inches of screening sand over one layer of 30-mil PVC geomembrane which, in turn, overlies 6 inches of bedding sand.

In February 2008, two areas of subsidence were observed. The general areas of subsidence are described below:

Subsidence Area - Southwest Face (See photographs in Attachment A)

The area of subsidence on the southwest face of the landfill begins in the first terrace swale (approximately elevation 40) and extends up the slope approximately 50 feet. The area extends approximately 80 feet northwest to southeast along the face of the slope and is approximately 3 feet deep at it deepest point. There was no evidence of soft spots or hollow areas beneath the geomembrane. The slopes from the edge of the subsidence to the center were relatively flat, and there was no evidence of surface cracking or slope failure. The recommended remediation for this area is backfilling with clean fill material and grading to approximately the original design slope. Following the completion of the grading, the area should be sodded with Bahia grass or other drought tolerance ground cover.

Subsidence Area – North Face (See photographs in Attachment B)

The area of subsidence on the north face of the landfill begin approximately 1/3 of the way up the lower slope below the first terrace swale and extends up the slope approximately 25 feet. The area extends approximately 30 to 35 feet west to east along the face of the slope and is approximately 3 to 4 feet deep at it deepest point. There was no evidence of soft spots or hollow areas beneath the geomembrane. The slopes from the edge of the subsidence to the center were relatively steep and there was evidence of surface cracking at the top of the area of subsidence. The recommended remediation for this area is to expose and replace the geomembrane in the area of subsidence, backfill the area with clean fill material and grade to approximately the original design slope. The geomembrane repair should extend approximately 5 feet in all directions beyond the area of subsidence or areas of visible geomembrane damage. Clean bedding sand should be placed beneath the new geomembrane. Following the completion of the geomembrane repair and grading, the area should be sodded with Bahia grass or other drought tolerance ground cover.

Subsidence and Geomembrane Repair Plan

During the repair of the cover system, wastes may be encountered. When waste is exposed, air, dust, landfill gas, leachate, and associated odors may be generated. The following operation plan should be followed closely during the repair of subsidence and PVC geomembrane.

Landfill Gas monitoring

Air monitoring and sampling should be conducted in accordance with Section 5.0 of the Health and Safety Plan (see Attachment C). In general, methane gas should be monitored in accordance with the following specifications:

Instrument	Tasks	Action Levels[a]	Action to be Taken when Action Level reached	Frequency[b]	Calibration
Hydrogen Sulfide Sensor	Excavation Liner Repair	< 10 ppm > 10 ppm ppm	Level D Evacuate work area and allow the area to off gas. Contact HSM	Initially and periodically during task	Daily
Methane Detector	Excavation Liner Repair	< 25% LEL > 25% LEL	Level D Provide mechanical ventilation.	Initially and periodically during task	Daily

[a] Action levels apply to sustained breathing-zone measurements above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).
[c] If the measured percent of O_2 is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O_2 action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O_2 action levels are required for confined-space entry (refer to Section 2 in Health and Safety Plan).

Odor and Dust Control

During the excavation of screening sand to expose PVC geomembrane and repair of the PVC geomembrane, the excavation area should be controlled to a workable area to minimize the exposure of waste and to prevent direct contact of waste with rain water. Each exposed area should be repaired and closed before the end of working day or before the rain storm comes.

Leachate Control

To prevent the direct contact of rain water with waste, a temporary earthen berm should be constructed on upslope side of the excavation. If leachate is observed seeping out of broken geomembrane, the leachate should be collected and disposed at City of Key West wastewater treatment plant.

PVC Geomembrane Installation Quality Assurance Plan

The installer's qualification, PVC geomembrane physical properties, chemical adhesive properties, geomembrane installation, seaming, placing of screening sand over geomembrane, and field quality control are presented in PVC Geomembrane specifications in Attachment D.

After the removal of cover sand, if the geomembrane is observed in tension and voids may exist under the geomembrane, the geomembrane should be cut and the voids should be filled with screening sand. The entire area of subsidence will be capped with geomembrane.

Final Side Slope Integrity

At the completion of the subsidence and geomembrane repair, the final side slope should be graded to no steeper than 3 horizontal to 1 vertical. The repaired areas should be sodded with Bahia grass for erosion protection.

Health and Safety Plan

A health and safety plan for the workers to be working at the site is presented in Attachment C. The plan will be closely enforced during the repair of the subsidence and PVC geomembrane.

Attachment A

Photographs
Area of Subsidence on Southwest Face of Stock Island Landfill

Stock Island Landfill – Southwest Face – View East

Stock Island Landfill – Southwest Face – View North

Stock Island Landfill – Southwest Face – View South

Stock Island Landfill – Southwest Face – View North

Attachment B

Photographs
Area of Subsidence on North Face of Stock Island Landfill

Stock Island Landfill – North Face – View South

Stock Island Landfill – North Face – View West

Stock Island Landfill – North Face – View Northeast

Stock Island Landfill – North Face – View West

Attachment C

Health and Safety Plan

CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Enterprise-wide Core Standards (CS) and Standard Operating Procedures (SOPs), as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Safety Coordinator (SC) is to be familiar with the CSs and SOPs and the contents of these instructions. CH2M HILL's personnel and subcontractors must be trained on this plan and sign Attachment 1.

Project Information and Background

PROJECT NO: 383471.WP.02

CLIENT: City of Key West

PROJECT/SITE NAME: Stock Island Landfill

SITE ADDRESS: Stock Island, Key West, Florida

CH2M HILL PROJECT MANAGER: Bo Bruner

CH2M HILL OFFICE: GNV

DATE HEALTH AND SAFETY PLAN PREPARED: December 11, 2008

DATE(S) OF SITE WORK: December/January 2008/2009

SITE BACKGROUND AND SETTING: Subsidence Area - Southwest Face The area of subsidence on the southwest face of the landfill begins in the first terrace swale (approximately elevation 40) and extends up the slope approximately 50 feet. The area extends approximately 80 feet northwest to southeast along the face of the slope and is approximately 3 feet deep at it deepest point. There was no evidence of soft spots or hollow areas beneath the geomembrane. The slopes from the edge of the subsidence to the center were relatively flat, and there was no evidence of surface cracking or slope failure.

The area of subsidence on the north face of the landfill begin approximately 1/3 of the way up the lower slope below the first terrace swale and extends up the slope approximately 25 feet. The area extends approximately 30 to 35 feet west to east along the face of the slope and is approximately 3 to 4 feet deep at it deepest point. There was no evidence of soft spots or hollow areas beneath the geomembrane. The slopes from the edge of the subsidence to the center were relatively steep and there was evidence of surface cracking at the top of the area of subsidence.

1.0 Tasks to be Performed under this Plan

1.1 Description of Tasks

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Table 1) has been performed for each task and is incorporated in this plan through task-

specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin

1.1.1 Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. **Prior approval from the Responsible Health and Safety Manager (RHSM) is required before these tasks are conducted on regulated hazardous waste sites.**

TASKS	CONTROLS
• General heavy equipment work (excavation, grading, etc.) • Landfill Liner Repair • • • •	• Brief on hazards, limits of access, and emergency procedures • Post contaminant areas as appropriate (refer to Section 8.2 for details) • Sample and monitor as appropriate (refer to Section 5.0)

Table 1 Hazard Analysis

(Refer to Section 2.0 for Hazard Controls)

POTENTIALHAZARDS	Project Activities									
	Excavation	Liner Repair								
Arsenic										
Asbestos Hazard										
Chemical Hazard-Dermal/Inhalation	x	X								
Confined Space Entry										
Excavations	X									
Fall Protection	X									
Fire Prevention	X	X								
Hand & Power Tools	X	X								
Heavy Equipment	X									
Hexavalent Chromium										
Manual Lifting	X	X								
Methylene Chloride										
Noise	X	X								
Utilities (underground/overhead)	X									
Vehicle Traffic	X	X								
Visible Lighting	X	X								
Work Alone										
Work Over Water										

2.0 Hazard Controls

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 RHSM for clarification.

The health and safety hazards posed by field activities have been identified for each project activity and are provided in the Hazard Analysis Table (Table 1). Hazard control measures for project-specific and general H&S hazards are provided in 2.1 and 2.2 of this section.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 5. 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 RHSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records.

Applicable project activity self-assessment checklists (see Attachment 5) shall be completed weekly by a CH2M HILL representative during the course of the project depending on the work performed at the time.

2.1 Project-Specific Hazards

2.1.1 Excavation Activities

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

Excavation Entry

This section applies to all excavation entry regardless of the party in control of the excavation.

Do not enter the excavations unless completely necessary, and only after the excavation competent person has completed their daily inspection and has authorized entry. An inspection shall be conducted by the competent person prior to the start of work, as needed throughout the shift, after every rainstorm, and after any hazard increasing occurrence. Documentation of the inspection must be maintained onsite at all times.

Follow all excavation entry requirements established by the excavation competent person and any excavation permit being used.

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. Protective systems for excavations deeper than 20 feet must be designed or approved by a registered professional engineer.

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.

Excavations shall not be entered when:

- Protective systems are damaged or unstable.

- Objects or structures above the work location may become unstable and fall into the excavation.
- The potential for a hazardous atmosphere exists, unless the air has been tested and found to be at safe levels.
- Accumulated water exists in the excavation, unless precautions have been taken to prevent excavation cave-in.

The Excavation HSE Self-Assessment Checklist may be used to evaluate excavations prior to entry.

- attached to a vertical lifeline and shall also be attached to a separate independent lifeline.

2.1.2 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:
  - be maintained in a fully charged and operable condition,
  - be 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.

2.1.3 Hand and Power Tools

(Reference CH2M HILL, SOP HSE-210, *Hand and Power Tools*)

- Tools shall be inspected prior to use and damaged tools will be tagged and removed from service.
- Hand tools will be used for their intended use and operated in accordance with manufacturers instructions and design limitations;
- Maintain all hand and power tools in a safe condition.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.
- Portable power tools will be plugged into GFCI protected outlets; and
- Portable power tools will be Underwriters Laboratories (UL) listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.
- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials.

- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof, etc.).
- When using a knife or blade tool, stroke or cut away from the body with a smooth motion. Be careful not to use excessive force that could damage the tool, the material being cut, or unprotected hands.
- Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors.

Machine Guarding

- Ensure that all machine guards are in place to prevent contact with drive lines, belts, chains, pinch points or any other sources of mechanical injury.
- Unplugging jammed equipment will only be performed when equipment has been shut down, all sources of energy have been isolated and equipment has been locked/tagged and tested.
- Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires lockout of that equipment prior to work.

2.1.4 Manual Lifting

(Reference CH2M HILL SOP HSE-112, *Manual Lifting*)

- Back injuries are the leading cause of disabling work and most back injuries are the result of improper lifting techniques or overexertion. Office or field tasks and activities involving manual lifting are to be identified and a program implemented to assist employees to mitigate the risks associated with manual lifting.
- When possible, the task should be modified to minimize manual lifting hazards.
- Effectiveness of manual handling control measures will be evaluated during assessments (HSE-114, Office & Warehouse Safety Program, or HSE-109, Audits).
- Manual handling incidents are reviewed as part of the HSE Program reviews, and the results influence program development, training, and education efforts.
- Lifting of loads weighing more than 40 pounds (18 kilograms) should be evaluated by the SC using the Lifting Evaluation Form contained in SOP HSE-112.
- Using mechanical lifting devices is the preferred means of lifting heavy objects such as forklifts; cranes, hoists, and rigging; hand trucks; and trolleys.
- Personnel shall seek assistance when performing manual lifting tasks that appear beyond their physical capabilities.
- Physical differences make it difficult to set up safe lifting limits, unless extensive individual testing is performed. In general, the following steps must be practiced when planning and performing manual lifts: Assess the situation before you lift; ensure good lifting and body positioning practices; ensure good carrying and setting down practices.
- All employees must receive training for the correct procedures to lift safely using the computer-based health and safety training or project-specific training.

2.1.5 Noise

(Reference CH2M HILL SOP HSE-108, *Hearing Conservation*)

- A noise assessment shall be conducted by the RHSM or designee based on potential to emit noise above 85 dBA.
- Areas or equipment emitting noise at or above 90dBA shall be evaluated to determine feasible engineering controls. When engineering controls are not feasible, administrative controls can be developed and appropriate hearing protection will be provided.
- Areas or equipment emitting noise levels at or above 85 dBA, hearing protection must be worn.
- Employees exposed to 84 dBA or a noise dose of 50% must participate in the Hearing Conservation program including initial and annual (as required) audiograms.
- The RHSM will evaluate appropriate controls measures and work practices for employees who have experienced a standard threshold shift (STS) in their hearing.
- Hearing protection is selected based upon noise levels and specific tasks to be performed.
- Employees are trained in the hazards of noise and how to properly wear and maintain their hearing protection.
- Hearing protection will be maintained in a clean and reliable condition, inspected prior to use and after any occurrence to identify any deterioration or damage, and damaged or deteriorated hearing protection repaired or discarded.
- In work areas where actual or potential high noise levels are present at any time, hearing protection must be worn by employees working or walking through the area.
- Areas where tasks requiring hearing protection are taking place may become hearing protection required areas as long as that specific task is taking place.
- High noise areas requiring hearing protection should be posted or employees must be informed of the requirements in an equivalent manner.

2.1.6 Traffic Control

(Reference CH2M HILL SOP HSE-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 reflective/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.

2.1.7 Utilities (underground)

Do not begin subsurface construction activities (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings and utility company searches must be supplemented with a geophysical or other survey by a qualified, independent survey contractor to identify additional and undiscovered buried utilities.

Examples of the type of geophysical technologies include:

- **Ground Penetrating Radar (GPR),** which can detect pipes, including gas pipes, tanks, conduits, cables etc, both metallic and non-metallic at depths up to 30 feet depending on equipment. Sensitivity for both minimum object size and maximum depth detectable depends on equipment selected, soil conditions, etc.
- **Radio Frequency (RF),** involves inducing an RF signal in the pipe or cable and using a receiver to trace it. Some electric and telephone lines emit RF naturally and can be detected without an induced signal. This method requires knowing where the conductive utility can be accessed to induce RF field if necessary.
- **Dual RF**, a modified version of RF detection using multiple frequencies to enhance sensitivity but with similar limitations to RF
- **Ferromagnetic Detectors**, are metal detectors that will detect ferrous and non-ferrous utilities. Sensitivity is limited, e.g. a 100 mm iron disk to a depth of about one meter or a 25 mm steel paper clip to a depth of about 20 cm.
- **Electronic markers,** are emerging technologies that impart a unique electronic signature to materials such as polyethylene pipe to facilitate location and tracing after installation. Promising for future installations but not of help for most existing utilities already in place.

Procedure

The following procedures shall be used to identify and mark underground utilities during subsurface construction activities on the project:

- The survey contractor shall determine the most appropriate geophysical technique or combinations of techniques to identify the buried utilities on the project, based on the survey contractor's experience and expertise, types of utilities anticipated to be present and specific site conditions.
- The survey contractor shall employ the same geophysical techniques used on the project to identify the buried utilities, to survey the proposed path of subsurface construction work to confirm no buried utilities are present.
- Identify customer specific permit and/or procedural requirements for excavation and drilling activities. For military installations contact the Base Civil Engineer and obtain the appropriate form to begin the clearance process.
- Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise of the proposed work, and ask them to establish the location of the utility underground installations prior to the start of actual excavation.
- Schedule the independent survey.
- Obtain utility clearances for subsurface work on both public and private property.
- Clearances are to be in writing, signed by the party conducting the clearance.
- Underground utility locations must be physically verified by hand digging using wood or fiberglass-handled tools when any adjacent subsurface construction activity (e.g. mechanical drilling, excavating) work is expected to come within 5 feet of the marked underground system. If subsurface construction activity is within 5 feet and parallel to a marked existing utility, the utility location must be exposed and verified by hand digging every 100 feet.
- Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the Project Manager must notify the utility company or utility protection service to inform them that the markings have been destroyed.
- Conduct a site briefing for employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation..
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon during drilling or change in color, texture or density during excavation that could indicate the ground has been previously disturbed).

2.1.8 Utilities (overhead)

Proximity to Power Lines

No work is to be conducted within 50 feet of overhead power lines without first contacting the utility company to determine the voltage of the system. No aspect of any piece of equipment is to be operated within 50 feet of overhead power lines without first making this determination.

Operations adjacent to overhead power lines are PROHIBITED unless one of the following conditions is satisfied:

- Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.

- The minimum clearance from energized overhead lines is as shown in the table below, or the equipment will be repositioned and blocked to ensure that no part, including cables, can come within the minimum clearances shown in the table.

MINIMUM DISTANCES FROM POWERLINES

Powerlines Nominal System Kv	Minimum Required Distance, Feet
0-50	10
51-100	12
101-200	15
201-300	20
301-500	25
501-750	35
751-1000	45

(These distances have been determined to eliminate the potential for arcing based on the line voltage.)

- The power line(s) has been isolated through the use of insulating blankets which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.
- All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the Project Manager/Construction Manager prior to the start of work.

2.1.9 Visible Lighting

- While work is in progress outside construction areas shall have at least 33 lux (lx).
- Construction work conducted inside buildings should be provided with at least 55 lux light.
- The means of egress shall be illuminated with emergency and non-emergency lighting to provide a minimum 11 lx measured at the floor. Egress illumination shall be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb will not leave any area in total darkness.

2.2 General Hazards

2.2.1 General Practices and Housekeeping

- Site work should be performed during daylight hours whenever possible.
- 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.
- Review the safety requirements of each job you are assigned to with your supervisor. You are not expected to perform a job that may result in injury or illness to yourself or to others.
- Familiarize yourself with, understand, and follow jobsite emergency procedures.
- Do not fight or horseplay while conducting the firm's business.
- Do not use or possess firearms or other weapons while conducting the firm's business.
- Report unsafe conditions or unsafe acts to your supervisor immediately.
- Report occupational illnesses, injuries, and vehicle accidents.
- Do not remove or make ineffective safeguards or safety devices attached to any piece of equipment.
- Report unsafe equipment, defective or frayed electrical cords, and unguarded machinery to your supervisor.
- Shut don and lock out machinery and equipment before cleaning, adjustment, or repair. Do not lubricate or repair moving parts of machinery while the parts are in motion.
- Do not run in the workplace.
- hen ascending or descending stairways, use the handrail and take one step at a time.
- Do not apply compressed air to any person or clothing.
- Do not wear steel taps or shoes with metal exposed to the sole at any CH2M HILL project location.
- Do not wear finger rings, loose clothing, wristwatches, and other loose accessories when within arm's reach of moving machinery.
- Remove waste and debris from the workplace and dispose of in accordance with federal, state, and local regulations.
- Note the correct way to lift heavy objects (secure footing, firm grip, straight back, lift with legs), and get help if needed. Use mechanical lifting devices whenever possible.

- Check toe work area to determine what problems or hazards may exist.

Personal Hygiene

- Keep hands away from nose, mouth, and eyes.
- Keep areas of broken skin (chapped, burned, etc.) covered.
- Wash hands with hot water and soap frequently prior to eating and smoking.

Drugs and Alcohol

The following situations pertaining to drugs and alcohol are prohibited:

- Use or possession of intoxicating beverages while performing CH2M HILL work
- Abuse of prescription or nonprescription drugs
- Regulations. Use or possession of illegal drugs or drugs obtained illegally
- Sale, purchase, or transfer of illegal or illegally obtained drugs
- Arrival at work under the influence of legal or illegal drugs or alcohol

2.2.2 Hazard Communication

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

The Hazard Communication Coordinator 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 required chemical-specific HAZCOM training using Attachment 3.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

2.2.3 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 RHSM or the Warehouse Coordinator for additional information.

2.2.4 Ultraviolet (UV) Radiation (sun exposure)

Health effects regarding UV radiation are confined to the skin and eyes. Overexposure can result in many skin conditions, including erythema (redness or sunburn), photoallergy (skin rash), phototoxicity (extreme sunburn acquired during short exposures to UV radiation while on certain medications), premature skin aging, and numerous types of skin cancer.

Acute overexposure of UV radiation to the eyes may lead to photokeratitis (inflammation of the cornea), also known as snow blindness. Symptoms include redness of the eyes and a gritty feeling, which progresses to pain and an inability to tolerate any kind of light. This condition can also occur when working in or around water and other UV radiation reflectors. In addition, long-term exposure to sunlight is thought to cause cataracts or clouding of the lens of the eye.

Limit Exposure Time

- Rotate staff so the same personnel are not exposed all of the time.
- Limit exposure time when UV radiation is at peak levels (approximately 2 hours before and after the sun is at its highest point in the sky).
- Avoid exposure to the sun, or take extra precautions when the UV index rating is high.

Provide Shade

- Take lunch and breaks in shaded areas.
- Create shade or shelter through the use of umbrellas, tents, and canopies.
- Fabrics such as canvas, sailcloth, awning material and synthetic shade cloth create good UV radiation protection.
- Check the UV protection of the materials before buying them. Seek protection levels of 95 percent or greater, and check the protection levels for different colors.

Clothing

- Reduce UV radiation damage by wearing proper clothing; for example, long sleeved shirts with collars, and long pants. The fabric should be closely woven and should not let light through.
- Head protection should be worn to protect the face, ears, and neck. Wide-brimmed hats with a neck flap or "Foreign Legion" style caps offer added protection.
- Wear UV-protective sunglasses or safety glasses. These should fit closely to the face. Wrap-around style glasses provide the best protection.

Sunscreen

- Apply sunscreen generously to all exposed skin surfaces at least 20 minutes before exposure, allowing time for it to adhere to the skin.
- Re-apply sunscreen at least every 2 hours, and more frequently when sweating or performing activities where sunscreen may be wiped off.
- Choose a sunscreen with a high sun protection factor (SPF). Most dermatologists advocate SPF 30 or higher for significant sun exposure.
- 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.

2.2.5 Heat 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 report it to their supervisor immediately to avoid progression of heat-related illness.

SYMPTOMS AND TREATMENT OF HEAT STRESS

	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and 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. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool– but not cold– water. Call 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.

2.3 Biological Hazards and Controls

2.3.1 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.

2.3.2 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.

2.3.3 Ticks

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only outside** of clothing with permethrin or permanone and spray skin with only DEET; and check yourself frequently for ticks.

If bitten by a tick, grasp it at the point of attachment and carefully remove it. After removing the tick, wash your hands and disinfect and press the bite areas. Save the removed tick. Report the bite to human resources. Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme: a rash might appear that looks like a bullseye with a small welt in the center. RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, seek medical attention.

2.3.4 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 your supervisor 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.

2.3.5 Bloodborne Pathogens

(Reference CH2M HILL SOP HSE-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 (PIM).

- Employees trained in first-aid/CPR or those exposed to PIM 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 PIM 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 receives the vaccine after exposure.)
- Employees who decline the HBV vaccine must sign the declination form (contact regional Safety Program Assistant [SPA]) 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 SPA.

- 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.

Post Exposure

CH2M HILL will provide exposed employees with a confidential medical examination should an exposure to PIM occur. 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

2.3.6 Mosquito Bites

Due to the recent detection of the West Nile Virus in the Southwestern United States it is recommended that **preventative measures** be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquito's 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.
- 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.

Contact the project RHSM with questions, and immediately report any suspicious symptoms to your supervisor/PM.

2.4 Radiological Hazards and Controls

Refer to CH2M HILL's Core Standard, Radiological Control and Radiological Controls Manual for additional requirements.

Hazards	Controls
None Known	None Required

2.5 Contaminants of Concern

Contaminants of Concern

Contaminant	Location and Maximum[a] Concentration (ppm)	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Methane	GW: SB: SS:	NA	5,000 ppm	Simple asphyxiant. Drowsiness; unconsciousness	12.98
Hydrogen sulfide	GW: SB: SS:	20 ppm	100 ppm	Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite	10.46

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).

[b] Appropriate value of PEL, REL, or TLV listed.

[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

Potential Routes of Exposure

Dermal: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

3.0 Project Organization and Personnel

3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL- SOPs HSE-113, Medical Surveillance, and HSE-110, Training)

The employees listed meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL- SOP HSE-120, *Reproductive Health*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
KR Chang	GNV	Field Team Lead	
TBD			

3.2 Field Team Chain of Command and Communication Procedures

3.2.1 Client

Contact Name: Gary Bowman
Phone: 305-809-3901
Mobile: 305-395-9933
Facility Contact Name: Fred (Red) Ball
Phone: (305) 809-3752
Mobile: (305) 797-2542

3.2.2 CH2M HILL

Program Manager: Bo Bruner/GNV
Project Manager (PM): Bo Bruner/GNV
Responsible Health and Safety Manager (RHSM): Michael Goldman/ATL
Field Team Leader: KR Chang
Safety Coordinator (SC): KR Chang

The PM is responsible for providing adequate resources (budget and staff) for project-specific implementation of the HS&E management process. The PM has overall management responsibility for the tasks listed below. The PM may explicitly delegate specific tasks to other staff, as described in sections that follow, but retains ultimate responsibility for completion of the following in accordance with this SOP:

- Include standard terms and conditions, and contract-specific HS&E roles and responsibilities in contract and subcontract agreements (including flow-down requirements to lower-tier subcontractors)
- Select safe and competent subcontractors by:
  - obtaining, reviewing and accepting or rejecting subcontractor pre-qualification questionnaires
  - ensuring that acceptable certificates of insurance, including CH2M HILL as named additional insured, are secured as a condition of subcontract award
  - including HS&E submittals checklist in subcontract agreements, and ensuring that appropriate site-specific safety procedures, training and medical monitoring records are reviewed and accepted prior to the start of subcontractor's field operations
- Maintain copies of subcontracts and subcontractor certificates of insurance (including CH2M HILL as named additional insured), bond, contractors license, training and medical monitoring records, and site-specific safety procedures in the project file accessible to site personnel
- Provide oversight of subcontractor HS&E practices per the site-specific safety plan
- Manage the site and interfacing with 3rd parties in a manner consistent with our contract and subcontract agreements and the applicable standard of reasonable care
- Ensure that the overall, job-specific, HS&E goals are fully and continuously implemented

The CH2M HILL RHSM is responsible for:

- Review and accept or reject subcontractor pre-qualification questionnaires that fall outside the performance range delegated to the Contracts Administrator (KA)
- Review and accept or reject subcontractor training records and site-specific safety procedures prior to start of subcontractor's field operations
- Support the oversight of subcontractor (and lower-tier subcontractors) HS&E practices and interfaces with on-site 3rd parties per the site-specific safety plan

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

- Verify this HSP is current and amended when project activities or conditions change.
- Verify CH2M HILL site personnel and subcontractor personnel read the HSP and sign Attachment 1, Employee Sign-Off 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 this HSP and applicable subcontractor health and safety plan(s)
- Act as the project "Hazard Communication Coordinator" and perform the responsibilities outlined in Section 2.2.2

- Act as the project "Emergency Response Coordinator" and perform the responsibilities outlined in Section 9.
- Post OSHA job-site poster; the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established.
- 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 and 6, are being used as outlined in Section 2.
- Perform oversight and/or assessments of subcontractor HS&E practices per the site-specific safety plan and verify that project activity self-assessment checklists, found in Attachment 6, are being used as outlined in Section 2
- Verify that project files available to site personnel include copies of executed subcontracts and subcontractor certificates of insurance (including CH2M HILL as named additional insured), bond, contractors license, training and medical monitoring records, and site-specific safety procedures prior to start of subcontractor's field operations
- Manage the site and interfacing with 3rd parties in a manner consistent with our contract/subcontract agreements and the applicable standard of reasonable care
- Coordinate with the RHSM regarding CH2M HILL and subcontractor operational performance, and 3rd party interfaces
- Ensure that the overall, job-specific, HS&E goals are fully and continuously implemented

The training required for the SC is as follows:

- SC-Initial and SC-Construction
- OSHA 10-hour course for Construction
- First Aid and CPR
- Relevant Competent Person Courses (excavation, confined space, scaffold, fall protection, etc.)

The SC is responsible for contacting the Field Team Leader and Project Manager. In general, the Project Manager will contact the client. The RHSM should be contacted as appropriate.

3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HSE-215, *Contracts and Subcontracts)*

Subcontractor: **TBD**
Subcontractor Contact Name:
Telephone:

The subcontractors listed above are required to submit their own Accident Prevention Plan, specific to this project. Other plans, such as Lead or Asbestos Abatement Compliance plans, may be required as well. Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit their plans to CH2M HILL for review before the start of field work.

Subcontractors are also required to prepare an Activity Hazard Analysis (AHA) before beginning each activity posing H&S hazards to their personnel using the AHA form provided in Attachment 6 as a guide. The AHA shall identify the principle steps of the activity, potential H&S hazards for

each step and recommended control measures for each identified hazard. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

CH2M HILL should continuously endeavor to observe subcontractors' safety performance and adherence to their Accident Prevention Plan and AHAs. 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. Self-assessment checklists contained in Attachment 5 are to be used by CH2M HILL personnel to review subcontractor performance. CH2M HILL oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

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 PM and RHSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

4.0 Personal Protective Equipment (PPE)

(Reference CH2M HILL- SOP HSE-117, *Personal Protective Equipment*)

- PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.
- A PPE assessment has been conducted by the RHSM based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the RHSM or designee.
- Employees must be trained to properly wear and maintain the PPE.
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage.
- PPE must be maintained in a clean and reliable condition.
- Damaged PPE shall not be used and must either be repaired or discarded.
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance.

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 [a]

Task	Level	Body	Head	Respirator [b]
General site entry Excavation Liner Repair	D	Work clothes; safety toed leather work boots and gloves	Hardhat [c] Safety glasses with side shields Ear protection [d]	None required

Reasons for Upgrading or Downgrading Level of Protection

Upgrade [f]	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels (Section 5) exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decrease the hazard. • Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

[b] No facial hair that would interfere with respirator fit is permitted.

[c] Hardhat and splash-shield areas are to be determined by the SSC.

[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

[e] Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

[f] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

5.0 Air Monitoring/Sampling

(Reference CH2M HILL SOP HSE-207, Exposure Monitoring for Airborne Chemical Hazards)

5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels[a]	Action to be Taken when Action Level reached	Frequency[b]	Calibration
Hydrogen Sensor	Excavation Liner Repair	< 10 ppm > 10 ppm ppm	Level D Evacuate work area and allow the area to off gas. Contact HSM	Initially and periodically during task	Daily
Methane Detector	Excavation Liner Repair	< 10 ppm > 10 ppm	Level D Evacuate work area and allow the area to off gas. Contact HSM	Initially and periodically during task	Daily

[a] Action levels apply to sustained breathing-zone measurements above background.

[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

[c] If the measured percent of O_2 is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O_2 action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O_2 action levels are required for confined-space entry (refer to Section 2).

[d] Refer to SOP HS-10 for instructions and documentation on radiation monitoring and screening.

[e] Noise monitoring and audiometric testing also required.

5.2 Calibration Specifications

Refer to the respective manufacturer's instructions for proper instrument/maintenance procedures

6.0 Decontamination

(Reference CH2M HILL SOP HSE-218, *Hazardous Waste Operations*)

The SC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SC. The SC must ensure that procedures are established for disposing of materials generated on the site.

7.0 Spill Containment Procedures

Sorbent material will be maintained in the support zone. Incidental spills will be contained with sorbent and disposed of properly.

8.0 Site-Control Plan

8.1 Site-Control Procedures

(Reference CH2M HILL SOP HSE-218, *Hazardous Waste Operations)*

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location in accordance with CH2M HILL- SOP, *OSHA Postings.*
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Initial air monitoring is conducted by the SC in appropriate level of protection.
- The SC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

9.0 Emergency Response Plan

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

9.1 Pre-Emergency Planning

- The Emergency Response Coordinator (ERC) 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.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- 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.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital. Drills should take place periodically but no less than once a year.
- Brief new workers on the emergency response plan.
- The ERC will evaluate emergency response actions and initiate appropriate follow-up actions.

9.2 Emergency Equipment and Supplies

The ERC should mark the locations of emergency equipment on the site map and post the map.

Emergency Equipment and Supplies	Location
20 (or two 10) class A,B,C fire extinguisher	
First aid kit	
Eye Wash	
Emergency Shower	
Potable water	
Bloodborne-pathogen kit	
Additional equipment (specify):	

9.3 Incident Response

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

- Notify appropriate response personnel.
- Shut down CH2M HILL operations and evacuate the immediate work area.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.
- Implement HSE-111, Incident Notification, Reporting and Investigation.
- Notify and submit reports to clients as required in contract.

Small fires or spills posing minimal safety or health hazards may be controlled with onsite spill kits or fire extinguishers without evacuating the site. When in doubt evacuate. Follow the incident reporting procedures in Section 5.7.

9.4 Emergency Medical Treatment

Emergency medical treatment is needed when there is a life-threatening injury (such as severe bleeding, loss of consciousness, breathing/heart has stopped). When in doubt if an injury is life-threatening or not, treat it as needing emergency medical treatment.

- Notify 911 or other appropriate emergency response authorities as listed in Attachment 4.
- The ERC 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, perform decontamination (if applicable) where feasible; lifesaving and first aid or medical treatment takes priority.
- Initiate first aid and CPR where feasible.
- Notify supervisor and if the injured person is a CH2M HILL employee. The supervisor will call the occupational nurse at 1-800-756-1130 and make other notifications as required by HSE SOP-111, *Incident Notification, Reporting and Investigation.*
- Make certain that the injured person is accompanied to the emergency room.
- Follow the Serious Incident Reporting process in HSE SOP-111, Incident Notification, Reporting and Investigation.
- Notify and submit reports to client as required in contract

9.5 Evacuation

- Evacuation routes, assembly areas, and severe weather shelters (and alternative routes and assembly areas) are to be specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the ERC or designee before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The ERC and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The ERC will account for all personnel in the onsite assembly area.

- A designated person will account for personnel at alternate assembly area(s).
- The ERC will follow the incident reporting procedures in Section 5.7.

9.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

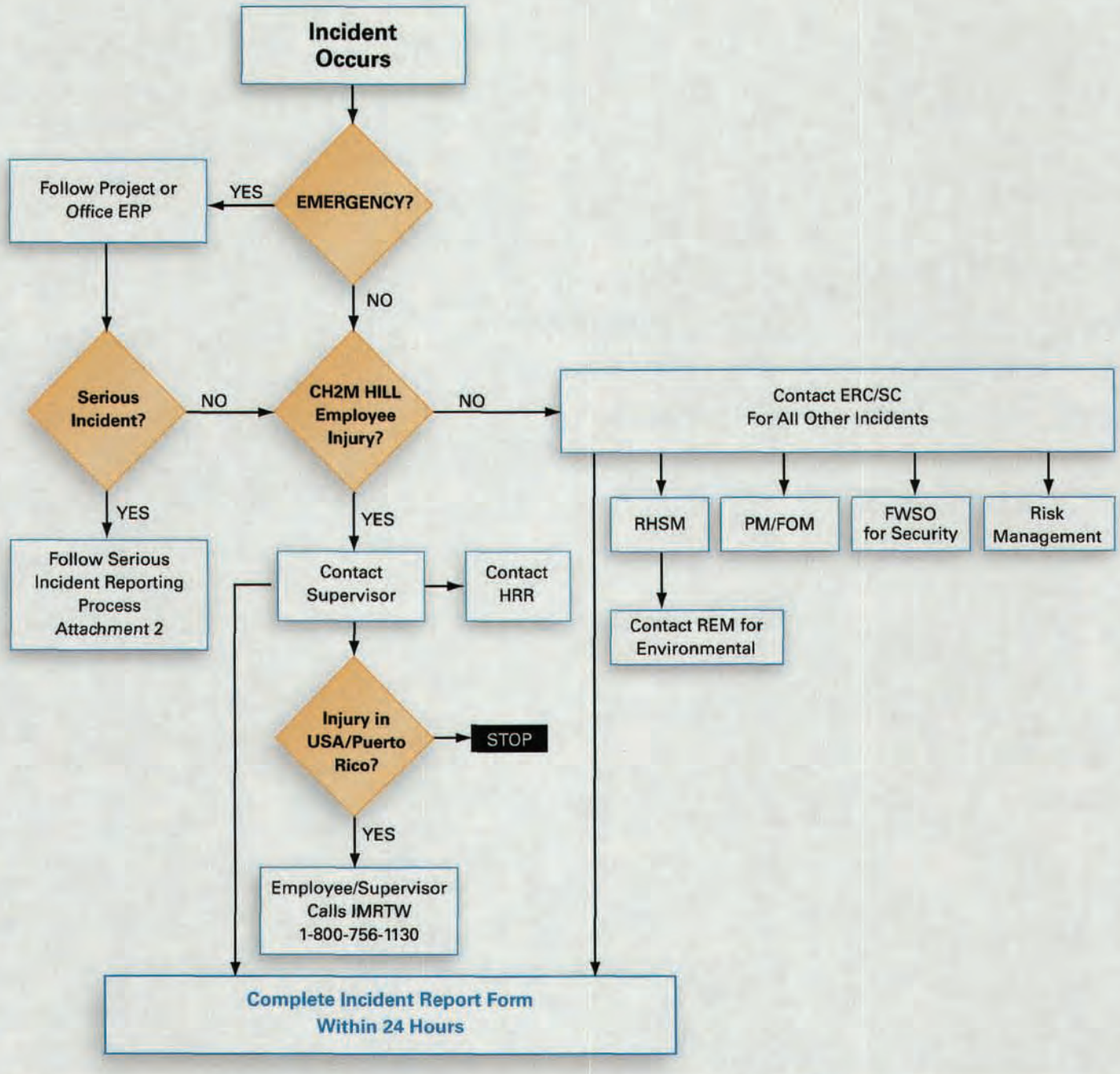
9.7 Incident Notification and Reporting

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

- If you are injured at work, notify your supervisor immediately and contact the Injury Management/Return-to-Work toll free number (for US and Puerto Rico) 1-800-756-1130. All supervisors must contact their Human Resources Representative and complete the employee injury/illness in the Incident Report Form (IRF) in the HITS database within 24 hours of the incident
- Immediately notify the Project Manager (PM), Emergency Response Coordinator (ERC), and/or Responsible Health and Safety Manager (RHSM) for any project incident (fire, spill/release, injury/illness, near miss, property damage, or security-related)
- Report any **serious incidents** (life-threatening injury/illness, death, kidnap/missing person, terrorism, property damage greater than $500K, significant environmental release) **immediately** to your ERC, PM, or RHSM. The Serious Incident Reporting number is 720-286-4911.
- For serious incidents, the Corporate Legal Department will determine who completes the IRF.
- For CH2M HILL subcontractor incidents, immediately notify the ERC and HSM to complete and submit an IRF.
- The RHSM will inform the Responsible Environmental Manager (REM) of any environmental incidents.
- Evaluation and follow-up of the IRF will be completed by the type of incident by the RHSM, REM, or FWSO. The Business Group (BG) HSE Lead will review all BG incidents and modify as required.
- Incident Investigations must be initiated and completed as soon as possible but no later than 72 hours after the incident.
- See the following flowcharts for Immediate Incident Reporting and Serious Incident Reporting.

CH2MHILL

Attachment 1
CH2M HILL Immediate Incident Notification



ERC = Emergency Response Coordinator (designated in Emergency Response Plan)
ERP = Emergency Response Plan
FOM = Facility Office Manager
FWSO = Firm Wide Security Operations
HRR = Human Resources Representative
IMRTW = Injury Management/Return-to-Work
PM = Project Manager
REM = Responsible Environmental Manager
RHSM = Responsible Health & Safety Manager
SC = Safety Coordinator

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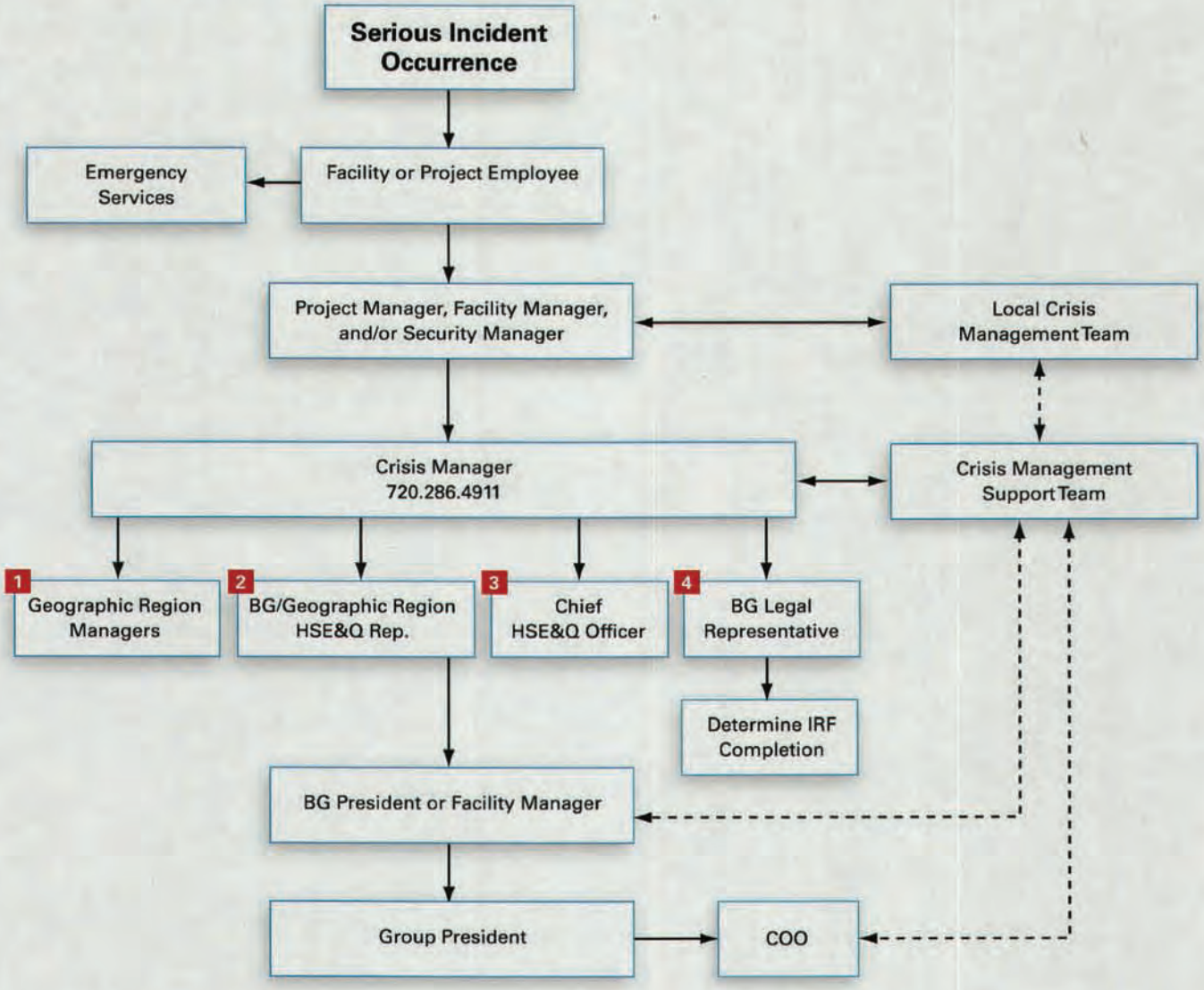
CH2MHILL

Attachment 2
CH2M HILL Serious Incident Notification



LEGEND:

Direct line of communication

Indirect line of communication

DEFINITIONS:

Local Crisis Management Team: Team comprised of key facility, project and/or business group personnel. Team is assembled as necessary and as appropriate to effectively manage and respond to a crisis situation (serious incident) at/on scene.

Crisis Management Support Team: Team comprised of key corporate personnel. Team is assembled as necessary and as appropriate to effectively support, direct, and /or supplement a Local Crisis Management Team.

Crisis Manager: Corporate based Crisis Manager, contactable by pager 24/7.

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10.0 Behavior Based Loss Prevention System

A Behavior Based Loss Prevention System (BBLPS) is a system to prevent or reduce losses using behavior-based tools and proven management techniques to focus on behaviors or acts that could lead to losses.

The four basic Loss Prevention tools that will be used CH2M HILL projects to implement the BBLPS include:

- Activity Hazard Analysis (AHA)
- Pre-Task Safety Plans (PTSP)
- Loss Prevention Observations (LPO)
- Loss and Near Loss Investigations (NLI)

The SC or designated CH2M HILL representative onsite is responsible for implementing the BBLPS on the project site. The Project Manager remains accountable for its implementation. The SC or designee shall only oversee the subcontractor's implementation of their AHAs and PTSPs processes on the project.

10.1 Activity Hazard Analysis

An Activity Hazard Analysis (AHA) defines the activity being performed, the hazards posed and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work and their input is solicited prior, during and after the performance of work to further identify the hazards posed and control measures required.

Activity Hazard Analysis will be prepared before beginning each project activity posing H&S hazards to project personnel using the AHA form provided in Attachment 6. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

An AHA shall be prepared for all field activities performed by CH2M HILL and subcontractor activities during the course of the project. Hazard Controls (found in Sections 2.0 and its subsections of the HSP), the Hazard Analysis Table (Table 1), and applicable CH2M HILL CSs and SOPs should be used as a basis for preparing AHAs.

CH2M HILL subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by CH2M HILL. Each subcontractor shall submit AHAs for their field activities, as defined in their work plan/scope of work, along with their project-specific safety plan/accident prevention plan. Additions or changes in CH2M HILL or subcontractor field activities, equipment, tools or material to perform work or additional/different hazard encountered that require additional/different hazard control measures requires either a new AHA to be prepared or an existing AHA to be revised.

10.2 Pre-Task Safety Plans

Daily safety meetings are held with all project personnel in attendance to review the hazards posed and required H&S procedures/AHAs, that apply for each day's project activities. The PTSPs serve the same purpose as these general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on those hazards posed to individual work crews.

At the start of each day's activities, the crew supervisor completes the PTSP, provided in Attachment 6, with input from the work crew, during their daily safety meeting. The day's tasks, personnel, tools and equipment that will be used to perform these tasks are listed, along with the hazards posed and required H&S procedures, as identified in the AHA. The use of PTSPs, better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required H&S procedures with the crew each day. The use of PTSPs is a common safety practice in the construction industry.

10.3 Loss Prevention Observations

Loss Prevention Observations (LPO's) shall be conducted by SC or designee for specific work tasks or operations comparing the actual work process against established safe work procedures identified in the project-specific HSP and AHAs. LPO's are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. The SC or designee shall perform at least one LPO each week for tasks/operations addressed in the project-specific HSP or AHA. The SC or designee shall complete the LPO form in **Attachment 6** for the task/operation being observed.

10.4 Loss/Near Loss Investigations

Loss/Near Loss Investigations shall be performed for CH2M HILL and subcontractor incidents involving:

- Person injuries/illnesses and near miss injuries
- Equipment/property damage
- Spills, leaks, regulatory violations
- Motor vehicle accidents

The cause of loss and near loss incidents are similar, so by identifying and correcting the causes of near loss causes, future loss incidents may be prevented. The following is the Loss/Near Loss Investigation Process:

- Gather all relevant facts, focusing on fact-finding, not fault-finding, while answering the who, what, when, where and how questions.
- Draw conclusions, pitting facts together into a probable scenario.
- Determine incident root cause(s), which are basic causes on why an unsafe act/condition existed.
- Develop and implement solutions, matching all identified root causes with solutions.
- Communicate incident as a Lesson Learned to all project personnel.
- Filed follow-up on implemented corrective active action to confirm solution is appropriate.

The SC or designee shall perform an incident investigation, as soon as practical after incident occurrence during the day of the incident, for all Loss and Near Loss Incidents that occur on the project. Loss and Near Loss incident investigations shall be performed using the following incident investigation forms provided in **Attachment 6**:

- Incident Report Form (IRF)
- Root Cause Analysis Form

All Loss and Near Loss incident involving personal injury, property damage in excess of $1,000 or near loss incidents that could have resulted in serious consequences shall be investigated by completing the incident investigation forms and submitting them to the PM and RHSM within 24 hours of incident occurrence. A preliminary Incident Investigation and Root Cause Analysis shall be submitted to the Project Manager and RHSM within 24 hours of incident occurs. The final Incident Investigation and Root Cause Analysis shall be submitted after completing a comprehensive investigation of the incident.

11.0 Approval

This site-specific HSP has been written for use by CH2M HILL 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 plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

Original Plan

Written By: KR Chang **Date: December 11, 2008**

Approved By: Michael Goldman **Date: December 11, 2008**

Revisions

Revisions Made By: **Date:**

Revisions to Plan:

Revisions Approved By: **Date:**

12.0 Attachments

Attachment 1:	**Employee Signoff Form – Health and Safety Plan**
Attachment 2:	**Chemical Inventory/Register Form**
Attachment 3:	**Chemical-Specific Training Form**
Attachment 4:	**Emergency Contacts**
Attachment 5:	**Project Activity Self-Assessment Checklists/Permits**
Attachment 6:	**Behavior Based Loss Prevention Forms**
Attachment 7:	**Material Safety Data Sheets**

CH2M HILL Health and Safety Plan

Attachment 1

Health and Safety Plan Employee Sign-off Form

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name: **Project Number:**

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

CH2M HILL Health and Safety Plan

Attachment 2

Chemical Inventory/Register Form

CH2MHILL

CHEMICAL INVENTORY/REGISTER FORM

Refer to Standard of Practice HSE-107 Attachment 1 for instructions on completing this form.

Location: _____

HCC: _____

☐ Office ☐ Warehouse ☐ Laboratory ☐ Project: _____

Project No.: _____

Regulated Product	Location	Container labeled (✓if yes)	MSDS available (✓if yes)

MSDS for the listed products will be maintained at: _____

CH2M HILL Health and Safety Plan

Attachment 3

Chemical-Specific Training Form

CH2MHILL

CHEMICAL-SPECIFIC TRAINING FORM

Refer to Standard Operating Procedure HSE-107 Attachment 1 for instructions on completing this form.

Location:	Project # :
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.

CH2M HILL Health and Safety Plan

Attachment 4

Emergency Contacts

Emergency Contacts

24-hour CH2M HILL Emergency Beeper – 720-286-4911

If injured on the job, notify your supervisor and then call 1-800-756-1130 to contact CH2M HILL'S Occupational Nurse

Medical Emergency – 911
Facility Medical Response #: 305/294-5531
Local Ambulance #:911

CH2M HILL- Medical Consultant
Dr. Peter Greaney
GMG WorkCare, Orange, CA
800/455-6155

Urgent Care Facility

CH2M HILL Director Security Operations
Mollie Netherland/SEA
888-444-1226 (cell) or 206/453-5005 (office)

Fire/Spill Emergency -- 911
Facility Fire Response #: 911
Local Fire Dept #: 911

Responsible Health and Safety Manager (RHSM)
Name: Mike Goldman/ATL
Phone: 770/604-9095 ext. 396

Security & Police – 911
Facility Security #: 911
Local Police #: 911

Human Resources Department
Name: Elizabeth Brown/ATL
Phone:

Utilities Emergency Phone Numbers
Water: 911
Gas: 911
Electric:911

Worker's Compensation:
Sterling Administration Services
Phone: 800/420-8926

Safety Coordinator (SC)
Name: K. R. Chang
Phone: 352/335-5877-52360

Media Inquiries Corporate Strategic Communications
Name: John Corsi
Phone: (720) 286-2087

Project Manager
Name: Bo. Bruner
Phone: 352/335-5877-52305

Automobile Accidents:
Rental: Linda Anderson/COR 720/286-2401
CH2M HILL owned vehicle: Linda George 720-286-2057

Federal Express Dangerous Goods Shipping
Phone: 800/238-5355

CH2M HILL Dangerous Goods Shipping
Phone: 800/255-3924

Facility Alarms:

Evacuation Assembly Area(s):

Facility/Site Evacuation Route(s):

Directions to Local Hospital

Local Hospital
Lower Keys Medical Center Phone No. 305/294-5531
5900 College Road, Key West, Fl. 33040

CH2M HILL Health and Safety Plan

Attachment 5

Project Activity Self-Assessment Checklists/Permits/Forms

- Excavations

CH2MHILL

HS&E Self-Assessment Checklist – EXCAVATIONS

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: (1) CH2M HILL employees enter excavations (complete Sections 1 and 3), and/or (2) CH2M HILL oversight of an excavation subcontractor is required (complete entire checklist).

SC may consult with excavation subcontractors when completing this checklist, but shall not direct the means and methods of excavation operations nor direct the details of corrective actions. Excavation subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Conditions considered imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazardous area 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
☐ Evaluate a CH2M HILL subcontractor's compliance with excavation HS&E requirements
Subcontractor 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 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 HSE-32.

SECTION 1	Yes	No	N/A	N/O
EXCAVATION ENTRY REQUIREMENTS (4.1)				
1. Personnel have completed excavation safety training	☐	☐	☐	☐
2. Competent person has completed daily inspection and has authorized entry	☐	☐	☐	☐
3. Personnel are aware of entry requirements established by competent person	☐	☐	☐	☐
4. Protective systems are free from damage and in stable condition	☐	☐	☐	☐
5. Surface objects/structures secured from falling into excavation	☐	☐	☐	☐
6. Potential hazardous atmospheres have been tested and found to be at safe levels	☐	☐	☐	☐
7. Precautions have been taken to prevent cave-in from water accumulation in the excavation	☐	☐	☐	☐
8. Personnel wearing appropriate PPE, per HSP/FSI	☐	☐	☐	☐

SECTION 2	Yes	No	N/A	N/O
GENERAL (4.2.1)				
9. Daily safety briefing/meeting conducted with personnel	☐	☐	☐	☐
10. Excavation and protective systems adequately inspected by competent person	☐	☐	☐	☐
11. Defective protective systems or other unsafe conditions corrected before entry	☐	☐	☐	☐
12. Guardrails provided on walkways over excavation 6' (1.8m) or deeper	☐	☐	☐	☐
13. Barriers provided at excavations 6' or deeper when excavation not readily visible	☐	☐	☐	☐
14. Barriers or covers provided for wells, pits, shafts, or similar excavation 6' (1.8 m) or deeper	☐	☐	☐	
15. Earthmoving equipment operated safely (use earthmoving equipment checklist in HS-27)	☐	☐	☐	
PRIOR TO EXCAVATING (4.2.2)				
16. Dig permit obtained where required by client/facility	☐	☐	☐	☐
17. Location of underground utilities and installations identified	☐	☐	☐	☐
18. Excavation area evaluated for OE/UXO hazards	☐	☐	☐	☐
19. Soils characterized prior to excavation where contamination may be present	☐	☐	☐	☐
20. USDA (or local equivalent) soil permit obtained for soil transport, where required	☐	☐	☐	☐
21. Excavation area checked for wetlands, endangered species, cultural/historic resources	☐	☐	☐	☐
22. ACOE/CWA 404 (or local equivalent) permit obtained for wetlands, where required	☐	☐	☐	☐
23. Stockpile management plan prepared	☐	☐	☐	☐
24. Waste discharge/NPDES (or local equivalent) permit obtained for excavation dewatering	☐	☐	☐	☐
25. Stormwater pollution prevention or erosion & sediment control plan prepared, where required)	☐	☐	☐	☐
EXCAVATING ACTIVITIES (4.2.3)				
26. Rocks, trees, and other unstable surface objects removed or supported	☐	☐	☐	☐
27. Exposed underground utility lines supported	☐	☐	☐	☐
28. Undermined surface structures supported or determined to be in safe condition	☐	☐	☐	☐
29. Warning system used to remind equipment operators of excavation edge	☐	☐	☐	☐
30. Stockpile, excavation covers, liners, silt fences in place, where required	☐	☐	☐	☐
31. Fugitive dust suppressed	☐	☐	☐	☐
EXCAVATION ENTRY (4.2.4)				
32. Trenches > 4' (1.2 m) deep provided with safe means of egress within 25' (7.6 m)	☐	☐	☐	☐
33. Structure ramps designed and approved by competent person	☐	☐	☐	☐
34. Potential hazardous atmospheres tested prior to entry	☐	☐	☐	☐
35. Rescue equipment provided where potential for hazardous atmospheres exists	☐	☐	☐	☐
36. Ventilation used to control hazardous atmospheres and air tested frequently	☐	☐	☐	☐
37. Appropriate respiratory protection used when ventilation does not control hazards	☐	☐	☐	☐
38. Precautions taken to prevent cave-in from water accumulation in excavation	☐	☐	☐	☐
39. Precautions taken to prevent surface water from entering excavation	☐	☐	☐	☐
40. Protection provided from falling/rolling material from excavation face	☐	☐	☐	☐
41. Spoil piles, equipment, materials restrained or kept at least 2' (61 cm) from excavation edge	☐	☐	☐	☐
EXCAVATION PROTECTIVE SYSTEMS (4.2.5)				
42. Protective systems used for excavations 5' (1.5 m) or deeper, unless stable rock	☐	☐	☐	☐
43. Protective systems for excavation deeper than 20' (6.1 m) designed by registered PE	☐	☐	☐	☐
44. If soil unclassified, maximum allowable slope is 34 degrees	☐	☐	☐	☐
45. Protective systems free from damage	☐	☐	☐	☐
46. Protective system used according to manufacturer's recommendations and not subjected to loads exceeding design limits	☐	☐	☐	☐
47. Protective system components securely connected to prevent movement or failure	☐	☐	☐	☐
48. Cave-in protection provided while entering/exiting shielding systems	☐	☐	☐	☐
49. Personnel removed from shielding systems when installed, removed, or vertical movement	☐	☐	☐	☐

SECTION 2 (Continued)	Yes	No	N/A	N/O
PROTECTIVE SYSTEM REMOVAL AND BACKFILLING (4.2.6)				
50. Protective system removal starts and progresses from excavation bottom	☐	☐	☐	☐
51. Protective systems removed slowly and cautiously	☐	☐	☐	☐
52. Temporary structure supports used if failure of remaining components observed	☐	☐	☐	☐
53. Backfilling taking place immediately after protective system removal	☐	☐	☐	☐
54. Backfill certified clean when required by client or local regulation	☐	☐	☐	☐
EXCAVATING AT HAZARDOUS WASTE SITES (4.2.7)				
55. Waste disposed of according to HSP and RCRA regulations	☐	☐	☐	☐
56. Appropriate decontamination procedures being followed, per HSP	☐	☐	☐	☐
EXCAVATING AT POTENTIAL ORDNANCE EXPLOSIVES SITES (4.2.8)				
57. OE plan prepared and approved	☐	☐	☐	☐
58. OE/UXO avoidance provided, routes and boundaries cleared and marked	☐	☐	☐	☐
59. Personnel remain inside the marked boundary	☐	☐	☐	☐
60. Earthmoving equipment does not excavate closer than 1' (30.5 cm) to anomalies	☐	☐	☐	☐

<u>SECTION 3</u>

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

Auditor: ______________________________ Project Manager: ______________________________

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CH2M HILL Health and Safety Plan

Attachment 6

Behavior Based Loss Prevention System Forms

Activity Hazard Analysis

Pre-Task Safety Plans

Loss Prevention Observation

CH2MHILL

Pre-Task Safety Plan (PTSP)

Project: _____ Location: _____ Date: _____

Supervisor: _____ Job Activity: _____

Task Personnel:

List Tasks:

Tools/Equipment Required for Tasks (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools):

Potential H&S Hazards, including chemical, physical, safety, biological and environmental (check all that apply):

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

Other Potential Hazards (Describe):

Hazard Control Measures (Check All That Apply):			
PPE __ Thermal/lined __ Eye __ Dermal/hand __ Hearing __ Respiratory __ Reflective vests __ Flotation device	Protective Systems __ Sloping __ Shoring __ Trench box __ Barricades __ Competent person __ Locate buried utilities __ Daily inspections	Fire Protection __ Fire extinguishers __ Fire watch __ Non-spark tools __ Grounding/bonding __ Intrinsically safe equipment	Electrical __ Lockout/tagout __ Grounded __ Panels covered __ GFCI/extension cords __ Power tools/cord inspected
Fall Protection __ Harness/lanyards __ Adequate anchorage __ Guardrail system __ Covered opening __ Fixed barricades __ Warning system	Air Monitoring __ PID/FID __ Detector tubes __ Radiation __ Personnel sampling __ LEL/O2 __ Other	Proper Equipment __ Aerial lift/ladders/scaffolds __ Forklift/heavy equipment __ Backup alarms __ Hand/power tools __ Crane with current inspection __ Proper rigging __ Operator qualified	Welding & Cutting __ Cylinders secured/capped __ Cylinders separated/upright __ Flash-back arrestors __ No cylinders in CSE __ Flame retardant clothing __ Appropriate goggles
Confined Space Entry __ Isolation __ Air monitoring __ Trained personnel __ Permit completed __ Rescue	Medical/ER __ First-aid kit __ Eye wash __ FA-CPR trained personnel __ Route to hospital	Heat/Cold Stress __ Work/rest regime __ Rest area __ Liquids available __ Monitoring __ Training	Vehicle/Traffic __ Traffic control __ Barricades __ Flags __ Signs
Permits __ Hot work __ Confined space __ Lockout/tagout __ Excavation __ Demolition __ Energized work	Demolition __ Pre-demolition survey __ Structure condition __ Isolate area/utilities __ Competent person __ Hazmat present	Inspections: __ Ladders/aerial lifts __ Lanyards/harness __ Scaffolds __ Heavy equipment __ Cranes and rigging	Training: __ Hazwaste __ Construction __ Competent person __ Task-specific (THA) __ Hazcom
Field Notes:_____			

Name (Print): _____

Signature:_____ Date:_____

Safe Work Observation Form		
Project:	Observer:	Date:
Position/Title of worker observed:	Background Information/ comments:	
Task/Observation Observed:		

- ❖ Identify and reinforce safe work practices/behaviors
- ❖ Identify and improve on at-risk practices/acts
- ❖ Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards
- ❖ Proactive PM support facilitates eliminating/reducing hazards (do you have what you need?)
- ❖ Positive, corrective, cooperative, collaborative feedback/recommendations

Actions & Behaviors	Safe	At-Risk	Observations/Comments
Current & accurate Pre-Task Planning/Briefing (Project safety plan, STAC, AHA, PTSP, tailgate briefing, etc., as needed)			**Positive Observations/Safe Work Practices:**
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			**Questionable Activity/Unsafe Condition Observed:**
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			**Observer's Corrective Actions/Comments:**
Pace			
Uncomfortable/unsafe position			
Inconvenient/unsafe location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			**Observed Worker's Corrective Actions/Comments:**
Other…			

Activity:	**Date:**
	Project:
Description of the work:	**Site Supervisor:**
	Site Safety Officer:
	Review for latest use: Before the job is performed.

Work Activity Sequence (Identify the principal steps involved and the sequence of work activities)	**Potential Health and Safety Hazards** (Analyze each principal step for potential hazards)	**Hazard Controls** (Develop specific controls for each potential hazard)

Work Activity Sequence (Identify the principal steps involved and the sequence of work activities)	**Potential Health and Safety Hazards** (Analyze each principal step for potential hazards)	**Hazard Controls** (Develop specific controls for each potential hazard)

Equipment to be used (List equipment to be used in the work activity)	**Inspection Requirements** (List inspection requirements for the work activity)	**Training Requirements** (List training requirements including hazard communication)

CH2M HILL Health and Safety Plan

Attachment 7

Material Safety Data Sheets

Attachment D

Material and Installation Specifications for PVC Geomembrane

SECTION 33 47 13.04
GEOMEMBRANE–PVC

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
   b. D413, Standard Test Methods for Rubber Property—Adhesion to Flexible Substrate.
   c. D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
   d. D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
   e. D1004, Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
   f. D1203, Standard Test Methods for Volatile Loss from Plastics Using Activated Carbon Methods.
   g. D1204, Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
   h. D1239, Standard Test Method for Resistance of Plastic Films to Extraction by Chemicals.
   i. D1790, Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact.
   j. D2240, Standard Test Method for Rubber Property—Durometer Hardness.
   k. D4545, Standard Practice for Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet Geomembranes.
   l. D5199, Standard Test Method for Measuring Nominal Thickness of Geosynthetics.
   m. D6392, Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
2. PVC Geomembrane Institute (PGI):
   a. 1104, PVC Geomembrane Material Specification.
   b. PVC Geomembrane Fabrication and Installation Specification.

1.02 DEFINITIONS

A. Watertight: Geomembrane installation, free of flaws and defects that would allow passage of water and gasses, liquids, and solids to be contained under anticipated service conditions.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Manufacturer's specifications, literature for geomembrane furnished, and products used to complete installation.
   b. Polymer Resin: Product identification and Supplier.

B. Informational Submittals:

   a. Qualifications: Installer.

1.04 QUALIFICATIONS

A. Fabricator and Installer: Has successfully installed a minimum of five projects with the geomembrane product specified in applications similar to the Project.

1.05 COORDINATION MEETINGS

A. Meet prior to commencing the repair:

1. Submission of Submittals.
2. Manufacture of geomembrane sheets.

B. Attendees:

1. Engineer.
2. Geomembrane installer.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install geomembrane or perform seaming under the following conditions, unless it can be demonstrated to satisfaction of Engineer that performance requirements can be met under these conditions:

1. Air temperature is less than 35 degrees F or more than 90 degrees F.
2. Relative humidity is more than 90 percent.
3. Raining, or wind is excessive.

B. Do not place granular materials on geomembrane when ambient temperature is more than 100 degrees F, unless it can be demonstrated to the satisfaction of Engineer that such materials can be placed at temperatures outside this range without damage to geomembrane.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Geomembrane:

1. Rocheux International, Inc., Carson, CA.
2. Hüls America, Inc., Edison, NJ.
3. Occidental Chemical Corp., Burlington, NJ.
4. Vernon Plastics, Haverhill, MA.

2.02 POLYVINYL CHLORIDE (PVC) GEOMEMBRANE

A. Description: Compounded from domestic virgin polyvinyl chloride resin and high quality ingredients to produce flexible, durable, watertight product. Uniform throughout in color, thickness, and size, and surface quality.

B. Formula Ingredients: Completely dispersed in mix stage prior to calendaring.

C. Carbon Black Pigment:

1. Use to produce an opaque film ranging from dark gray to black in color.
2. Introduce during premix stage and evenly disperse so as to produce uniform color.
3. Film: Smooth, dull matte finish on both sides.

D. Condition: Free from dirt, oil, foreign matter, scratches, cracks, creases, bubbles, pits, tears, holes, or other defects that may affect its serviceability.

E. Physical Properties: Meet or exceed manufacturer's most recent published specifications, and conforming to following requirements:

30-mil PVC Geomembrane Physical Properties		
Property	**Required Values**	**Test Method**
Thickness	30 mils, plus or minus 5%	ASTM D5199
Specific Gravity	1.20 g/cc, min.	ASTM D792
Elongation at Break	380% min.	ASTM D882*
Tensile Strength	73 lb/in width, min.	ASTM D882*

30-mil PVC Geomembrane Physical Properties		
Property	**Required Values**	**Test Method**
Tear Resistance, Each Direction	8.0 lbs, min.	ASTM D1004*
Modulus at 100%	32 lbs/in	ASTM D882*
Water Extraction, as Compared to Blanks of Same Nominal Thickness	0.15% loss, max.	ASTM D1239*
Volatility	0.7% loss, max.	ASTM D1203*
Low Temperature, Pass	Minus 20 degrees F	ASTM D1790*
Dimensional Stability, Each Direction	3% change, max.	ASTM D1204* (MD and TD)
*Modifications or further details of test are described in PGI 1104 Appendix B.		

2.03 CHEMICAL ADHESIVE

A. Use seaming chemical adhesives, including bodied chemical adhesive, for making required geomembrane connections.

B. Color: Clear or same as geomembrane.

C. Film Tearing Bond: Provided within 48 hours of field seaming for seams.

D. Manufacturer: Clifton Adhesive, Inc., Wayne, NJ, or as recommended by geomembrane manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Do not place geomembrane until condition of previously installed geosynthetics is acceptable to Engineer.

B. Subgrade: Maintain in smooth, uniform, and compacted condition.

3.02 GEOMEMBRANE INSTALLATION

A. Placement:

1. Unless specified otherwise, each product required for completion of geomembrane installation shall be installed in strict accordance with geomembrane manufacturer's recommendations.
2. Reduce field seaming to the minimum possible. Horizontal seams on slopes will not be acceptable. Seams parallel to toe shall be at least 5 feet from toe.
3. Prevent wrinkles, folds, or other distress that can result in damage or prevent satisfactory alignment or seaming. Provide for factors such as expansion, contraction, overlap at seams, anchorage requirements, seaming progress, and drainage.
4. Temporarily weight sheets with sandbags as necessary to anchor or hold down in position during installation. Use sandbags continuously along edges to reduce wind flow under sheet.

B. Field Seams:

1. Adjust edges to be seamed and temporarily anchor to prevent wrinkling and shrinkage.
2. Wipe sheet contact surfaces clean to remove dirt, dust, moisture, and other foreign materials and prepare contact surfaces in accordance with seaming method accepted by Engineer.
3. Lap sheet edges minimum of 3 inches to form seams.
4. Make with seam supported on a firm, smooth. Avoid seam intersections involving more than three thicknesses of geomembrane material and offset seam intersections at least 2 feet.
5. Extend seams through anchor trench, boots, and mechanical attachments to sheet edges.
6. When ambient conditions result in temperature below 85 degrees F at time of seaming, warm geomembrane material, adhesive, or solvent by artificial means to temperature above 85 degrees F.
7. Accessories:
   a. Rags: Use clean, white cotton rags for seaming procedures. When rag shows discoloration from use, discard and replace with fresh one.
   b. Scissors: Blades with rounded points.
8. Uneven Seams: Avoid fishmouths, pleats, folds, and tucks in field seams. Repair each one by slitting out far enough from seam to dissipate it and patch in accordance with this Specification.
9. Completed Seams: Sealed, smooth, watertight, and conforming with factory seam strengths specified in Article Panel Fabrication.

3.03 PLACING PRODUCTS OVER GEOMEMBRANE

A. Prior to placing material over geomembrane, notify Engineer. Do not cover installed geomembrane until after Engineer provides authorization to proceed.

B. If tears, punctures, or other geomembrane damage occurs during placement of overlying products, remove overlying products as necessary to expose damaged geomembrane, and repair damage.

C. Geomembrane installer shall remain available during placement of overlying products to repair geomembrane if damaged.

3.04 FIELD QUALITY CONTROL

A. Identify each test by date of Sample, date of test, Sample location, name of individual who performed test, standard test method used, list of departures from standard test methods, at a minimum.

B. In-Place Observation and Testing:

1. Visually inspect geomembrane sheets, seams, anchors, seals, and repairs for defects as installation progresses and again on completion.
2. In addition, check seams and repairs using metal probe. Run metal probe, such as dull-pointed ice pick, along entire length of each seam, including repairs, to check for continuity of seams and absence of leak paths.
3. Depending on seam welding equipment used, test each seam and repair, using air lance device or air channel pressure for double wedge welded seams.
4. Perform testing in presence of Engineer.

C. Air Lance Testing:

1. Perform on each seam, including patches and factory seams in accordance with the following:
2. Air Lance:
   a. Created with 3/16-inch diameter orifice at minimum pressure of 50 psi, held not more than 2 inches from seam edge.
   b. Direct jet of air at edges of seams and patches to result in lifting of unbonded seam areas.
3. Perform air lancing in presence of Engineer and allow sufficient time for Engineer to mark leaks or suspicious areas for repair.

3.05 CLEANUP

A. Clean up work area as the Work proceeds. Take particular care to ensure that no trash, tools, and other unwanted materials are trapped beneath geomembrane and that scraps of geomembrane material are removed from work area prior to completion of installation.

END OF SECTION