

## Decision Documents for FST-039

GA EPD letter received	dated November 10, 2010
GA EPD letter received	dated September 10, 2010
Transmittal letter sent to GA EPD	dated September 3, 2010
Transmittal letter sent to GA EPD	dated July 29, 2010
GA EPD letter received	dated April 22, 2010
Transmittal letter sent to GA EPD	dated January 22, 2010
Transmittal letter sent to GA EPD	dated April 27, 2009
Transmittal letter sent to GA EPD	dated March 16, 2009
GA EPD letter received	dated December 22, 2008
Transmittal letter sent to GA EPD	dated June 25, 2008
GA EPD letter received	dated May 8, 2008
Transmittal letter sent to GA EPD	dated April 21, 2008
GA EPD letter received	dated April 7, 2008
GA EPD letter received	dated April 2, 2008
Transmittal letter sent to GA EPD	dated March 6, 2008
Transmittal letter sent to GA EPD	dated October 31, 2007
GA EPD letter received	dated September 18, 2007
Transmittal letter sent to GA EPD	dated July 17, 2007
GA EPD letter received	dated May 30, 2006
Transmittal letter sent to GA EPD	dated February 8, 2006
Transmittal letter sent to GA EPD	dated August 6, 2003
Transmittal letter sent to GA EPD	dated October 28, 2002
GA EPD letter received	dated February 5, 2002
Transmittal letter sent to GA EPD	dated October 9, 2001
Transmittal letter sent to GA EPD	dated May 9, 2001
Transmittal letter sent to GA EPD	dated May 7, 2001

1. Introduction

2. Methodology

3. Results and Discussion

4. Conclusion

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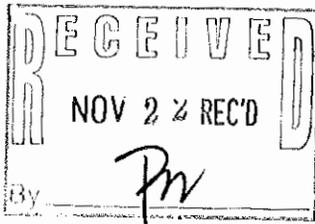
26. Keywords

27. Summary

# Georgia Department of Natural Resources

2 Martin Luther King Jr. Dr., S.E., Suite 1154, Atlanta, Georgia 30334-9000

Chris Clark, Commissioner  
Environmental Protection Division  
F. Allen Barnes, Director  
Land Protection Branch  
Mark Smith, Branch Chief  
Phone: 404/656-7802 FAX: 404/651-9425



November 10, 2010

Mr. Robert R. Baumgardt  
Acting Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Response to Technical Memorandum Phase 1 RCRA Facility Investigation update, dated July 29, 2010 and received August 3, 2010, for SWMU (Solid Waste Management Unit) 39 RCRA Facility Investigation (RFI) Work Plan – Direct Support Maintenance Facility (DSMF); Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Mr. Baumgardt:

The Land Protection Branch of the Georgia Environmental Protection Division (EPD) has reviewed Fort Stewart's Technical Memorandum Phase 1 RCRA Facility Investigation update, dated July 29, 2010 and received August 3, 2010, for the SWMU 39– Direct Support Maintenance Facility. EPD concurs with Fort Stewart's proposed plan for additional sampling in the vicinity of temporary well F39TW011, where Tetrachloroethylene (PCE), Trichloroethylene (TCE), and cis-1,2-Dichloroethene (cis-1,2- DCE) have been newly discovered in the groundwater at concentrations of 140 ug/L, 1,300 ug/L, and 450 ug/L, respectively.

According to this Technical Memorandum, one boring will be installed immediately adjacent to well F39TW011, and one sample will be collected every five (5) feet starting at 30 feet below ground surface (bgs) for vertical delineation of the contaminants. In addition to this vertical delineation at a minimum, one upgradient well (east of well F39TW011) and one side-gradient sentry well (north of well F39TW011) will be installed to define the plume and monitor lateral migration of the plume in the vicinity of the new discovery. Moreover, the investigation should be extended to include identification of the source of PCE, TCE, and cis-1,2- DCE.

If you have any questions concerning this correspondence, please contact Mr. Mo Ghazi or William Powell at (404) 657-8674/8680.

Sincerely,

A handwritten signature in cursive script that reads "Amy Potter".

Amy Potter  
Unit Coordinator  
Hazardous Waste Management and Remediation Program

cc:Tressa Rutland, Fort Stewart (via facsimile)

File: Fort Stewart (G)

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# Georgia Department of Natural Resources

2 Martin Luther King Jr. Dr., S.E., Suite 1154, Atlanta, Georgia 30334-9000

Chris Clark, Commissioner

Environmental Protection Division

F. Allen Barnes, Director

Land Protection Branch

Mark Smith, Branch Chief

Phone: 404/656-7802 FAX: 404/651-9425

September 10, 2010

?



23/10/10

Mr. Robert R. Baumgardt  
Acting Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Response to Comments (RTC) and Replacement Pages, dated July 29, 2010 and received August 3, 2010, for SWMU (Solid Waste Management Unit) 39 RCRA Facility Investigation (RFI) Work Plan – Direct Support Maintenance Facility (DSMF); Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Mr. Baumgardt:

The Land Protection Branch of the Georgia Environmental Protection Division (EPD) has reviewed Fort Stewart's RTCs and replacement pages, dated July 29, 2010 and received August 3, 2010, for the SWMU 39 RFI Work Plan – Direct Support Maintenance Facility, dated December 2009 and received January 26, 2010. From that review, it appears that our comments dated April 22, 2010, have been addressed, and therefore, the revised RFI Work Plan for SWMU 39, with July 29, 2010 replacement pages incorporated therein, is approved.

Should you have any questions concerning this correspondence, please contact Mr. Mo Ghazi or William Powell of my staff at (404) 657-8674/8680.

Sincerely,



Amy Potter

Unit Coordinator

Hazardous Waste Management and Remediation Program

cc:Tressa Rutland, Fort Stewart (via facsimile)  
File: Fort Stewart (G)

(

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DEPARTMENT OF THE ARMY  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, US ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

REPLY TO  
ATTENTION OF

SEP - 3 2010

Office of the Directorate

CERTIFIED MAIL

7008 32300000 7027 6887

Georgia Environmental Protection Division  
Attention: Ms. Amy Potter  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1452  
Atlanta, Georgia 30334

Dear Ms. Amy Potter:

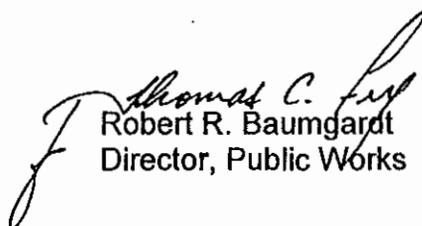
Fort Stewart is pleased to submit two hard copies of the letter report for the Final Phase I RCRA Facility Investigation Update for Solid Waste Management Unit 39 – Direct Support Maintenance Facility, Fort Stewart, Georgia, dated July 2010.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Algeana Stevenson at (912) 315-5144 or Ms. Tressa Rutland, Directorate of Public Works, Prevention and Compliance Branch, at (912) 767-2010, should questions arise regarding the enclosed report.

Sincerely,

  
Robert R. Baumgardt  
Director, Public Works

Enclosure





REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, US ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

Office of the Directorate

JUL 29 2010

CERTIFIED MAIL

7008 3230 0000 7027643

Georgia Environmental Protection Division  
Attention: Ms. Amy Potter  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1452  
Atlanta, Georgia 30334

Dear Ms. Amy Potter:

Fort Stewart is pleased to receive the Georgia Environmental Protection Division's (GA EPD) correspondence dated April 22, 2010, regarding the Solid Waste Management Unit 39 RCRA Facility Investigation (RFI) Work Plan – Direct Support Maintenance Facility, Fort Stewart, Georgia, dated December 2009.

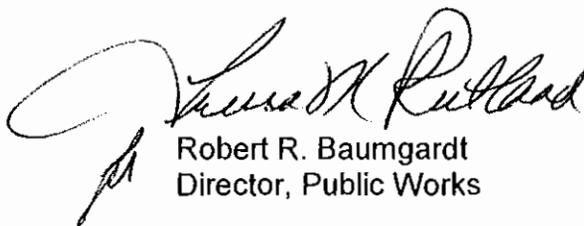
In response to the comments received from GA EPD, Fort Stewart has enclosed two hard copies of replacement pages, one electronic copy of a full report and a formal response to comments table dated June 21, 2010.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Algeana Stevenson at (912) 315-5144 or Ms. Tressa Rutland, Directorate of Public Works Prevention and Compliance Division, at (912) 767-2010, should questions arise regarding the enclosed report.

Sincerely,



Robert R. Baumgardt  
Director, Public Works

Enclosures



<b>RESPONSE TO COMMENTS</b> Received April 22, 2010 (Potter to Baumgardt)		Date: June 21, 2010	Page 1 of 3
<b>To:</b> Amy Potter		<b>From:</b> Georgia Department of Natural Resources Environmental Protection Division	
<b>Project:</b> SWMU 39 RCRA Facility Investigation (RFI) Work Plan, Direct Support Maintenance Facility (DSMF), dated December 2009 Fort Stewart, Georgia, EPA ID # GA9 210 020 872			
ITEM NUMBER	COMMENT	RESPONSE	
1	<b>Page 1-2, top paragraph.</b> This paragraph states, "During the investigations, a light nonaqueous phase liquid (LNAPL) was detected near Building 1161 and UST [underground storage tank] 61." Please include a description of the LNAPL (i.e., diesel fuel, motor gasoline, jet fuel, oil, etc.).	The LNAPL is believed to be waste oil. Page 1-2 has been revised as requested.	
2	<b>Page 1-2, last sentence.</b> This sentence states, "The investigation data will be used to refine the conceptual site model (CSM), and finalize the RFI" EPD could not find the CSM in the work plan. Please include a Subsection in Section 4 briefly summarizing the site's preliminary Conceptual Site Model (CSM). Elements of a CSM include the integration all known information regarding suspected source, site geology and hydrogeology, current estimated extent of contamination, fate and transport of contaminants, exposure routes, and receptors.	Section 4.1 has been added to the revised work plan to include a preliminary conceptual site model.	
3	<b>Page 4-2, Section 4.1.1, 1st paragraph, 3rd sentence.</b> This sentence states, "The proposed boring locations are illustrated on Figure 6-1." It appears the correct figure is Figure 4-1. Please revise.	The reference to Figure 4-1 has been corrected in Section 4.3.1 (Previously Section 4.1.1) as requested.	
4	<b>Section 4, Proposed Investigation.</b> The proposed investigation refers to the delineation of TCE (Trichloroethylene) and PCE (Tetrachloroethylene). Please revise to include the associated daughter products (e.g., cis- 1,2-Dichloroethylene, trans- 1,2-Dichloroethylene, Vinyl Chloride) as groundwater monitor well sample results (Table 3-3) show that the result for Vinyl Chloride at monitoring well G4MW010 is above the MCL.	Section 4 has been revised to include the delineation of TCE daughter products.	



<b>RESPONSE TO COMMENTS</b> Received April 22, 2010 (Potter to Baumgardt)	Date: June 21, 2010	Page 2 of 3
<b>ITEM NUMBER</b>	<b>COMMENT</b>	<b>RESPONSE</b>
5	<b>Section 4, Proposed Investigation.</b> This section describes the soil borings, the groundwater monitoring wells, and the investigative-derived waste activities, but not the field decontamination procedures. Please include a description of the field decontamination procedures that will be utilized to minimize potential cross-contamination.	Section 4.5 has been added to the Work Plan to detail the decontamination procedures.
6	<b>Page 4-9, Section 4.3.2, 2nd paragraph.</b> Please add that all detected contaminants without a Regional Screening Level (RSL) will be identified as a contaminant of potential concern (COPC).	Section 4.5.2 (Previously Section 4.3.2) has been revised as requested.
7	<b>Page 4-9, Section 4.3.2, 2nd paragraph.</b> Please add that for contaminants listed as noncarcinogens, the RSL value shall be multiplied by 0.1 to account for cumulative effects of non-carcinogens.	Section 4.5.2 (Previously Section 4.3.2) has been revised as requested.
8	<b>Additional Figure (Section 4.1.4) - Monitoring Well Schematic.</b> Please provide a generic schematic of a proposed monitoring well that will be installed at SWMU 39.	A proposed Monitor Well schematic has been added to the Work Plan as Figure 4-2.
9	<b>Project Schedule.</b> Please provide a projected schedule to reflect as closely as possible the timing of activities at the site. The project schedule should reflect the number of days to complete each task pending EPD review and approval of required deliverables.	A proposed schedule has been added as Figure 5-1 and is referenced in Section 5 of the work plan.
10	<b>Certifications.</b> Please provide the personnel's health and safety certifications, as well as certifications for the Certified Laboratory which will perform all the sample analysis in accordance with Chapter 391-3-26-.05(2) of the Rules for Commercial Environmental Laboratories.	Personnel health and safety certifications have been added to Appendix C and a Commercial Laboratory Stipulation has been added to Appendix A.



**RESPONSE TO COMMENTS**Received April 22, 2010  
(Potter to Baumgardt)

Date: June 21, 2010

Page 3 of 3

<b>ITEM NUMBER</b>	<b>COMMENT</b>	<b>RESPONSE</b>
11	<b>Future RFI Report requirements.</b> It appears there may be two distinct sources of contamination with two distinct contaminant plume areas. This may result in the identification of two separate SWMUs; however, the two SWMUs may be investigated under the same RFI.	Comment noted.

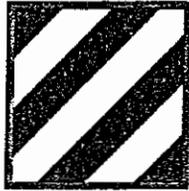


# Fort Stewart, Georgia

Imagine the result



IMA



3d Inf Div (Mech)

## SWMU 39 RCRA Facility Investigation Work Plan

### Direct Support Maintenance Facility

Fort Stewart, Georgia  
EPA ID # GA9 210 020 872

Revision 1 – June 2010  
Original Report – December 2009



# ARCADIS

Revision 1 – June 2010

Original Report – December 2009

SWMU 39  
RFI Work Plan  
Fort Stewart, GA

## 5. Conclusions

The extent of impacted soil and groundwater at SWMU 39 has not been sufficiently defined. The objective of the proposed phased investigation activities is to adequately define the extent of impacts to soil and groundwater, delineate the extent of LNAPL near G4MW002, and identify the source of TCE impacts south and east of the DSMF.

The initial phase of investigation will include a series of borings for soil sampling and LNAPL delineation, installation of temporary wells for groundwater delineation, installation of monitor wells, collection of lithologic and hydrologic data, and the collection of surface water and sediment sampling. A second phase of investigation will be conducted to fill in any remaining data gaps, install additional monitor wells, collect background soil data if determined to be necessary and perform slug tests. The results of both phases of investigation will be included in an RFI Report. A proposed project schedule is included as Figure 5-1. Copies of the 8-hour refresher certificates for the field investigation staff is included in Appendix C.



# Georgia Department of Natural Resources

2 Martin Luther King Jr. Dr., S.E., Suite 1154, Atlanta, Georgia 30334-9000  
Chris Clark, Commissioner  
Environmental Protection Division  
F. Allen Barnes, Director  
Land Protection Branch  
Mark Smith, Branch Chief  
Phone: 404/656-7802 FAX: 404/651-9425

April 22, 2010

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

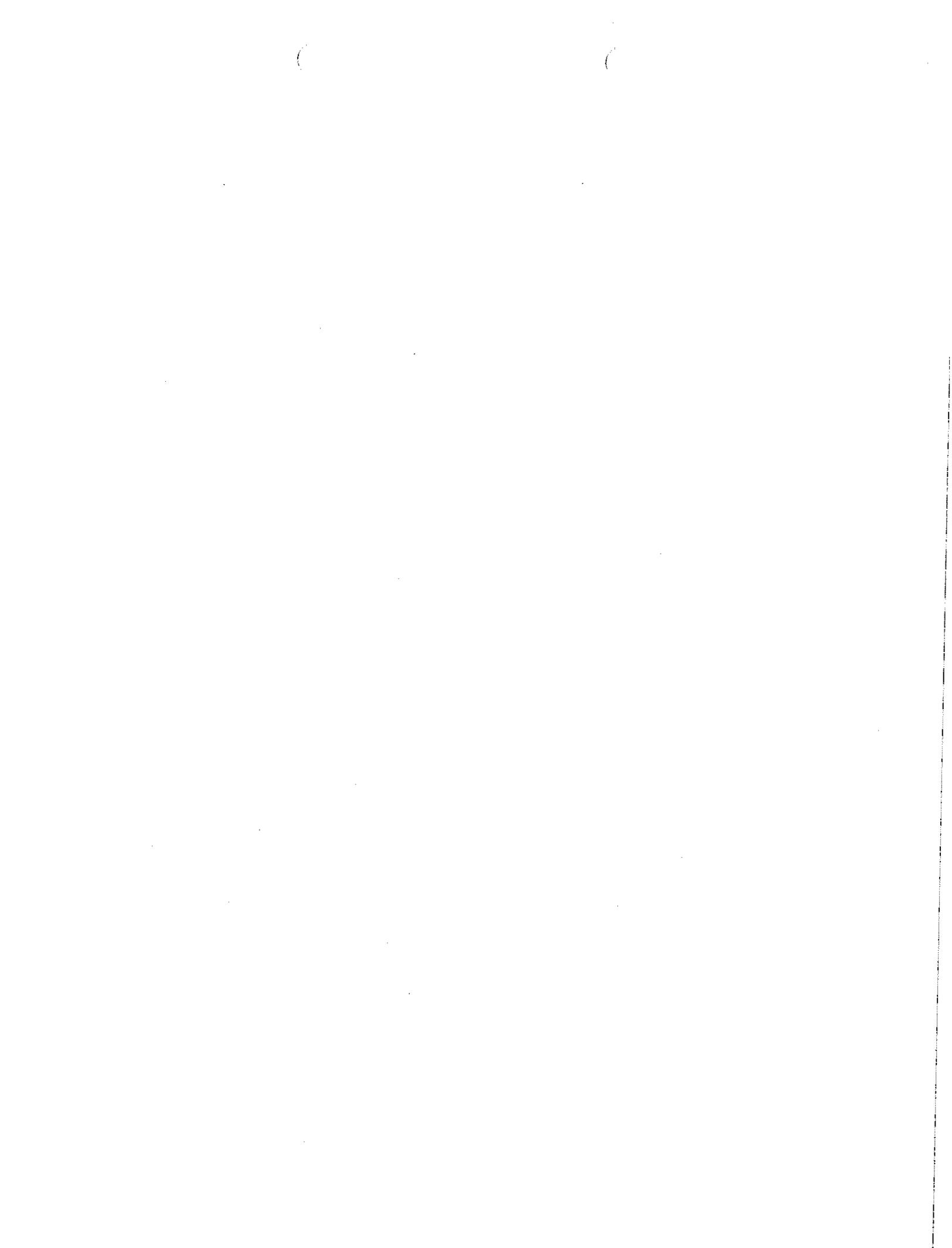
Mr. Robert R. Baumgardt  
Acting Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: SWMU (Solid Waste Management Unit) 39 RCRA Facility Investigation (RFI) Work Plan –  
Direct Support Maintenance Facility (DSMF), dated December 2009; Fort Stewart; EPA ID  
No. GA9 210 020 872.

Dear Mr. Baumgardt:

The Land Protection Branch of the Georgia Environmental Protection Division (EPD) has completed the review of Fort Stewart's SWMU 39 RFI Work Plan – Direct Support Maintenance Facility, dated December 2009 and received January 26, 2010. EPD has the following comments:

1. **Page 1-2, top paragraph.** This paragraph states, "During the investigations, a light non-aqueous phase liquid (LNAPL) was detected near Building 1161 and UST [underground storage tank] 61." Please include a description of the LNAPL (i.e., diesel fuel, motor gasoline, jet fuel, oil, etc.).
2. **Page 1-2, last sentence.** This sentence states, "The investigation data will be used to refine the conceptual site model (CSM), and finalize the RFI." EPD could not find the CSM in the work plan. Please include a Subsection in Section 4 briefly summarizing the site's preliminary Conceptual Site Model (CSM). Elements of a CSM include the integration all known information regarding suspected source, site geology and hydrogeology, current estimated extent of contamination, fate and transport of contaminants, exposure routes, and receptors.
3. **Page 4-2, Section 4.1.1, 1<sup>st</sup> paragraph, 3<sup>rd</sup> sentence.** This sentence states, "The proposed boring locations are illustrated on Figure 6-1." It appears the correct figure is Figure 4-1. Please revise.



4. **Section 4, Proposed Investigation.** The proposed investigation refers to the delineation of TCE (Trichloroethylene) and PCE (Tetrachloroethylene). Please revise to include the associated daughter products (e.g., cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Vinyl Chloride) as groundwater monitor well sample results (Table 3-3) show that the result for Vinyl Chloride at monitoring well G4MW010 is above the MCL.
5. **Section 4, Proposed Investigation.** This section describes the soil borings, the groundwater monitoring wells, and the investigative-derived waste activities, but not the field decontamination procedures. Please include a description of the field decontamination procedures that will be utilized to minimize potential cross-contamination.
6. **Page 4-9, Section 4.3.2, 2<sup>nd</sup> paragraph.** Please add that all detected contaminants without a Regional Screening Level (RSL) will be identified as a contaminant of potential concern (COPC):
7. **Page 4-9, Section 4.3.2, 2<sup>nd</sup> paragraph.** Please add that for contaminants listed as non-carcinogens, the RSL value shall be multiplied by 0.1 to account for cumulative effects of non-carcinogens.
8. **Additional Figure (Section 4.1.4) - Monitoring Well Schematic.** Please provide a generic schematic of a proposed monitoring well that will be installed at SWMU 39.
9. **Project Schedule.** Please provide a projected schedule to reflect as closely as possible the timing of activities at the site. The project schedule should reflect the number of days to complete each task pending EPD review and approval of required deliverables.
10. **Certifications.** Please provide the personnel's health and safety certifications, as well as certifications for the Certified Laboratory which will perform all the sample analysis in accordance with Chapter 391-3-26-.05(2) of the Rules for Commercial Environmental Laboratories.
11. **Future RFI Report requirements.** It appears there may be two distinct sources of contamination with two distinct contaminant plume areas. This may result in the identification of two separate SWMUs; however, the two SWMUs may be investigated under the same RFI.

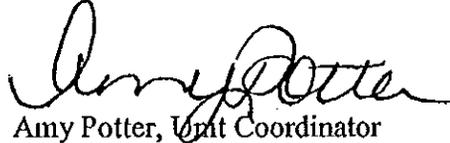
Within sixty (60) days of receipt of this letter, please submit two (2) copies of all revisions that address the above comments to the work plan, and one (1) electronic copy (in PDF format) of the full report. The revised pages should be noted at the bottom with the word "Revised" and the revision date.



Mr. Baumgardt  
Fort Stewart  
April 22, 2010  
Page 3

Should you have any questions concerning this correspondence, please contact Mr. Mo Ghazi or William Powell of my staff at (404) 657-8674/8680.

Sincerely,



Amy Potter, Unit Coordinator  
Hazardous Waste Management and Remediation Program  
Land Protection Branch

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)  
File: Fort Stewart (G)

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December 2009-04-22-2010.doc





DEPARTMENT OF THE ARMY  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, US ARMY GARRISON, FORT STEWART/HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-5048

REPLY TO  
ATTENTION OF

Office of the Directorate

JAN 22 2010

CERTIFIED MAIL

Georgia Environmental Protection Division  
Attention: Mr. Mahamad Ghazi, PhD  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1452  
Atlanta, Georgia 30334

Dear Mr. Ghazi:

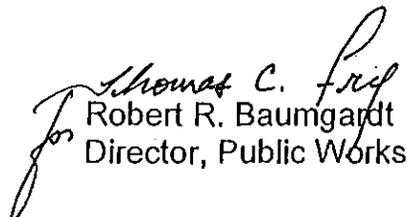
Fort Stewart is pleased to submit two hard copies and one electronic copy of the Final Resource Conservation and Recovery Act Facility Investigation Report for Solid Waste Management Unit 39 at Fort Stewart Military Reservation, Fort Stewart, Georgia, dated December 2009, for your review and approval.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Algeana Stevenson at (912)315-4226 or Ms. Tressa Rutland, Directorate of Public Works Environmental Division, at (912)767-2010 should questions arise regarding the enclosed report.

Sincerely,

  
Robert R. Baumgardt  
Director, Public Works

Enclosures





DEPARTMENT OF THE ARMY  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, US ARMY GARRISON, FORT STEWART/HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

REPLY TO  
ATTENTION OF

Office of the Directorate

APR 27 2009

CERTIFIED MAIL

7008 3230 000 292 072 380

Georgia Environmental Protection Division  
Attention: Mr. Mo Ghazi, PhD, Geology  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

Dear Mr. Ghazi:

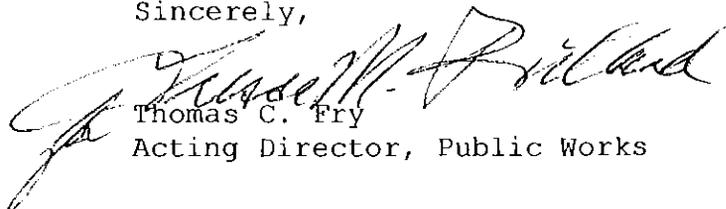
Fort Stewart appreciates your comments in our teleconference on April 20, 2009. The Installation concurs with the Georgia Environmental Protection Division (GA EPD) determination that the Responses to Comments Concerning Final Resource Conservation and Recovery Act Facility Investigation and Interim Actions Report for Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated 2005, revised June 2008; EPA ID No. GA9 210 020 872, should be withdrawn due to the transfer of this site to a Performance Based Acquisition Contractor. The Installation respectfully requests the withdrawal of these responses to comments and appreciates your acceptance.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Algeana Stevenson at (912) 315-5144, or Ms. Tressa Rutland, Directorate of Public Works, Prevention and Compliance Branch, at (912)767-2010, should questions arise regarding the enclosed report.

Sincerely,

  
Thomas C. Fry  
Acting Director, Public Works





DEPARTMENT OF THE ARMY  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, US ARMY GARRISON, FORT STEWART/HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

REPLY TO  
ATTENTION OF

MAR 16 2009

Directorate of Public Works

Certified Mail

70082810000077840558

Georgia Environmental Protection Division  
Attention: Mr. Mo Ghazi, PhD, Geology  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

COPY

Dear Mr. Ghazi:

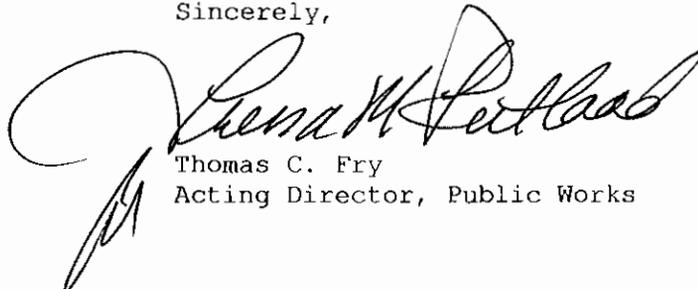
Reference Georgia Environmental Protection Division (GA EPD) letter, dated December 22, 2008, with comments regarding the Final Resource Conservation and Recovery Act Facility Investigation (RFI) and Interim Actions Report for Solid Waste Management Unit (SWMU) 39; Fort Stewart, Georgia, dated December 2005 and Revised June 2008, EPA ID No. GA9 210 020 872. In accordance with referenced letter, one CD-Rom electronic file and two copies of the "Response to Comments Concerning Final Resource Conservation and Recovery Act Facility Investigation and Interim Actions Report for Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated 2005, revised June 2008; EPA ID No. GA9 210 020 872" are enclosed.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

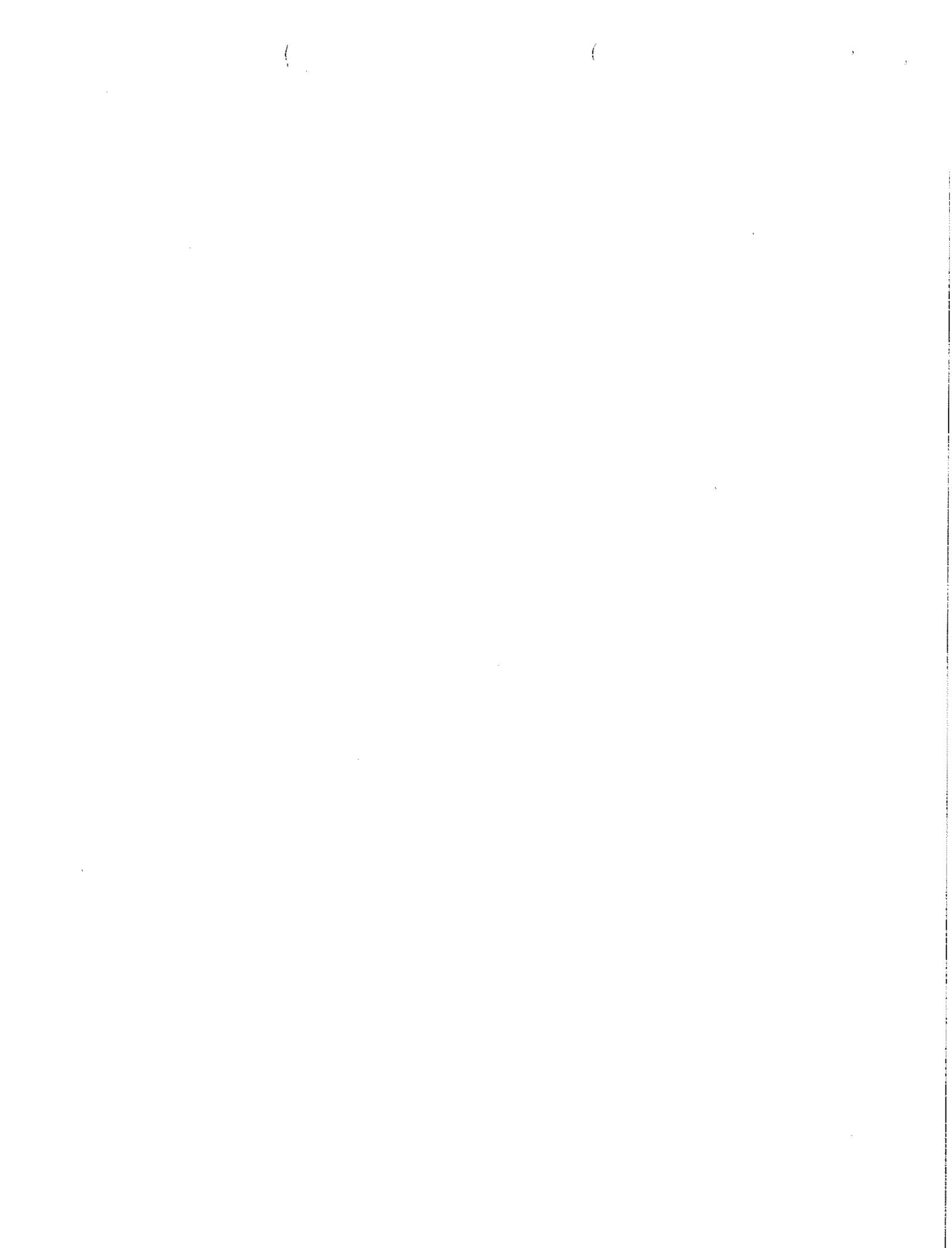
Please contact Mr. Dale Kiefer at (912) 767-4629, or Ms. Tressa Rutland, Directorate of Public Works, Environmental Division, at (912)767-2010, should questions arise regarding the enclosed Response to Comments.

Sincerely,



Thomas C. Fry  
Acting Director, Public Works

Enclosures



# Georgia Department of Natural Resources

2 Martin Luther King Jr. Drive, S.E., Suite 1470, Atlanta, Georgia 30334  
Noel Holcomb, Commissioner  
Environmental Protection Division  
Carol A. Couch, Ph.D., Director  
404-656-2833

December 22, 2008

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Mr. Thomas V. Maulden  
Acting Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Final Resource Conservation and Recovery Act Facility Investigation and Interim Actions Report for Solid Waste Management Unit 39; Fort Stewart, Georgia; Dated December 2005 and Revised June 2008; EPA ID No. GA9 210 020 872.

Dear Sir:

The Hazardous Waste Management Branch of the Georgia Environmental Protection Division (GA EPD) has completed its review of the above referenced document. Based on our review of the document the following comments have been generated.

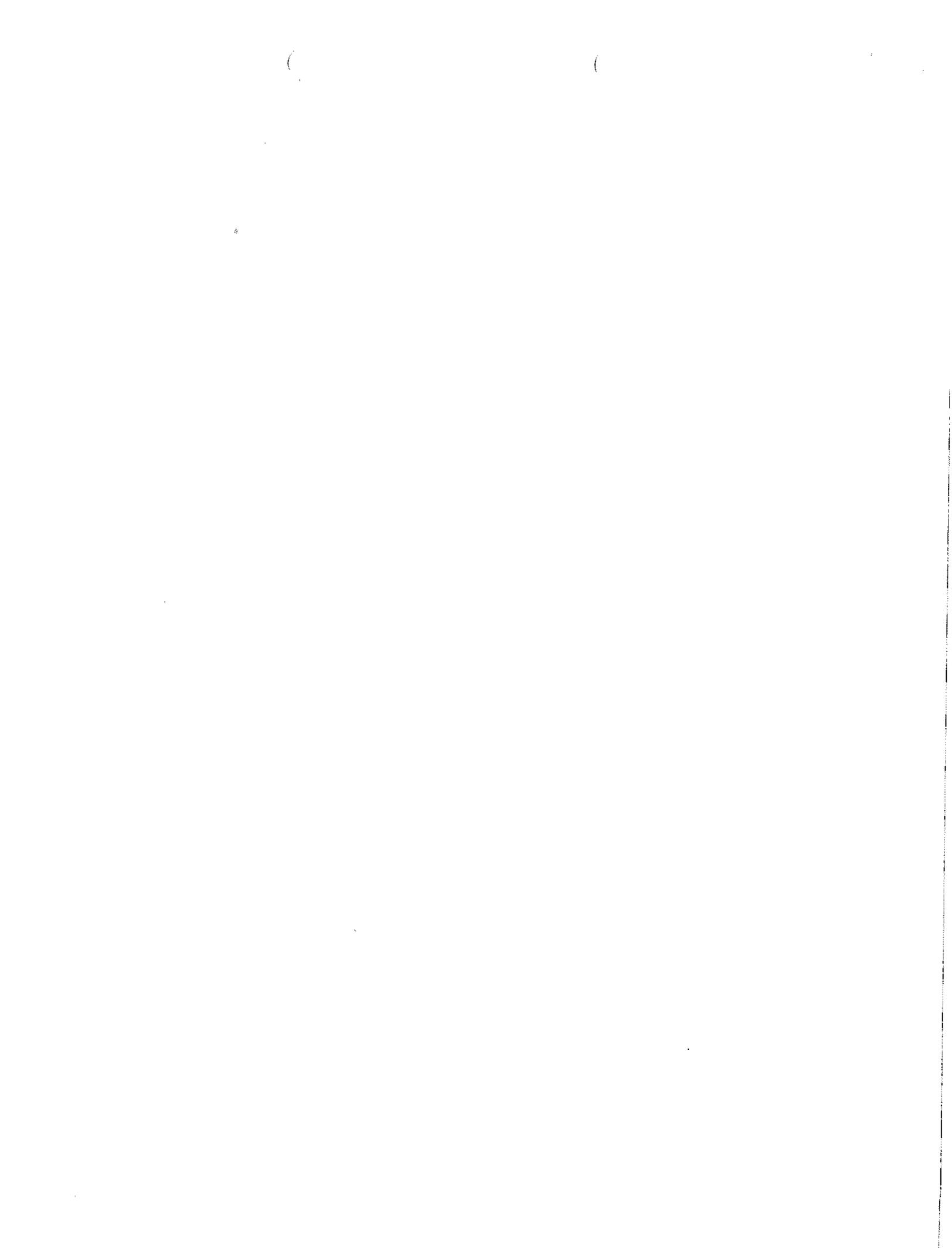
**A. General and Corrective Action Comments**

1. *General Comment on Contaminants of Concern* – In reviewing the previous documents on this SWMU, including all e-mail correspondences, it has come to our attention that listed Contaminants of Concern (COCs) for this site includes metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) (Table-1, Summary of SWMUs at Fort Stewart, Georgia, sent as an e-mail attachment correspondence, Powell-Jones to Ghazi, 08/1/2007). However, in this report, as well as in all previous reports on this SWMU, there are no analytical results for metals and SVOCs. Please provide a rationale for excluding metals and SVOCs from the list of analytes.
2. *Executive Summary, Page E-7 and Section 4.2 (Previous Investigations at UST 6, Page 57)* - The report states “Following discovery of free product at UST 61, a removal action occurred in July and August 2006. Solution to Environmental Problems, Inc. (STEP) excavated and removed Well 22-07 along with contaminated soil/free product around the well. After the excavation was complete, soil samples were obtained, Oxygen Release Compound® was applied to the excavation floor and sidewalls, and a new 4-inch diameter pre-packed well (Well 22-07R) was installed to replace Well 22-07.” The locations of monitoring wells 22-



07 and 22-07R are missing in all the related maps. Please identify the locations for the two monitoring wells and use all available well information and analytical data for constructing potentiometric and iso-concentration maps.

3. *Section 4.1.2 (Page 10), Section 4.1.4.1.2 (Page 25) and Section 5.5 (Page 76)* – In these sections as well as in Appendices C and F, the report states that Georgia In-Stream Water Quality Standards (IWQS) were used as the screening criteria for surface water samples. According to the Georgia Guidance (*Georgia Environmental Protection Division Guidance For Selecting Media Remediation Levels at RCRA Solid Waste Management Units. November 1996*), the maximum detected concentrations in surface water should be compared to the National Recommended Water Quality Criteria (i.e., consumption of water and organism), which can be found at:  
<http://www.epa.gov/waterscience/criteria/wqctable/nrwqc-2006.pdf>
4. *Figure 4-12* – It appears that the labels for well 22-08 and well 22-09 have been switched. Please correct.
5. *Section 4.1.8, October 2007, Groundwater Sampling at SWMU 39, Page 53* – The report states, “The project scope of work and the approved work plan also required STEP to monitor the groundwater at the site on a semiannual basis for a period of one year (two sampling events), and to prepare and submit an annual progress report after both rounds of sampling were completed. The first of the two required sampling events has been completed, and was reported in the “*Letter Report for Groundwater Sampling Activities at Solid Waste Management Unit (SWMU) 39, Underground Storage Tanks 59 and 60, Fort Stewart, Georgia*” (*SES, January 2008*).” GA EPD has not received the above Letter Report. Please submit this document within thirty (30) days of the receipt of this letter.
6. *Section 4.2, Previous Investigations at UST 60, Page 57* - The report states, “The soil samples taken from the excavation bottom and sidewalls were analyzed for BTEX, MTBE, PAHs, TPH DRO, and TPH GRO. Benzene, in the sample from the excavation bottom, was estimated at a concentration of 62 µg/kg; the sample from the east sidewall reported concentrations of naphthalene, phenanthrene, and pyrene that exceeded the GUST-9 estimated laboratory detection limits; and all of the samples reported concentrations of TPH above the GUST-9 estimated laboratory detection limits.” The analytical results for the above samples are missing in this report. Please provide the missing results in the form of a table and/or concentration maps. Moreover, GA EPD requests that all raw laboratory data for the above samples (including chain-of-custodies) should be provided in Appendices C and F. Finally, the GUST-9 estimated laboratory detection limits are not acceptable reference values to use in this report. Please use the current screening levels the EPA Regional Screening Levels (RSLs), [with all non-carcinogenic constituents adjusted by a factor of 0.1 to meet the Hazard Quotient (HQ) criteria], which can be found at:  
[http://www.epa.gov/reg3hwm/d/risk/human/rb-oncentration\\_table/Generic\\_Tables/index.htm](http://www.epa.gov/reg3hwm/d/risk/human/rb-oncentration_table/Generic_Tables/index.htm)



Please note that EPA Region 9 Preliminary Remediation Goals (PRGs) for human health risk evaluation are no longer used by GA EPD as screening levels.

7. *Section 5.2, Isolation of Two Concrete flow Through Vaults, August 2004* – GA EPD has never received the interim measures (IM) work plan requested in correspondences (Rabon to Biering, dated June 1, 2004 and May 30, 2006). In Section 4.1.5 (page 46), please provide the rationale for filling the concrete vaults with concrete and plugging underground pipes with fuel-resistant caulking, as opposed to the complete removal of the underground installations. Also, please provide analytical evidence that vaults and the piping system were free of residual used oil when sealed with concrete.
8. *Table 5-2, On-Site Analysis of Groundwater* – There are a significant number of repeated data entries in Table 5-2 [e.g., the entire Page 2 of the table (Page 66) is repeated data]. Please revise the table.
9. *Section 4.1.4.5, Baseline Human Health Risk Assessment 2004* - The report states, “Tetrachloroethene in sample 04307G07 from monitoring well G4MW016 appears to be an anomaly for the November 2004 sampling event.” The detection of the tetrachloroethene (PCE) in this well does not appear to be an anomaly, since PCE is also present in monitoring well G4MW017 (Figure 4-3). Moreover, PCE continued to be present during the March/April 2008 sampling events in both of the above monitoring wells, as well as in the monitoring well G4MW027 at concentrations of 1.9  $\mu\text{g/L}$  (Figure 5-7). GA EPD recommends expanding the scope of work to include the following tasks:
  - a. Complete delineation of the extent of contaminated soil and groundwater to background concentrations (non-detect) for PCE and trichloroethene (TCE) (i.e., this should include installing additional wells upgradient from G4MW032 where PCE and TCE were detected); and
  - b. Installing two additional “sentinel” monitoring wells, downgradient and sidegradient, and revising the iso-concentration maps based on the new analytical results.
10. *Install additional Monitoring well to define PCE source area* - The existing groundwater analytical data do not indicate the location of the PCE source (s). For example, there is a sharp contrast between the contour patterns in iso-concentration maps for PCE (as shown in Figures 5-3 and 5-7) and for (TCE) (as shown in Figures 5-2 and 5-6). Additional investigation is necessary to define the lateral and vertical profile of the PCE and TCE plumes in groundwater. This investigation should include installing new monitoring wells as well as obtaining results from existing monitoring wells G4MW22-07R, G4MW22-08 and G4MW22-09, which have not been sampled during recent sampling events.
11. *Missing Figure 5-5* – The figure showing the extent of free product (Figure 5-5) is missing in the report. Please provide Figure 5-5.

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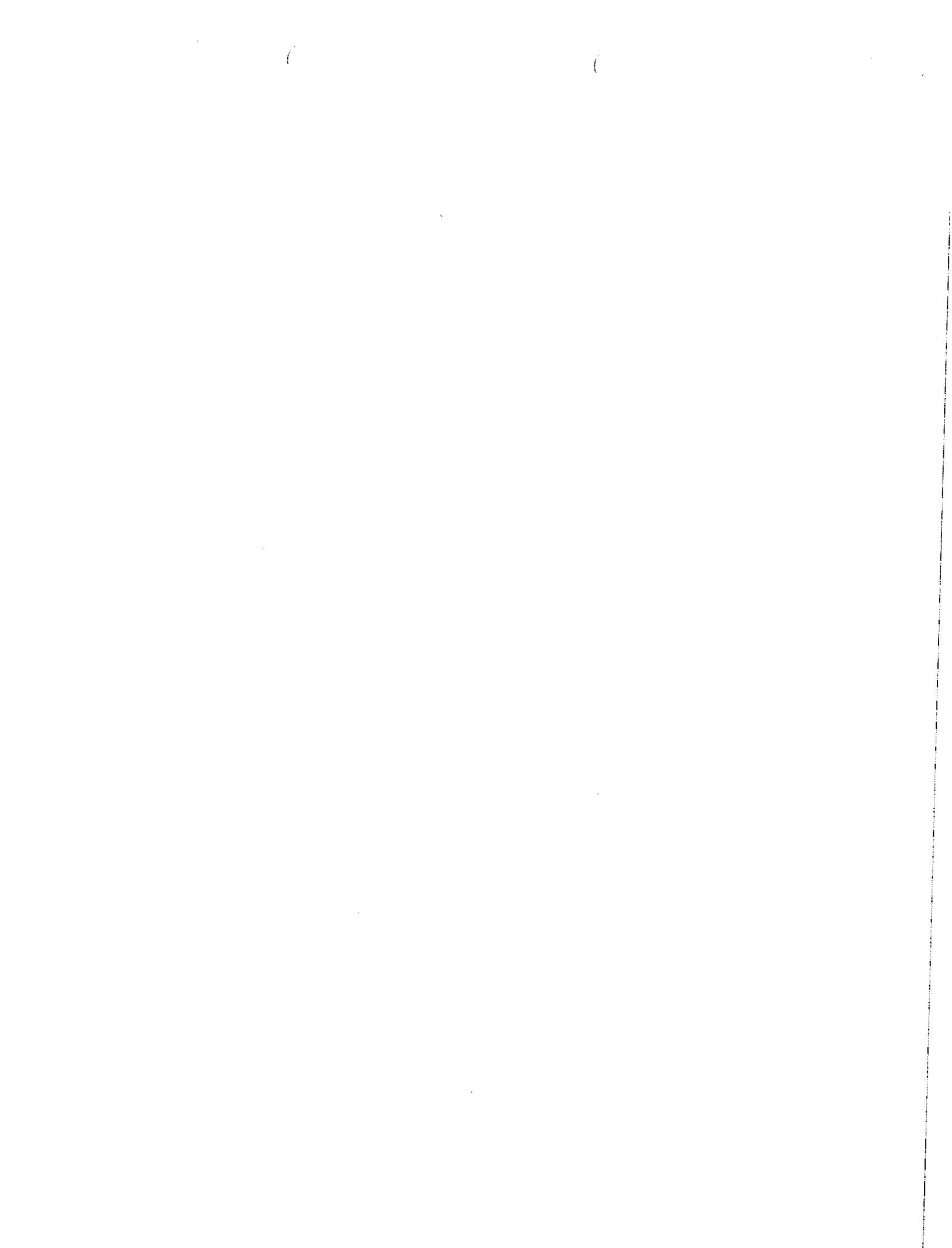
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12. *Potentiometric Map, TCE and PCE Iso-Concentrations Maps (Figures 5-4, 5-6 and 5-7)* - There is no apparent correlations between the groundwater flow direction in the potentiometric map (Figure 5-4) and the iso-concentration contours for TCE (Figure 5-6) and PCE (Figure 5-7). This discrepancy is most likely due to insufficient data and control points. Additional groundwater data is necessary to resolve the discrepancies among these three figures and to provide more accurate iso-concentration maps to show the extent of TCE and PCE.
13. *Concentration Map PCE, Figure 5-7* – In the legend, please change “TCE Concentration Levels” to “PCE Concentration Levels”, and delete “Free Product Not Detected”.
14. *Concentration Map PCE, Figure 5-7* – There are two unlabeled monitoring wells on both sides of the monitoring well G4MW022-08. Please label these two wells and provide PCE concentration results. Similarly, please show these two monitoring wells in all other maps (including TCE and potentiometric maps).
15. *Concentration Map TCE, Figure 5-6* - TCE concentration values are missing at each monitoring well location. Please include the concentration values and show the corresponding symbol in the legend.
16. *Missing Background Soil and Ground Water Sample* – GA EPD recommends that Fort Stewart should install background monitoring wells, as well as sentinel wells (sidegradient and downgradient).
17. *Conclusion and Recommendations*- The report states, “As Figure 5-6 shows, the TCE has been fully delineated to 10  $\mu\text{g/L}$ . There is still one well along the southeast perimeter (Well G4MW027) that has TCE at 8.9  $\mu\text{g/L}$  which is higher than the MCL or delineation target concentration of 5  $\mu\text{g/L}$ .” GA EPD believes that PCE and TCE have not been appropriately delineated (i.e., vertically or laterally). The concentration value of 10  $\mu\text{g/L}$  is an unacceptable delineation value. All samples should be delineated to background (i.e., non detect).

**B. Human Health Risk Assessment Comments**

1. *General Comment*- It was noted that Risk Assessment comments regarding toxicity factors, exposure parameters and risk calculations (i.e., 3, 4, and 5) from our letter dated May 30, 2006 were not addressed in the revised report. These comments were reiterated and additional comments are provided below.
2. *Executive Summary* – (Page E-9) - The executive summary suggests that contaminants in groundwater would be remediated to the in-stream water quality standard (IWQS). However,



GA EPD requires all groundwater constituents to be cleaned up to their respective maximum contaminant levels (MCL). In the absence of MCL data for any constituent, the risk-based remedial goal option (RGO) would need to be developed as the clean-up value. Please revise text.

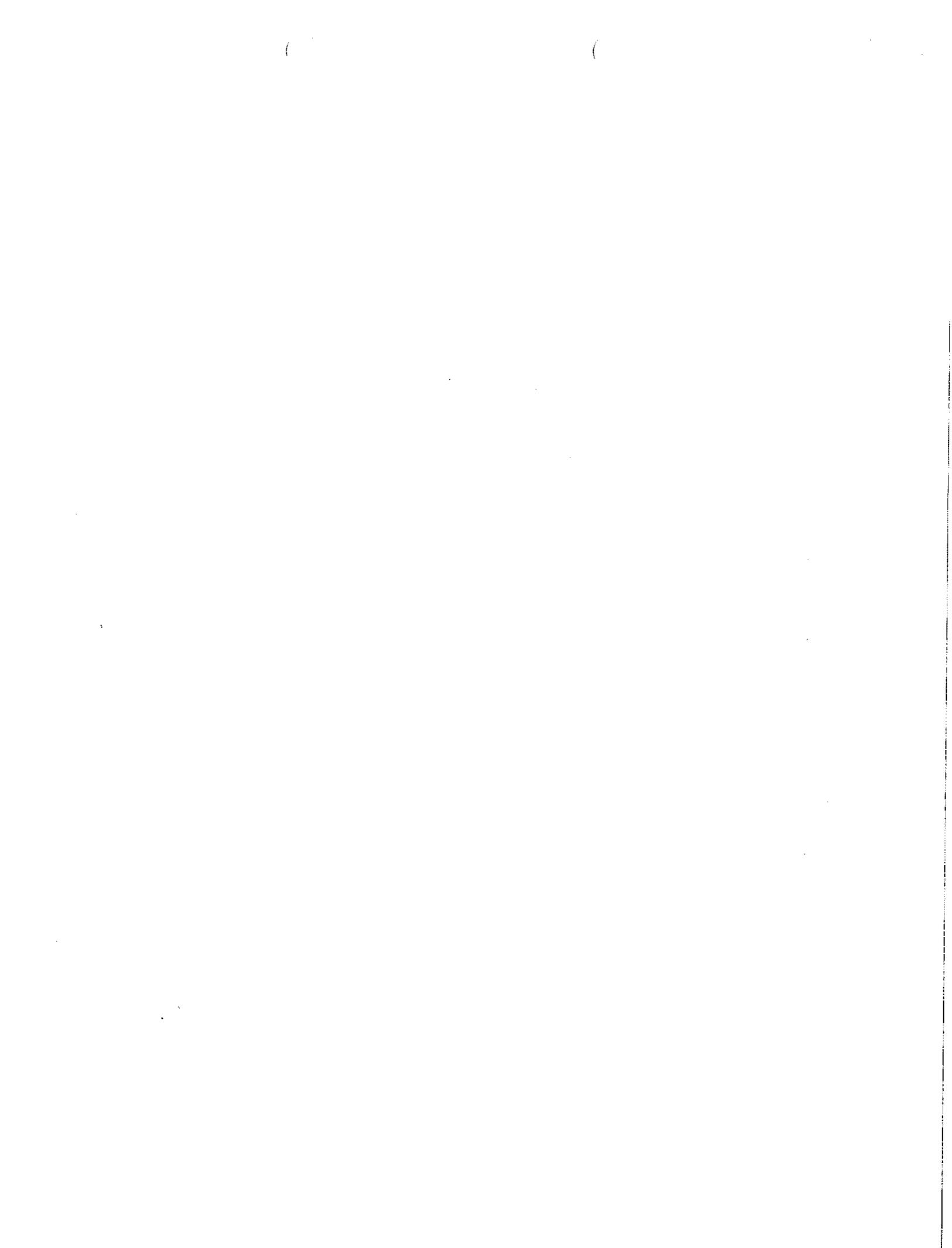
3. *Appendix C: Section 1.2 Identification of Chemicals of Potential Concern (COPC)*

- a. *Surface Water*- This section states that the Georgia IWQS were used as the screening criteria for surface water samples (e.g. Table 1-3, Appendix F). According to the Georgia Guidance<sup>1</sup>, the maximum detected concentrations in surface water should be compared to the National Recommended Water Quality Criteria (i.e., consumption of water and organism). However, if there are no National Recommended Water Quality Criteria values for a COPC (e.g. Cis-1,2-DCE, see comment 2 below), then the constituent should be carried forward in the risk assessment. Please revise the text and remove Table 1-3.
- b. *Soil*- Please note that the guidance considers surface soil (0-1 feet bgs) and subsurface soil (>1 feet bgs) as separate media. The report does not distinguish between surface and subsurface soil data. Please segregate soil data into these separate media, revise the conceptual site model, and reevaluate the risk from exposure to address this issue.
- c. The guidance states that the screening process is not designed to eliminate any chemical as a COPC relative to protection of groundwater, and that the potential for chemicals in subsurface soil to leach to groundwater should be addressed in the remedial investigation. The potential for COPCs in soil to leach to groundwater should be evaluated by appropriate laboratory testing and/or fate and transport modeling as needed. Laboratory tests include the Synthetic Precipitation Leaching Procedure (SPLP) and Toxicity Characteristics Leaching Procedure (TCLP) methods. Appropriate modeling includes the site-specific application of Equations 22 and 24 from the SSG<sup>2</sup> technical background guidance document.

4. *Appendix C- Table 1-3*- The risk-based screening levels (RBSLs) for surface water for all the VOCs are incorrect. Therefore, Cis-1,2-DCE, PCE, and TCE need to be retained as COPCs in the risk assessment and this media needs to be addressed in all risk calculations. The correct values are provided below:

Constituent	Maximum Detected Concentration (µg/L)	RBSLs <sup>§</sup> (µg/L)
Cis-1,2-Dichloroethene	0.67	N/A
Trans-1,2- Dichloroethene	0.12J	140
Tetrachloroethene (PCE)	0.94	0.69
Trichloroethene (TCE)	2.5	2.5

§ RBSLs were derived from National Recommended Water Quality Criteria (EPA, 2006)



5. *Appendix C&F: Section 1.3.2 Identification of Potential Receptors and Exposure Pathways*

- a. *Potential Receptors* – Based on the information presented in the RFI report, it is not acceptable to eliminate the potential for future construction workers, indoor workers, and residents (includes adult and child). Please note that although residents and construction workers are not currently residing or working within the SWMU 39 property boundary and there are no current construction activities being conducted at the site, these receptors should still be evaluated in the RFI because of the potential for land use to change in the future. The potential receptor scenarios and recommended exposure pathways outlined in Exhibit 3-1 of the Soil Screening Guidance<sup>3</sup> should be included in the conceptual site model and evaluated in the risk assessment, or appropriate justification for the elimination of a receptor and/or pathway should be provided. Please make necessary changes to the tables, figures and text.
- b. *Exposure Pathway* - Justification needs to be provided for the elimination of inhalation of volatiles from surface water, groundwater, and sediment for the maintenance worker and trespasser as shown in Figure 1-1. Also, dermal absorption of groundwater should be evaluated for all applicable receptors at SWMU-39.
- c. *Editorial Note* - Please revise text on page 12 (Appendix C) to read “Figure 1-1” instead of Figure 8-1.

6. *Appendix C&F: Section 1.3.3 Quantification of Exposure-*

- a. *Exposure Variables*- Please provide the exposure variables that were used to estimate potential chemical intakes and contact rates for receptors. BPD recommends the values taken from the Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins (EPA, 1995).
- b. *Intake Model* - The intake models for the various exposure routes need to be provided separately with their respective units. Therefore, please provide equations for:
  - Inhalation of COPCs in air
  - Ingestion of COPCs in soil
  - Ingestion of COPCs in groundwater
  - Dermal Absorption of COPCs in soil and water
- c. *Concentration Term in Intake Equations* - The concentration term or source term concentration (STC) was not provided for review and it is unclear if the derivation of the STC was part of the calculations for the site-specific target levels (SSTLs). The guidance specifies that the STC for soil, sediment, and surface water should be calculated based on the 95% upper confidence limit (UCL). For groundwater, the STC must be based on the arithmetic mean of the concentrations in the most highly contaminated area of the plume. Please note however, that according to the “Supplemental Guidance to RAGS: Calculating the Concentration Term” (May 1992), “...data sets with fewer than ten samples provide poor estimates of the mean



concentration (i.e., there is a large difference between the sample mean and the 95% UCL).” Therefore, for sample sizes less than ten, the maximum detected concentration can be used as the STC as a conservative estimate. All statistical model outputs to derived the 95% UCL should be included in the appendix.

7. *Appendix C&F: Section 1.4 Toxicity Assessment*- Please provide all toxicity data in table format. A table format similar to the one in the Georgia Guidance for presentation of toxicity values should be used as a template. To be consistent, please provide all inhalation toxicity data as RfDi (mg/kg-day) and SFi (1/(mg/kg-day)), and not RfC (mg/m3) and IUR (µg/m3) respectively. In addition, the toxicity data for all COPCs identified in groundwater during 2008 sampling (Appendix F) should be provided for review. It was noted that the toxicity data for tetrachloroethene and vinyl chloride were incorrect. The correct values are provided below:

Constituent	EPD Value (from Region IX PRG tables)	
Tetrachloroethene	RfDi = 0.14 mg/kg-day (Cal-EPA)	SFo = 0.54(mg/kg-day) <sup>-1</sup> (Cal-EPA) SFi = 0.021 (mg/kg-day) <sup>-1</sup> (Cal-EPA)
Vinyl Chloride		SFo = 1.5 (mg/kg-day) <sup>-1</sup> (IRIS) SFi = 0.031 (mg/kg-day) <sup>-1</sup> (IRIS)

8. *Appendix C&F: Section 1.5 Risk Characterization* - Please provide input parameters and the risk equations used to calculate the SSTLs. In addition, please provide sample calculations for the Hazard Index and Risk Calculations shown in Table 1-5 in Appendix F.
9. *Appendix C&F: Section 1.6 Risk Summary* - Please develop Remedial Goal Options (RGOs) based on a target risk of  $1 \times 10^{-06}$  and Hazard Index (HI) of 1.0 for all constituents retained as COCs in surface water and groundwater. The remedial goals cleanup levels should be presented for each COC in each medium and land use scenario, include any state or federal applicable or relevant and appropriate requirements (ARARs), and appropriate groundwater protection levels, as necessary.

### C. Ecological Risk Assessment (ERA) Comments

1. *General Comments* - The review was conducted in accordance with the Georgia EPD Guidance for Selecting Media Remediation Levels at RCRA Solid Waste Management Units<sup>1</sup> (hereinafter EPD Guidance) and USEPA regional guidance “Ecological Risk Assessment Bulletins –Supplement to RAGS<sup>4</sup>” dated March 18th, 2008 and the USEPA Region 4 memorandum “Amended Guidance on Ecological Risk Assessment at Military Bases: Process Considerations, Timing of Activities, and Inclusion of Stakeholders,” dated June 23, 2000. This most current revised Ecological Risk Assessment Bulletin (03/18/08) cited above appears to be the reference document used in the Ecological Risk Assessment (ERA).



2. *Table 4-1 Preliminary Ecological Screening for VOCs in Soils at SWMU 39* - The GA EPD concurs that the following constituents may be eliminated from the list of chemicals of potential concern (COPC) in the ERA: benzene, ethylbenzene, and toluene. Section 2.a of the EPD Guidance states: "The primary purpose of the preliminary risk evaluation (PRE) is to compare concentrations of facility related contaminants with USEPA Region 4 ecological screening values." For constituents for which there are no (Region 4) values, the chemical(s) of potential (ecological) concern (COPEC) will be carried forward for refinement in step 3 of the assessment process. Note: There is no Region 4 recommended ecological screening value for cis-1,2,-dichloroethylene, and therefore, the constituent must be carried forward with the remaining VOCs in soil in a separate table for further evaluation.
3. *Table 4-2 Preliminary Ecological Screening for VOCs in Sediment at SWMU 39* - Section 2.a of the Guidance states: "The primary purpose of the PRE is to compare concentrations of facility related contaminants with USEPA Region 4 ecological screening values." For constituents for which there are no (Region 4) values, the COPEC will be carried forward for refinement in Step 3 of the assessment process. There are no Region 4 ESVs for the following two constituents. Please carry these constituents forward in the risk assessment process.

Constituent	Ft. Stewart	Region IV ESV	Retain as COPC	Action
Cis 1,2-Dichloroethylene	1350 µg/L	no value	Yes	Carry forward
Trichloroethylene	47 µg/L	no value	Yes	Carry forward

4. *Refinement Step Three* - Please screen the constituents carried forward in comments 1 - 3 above to an acceptable alternate screening value reference, e.g. Region 5 Ecological Screening Levels, or the new website, USEPA's Mid-Atlantic Risk Assessment (<http://www.epa.gov/reg3hscd/risk/eco/index.htm>). Surrogates may be used in determining the Chemical of Ecological Concern (COEC) remediation levels. See Section III.2 and III.3 of the EPD Guidance for Assessment of Risk to Ecological Receptors, and COC Remediation Levels. Preliminary Remediation Goals (PRGs) are not addressed in the ecological risk guidance and may be deleted from the ecological review process.
5. *Baseline Ecological Risk Assessment* - The Amended Guidance on Ecological Risk Assessment at Military Bases: Process Considerations, Timing of Activities, and Inclusion of Stakeholders, dated June 23, 2000, on page six of the document states: "It is not necessary to perform food chain modeling for all COPCs. Rather, food chain models should be limited to those chemicals that are bioaccumulative." The food web modeling will probably be unnecessary.



Mr. Thomas V. Maulden  
December 22, 2008  
Page 9

The revision for the SWMU 39 RFI-Interim Action Report, appropriately addressing the comments above, should be submitted to GA EPD within sixty (60) days from receipt of this correspondence in the form of revised/new pages or a totally revised document. Note that two (2) copies of the revised report are requested by GA EPD in accordance with Condition IV.G.2 in your Hazardous Waste Facility Permit #HW-045(S&T). Should Fort Stewart decide to submit revised or new pages, please number with appropriate page numbers and the date revised, e.g., Page 6 (Revised 01/30/2006).

Should you have any questions concerning this correspondence, please contact Mo Ghazi of my staff at (404) 463-7507.

Sincerely,



Amy Potter  
Unit Coordinator  
Hazardous Waste Management Branch

<sup>1</sup> Georgia Environmental Protection Division Guidance For Selecting Media Remediation Levels At RCRA Solid Waste Management Units. November 1996.

<sup>2</sup> Soil Screening Guidance: Technical Background Document (EPA July 1996)

<sup>3</sup> USEPA Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24, Dec. 2002)

<sup>4</sup> Region 4, Ecological Risk Assessment Bulletins-- Supplement to RAGS, 03/18/08

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)

File: Fort Stewart (G)

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**DEPARTMENT OF THE ARMY**  
US ARMY INSTALLATION MANAGEMENT COMMAND  
US ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

REPLY TO  
ATTENTION OF

Directorate of Public Works

Certified Mail

**JUN 25 2008**

Georgia Environmental Protection Division  
Attention: Mr. Mo Ghazi  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

Dear Mr. Ghazi:

Reference Georgia Environmental Protection Division (GA EPD) letter, dated May 8, 2008, approving an extension until June 30, 2008 to complete and respond to comments for the Final Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IA) Report for the Underground Storage Tanks (USTs) Numbers 59 & 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39], dated December 2005, Fort Stewart, Georgia, Environmental Protection Agency (EPA) Identification (ID) Number GA9 210 020 872.

Fort Stewart is pleased to submit two copies and one CD-Rom of the Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IA) Report for Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated December 2005, revised June 2008; EPA ID No. GA9 210 020 872. This report outlines the field activities completed for the RFI (in response to GA EPD comments dated May 30, 2006 for this site) and includes recommendations for site restoration.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Mr. Dale Kiefer at (912) 767-4629, or Ms. Tressa Rutland, Directorate of Public Works, Environmental Division, Prevention and Compliance Branch, at (912)767-2010, should questions arise regarding the enclosed report.

Sincerely,

*Thomas V. Maulden*  
for Thomas V. Maulden  
Acting Director, Public Works

7006 2760 0000 2572 6048



7006 2760 0000 2572





**Final**  
**Resource Conservation and Recovery Act**  
**Facility Investigation and Interim Actions**  
**Report for Solid Waste Management Unit 39**  
**Fort Stewart, Georgia**



**December 2005**  
**Revised**  
**June 2008**

**Submitted to:**  
**Directorate of Public Works**  
**Environmental and Natural Resources Division**  
**Environmental Branch**

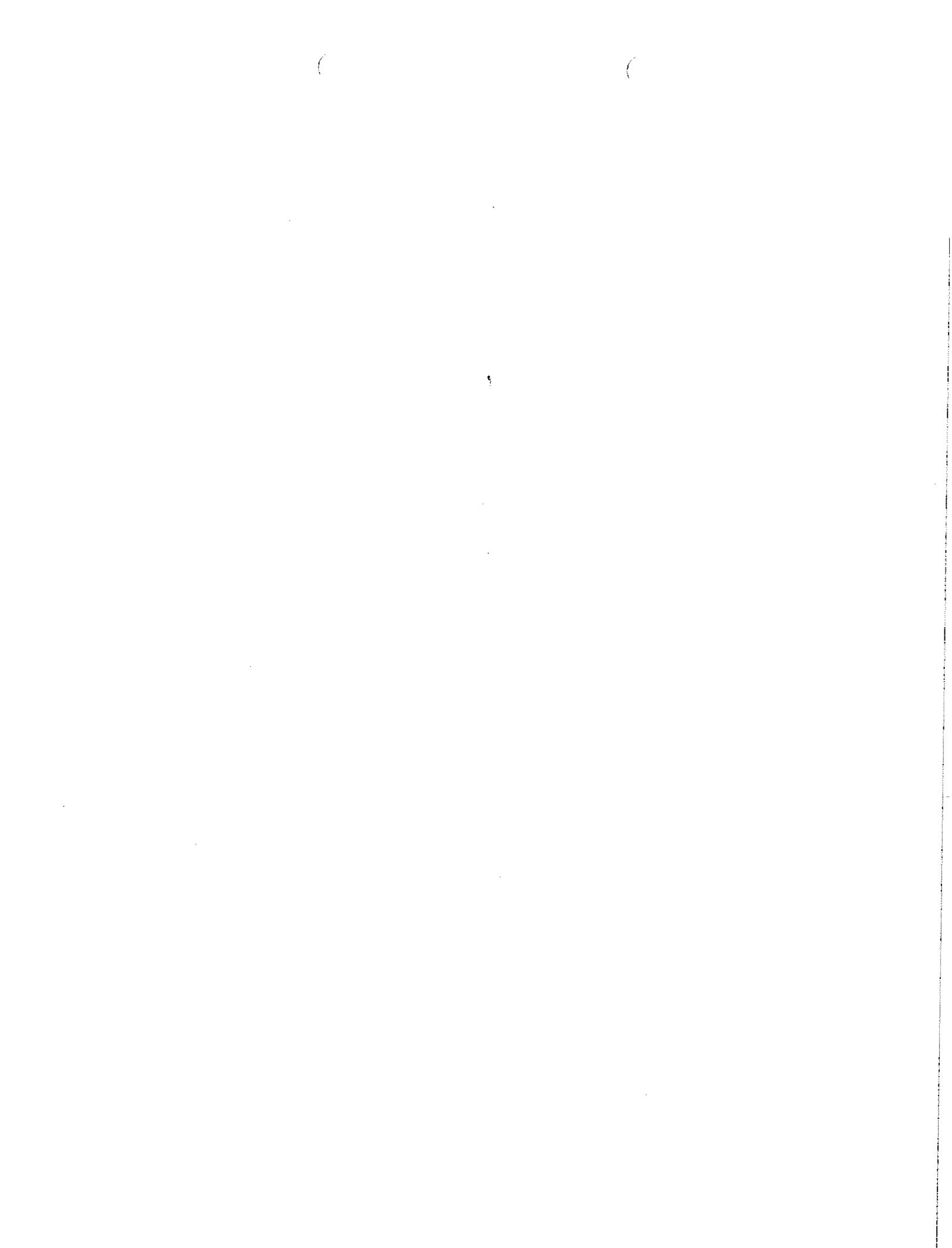
**Submitted by:**  
**U.S. Army Corps of Engineers**  
**Savannah District**



**Prepared by:**  
**SpecPro Environmental Services LLC**  
**1006 Floyd Culler Court**  
**Oak Ridge, Tennessee**

**under**  
**Contract No. DACA01-03-D-0010, Delivery Order No. CV06**  
**and**

**Contract No. W912HN-04-D-0019, Delivery Order No. 0002**



**7. CONCLUSIONS AND RECOMMENDATIONS**

The investigations at SWMU 39 included the isolation of two concrete flow-through vaults to eliminate a potential source area; multi-phase extraction for free product removal; an interim remedial action to eliminate free product on the water table; and soil, sediment, surface water, and groundwater sampling. The 2004 data were used in a human health risk assessment and an ecological risk assessment, and the most recent 2008 data were used in a second human health risk assessment.

Free product removal is needed for the free product found in well G4MW002. The extent of free product is shown in Figure 5-5.

Based on the results of the 2004 investigations, STEP recommended further action to remove the free product from those monitoring wells (G4MW007 and G4MW013). This removal was accomplished as discussed in Section 4. Groundwater monitoring in the replacement wells and other wells in the immediate area indicate the removal action was successful.

While the TCE and PCE concentrations found at the site were below the IWQS, complete delineation of those two contaminants was also recommended in previous investigations. As Figure 5-7 shows, the extent of PCE contamination has been determined. Figure 5-6 shows the TCE concentrations (based on the March/April 2008 groundwater monitoring). As Figure 5-6 shows, the TCE has been fully delineated to 10 µg/L. There is still one well along the southeast perimeter (Well G4MW027) that has TCE at 8.9 µg/L which is higher than the MCL or delineation target concentration of 5 µg/L.

Revisions were made to the 2004 human health risk assessment; the revised version is presented in Appendix C. The 2004 human health risk assessment concluded that TCE concentrations in surface water pose a potential risk to the unprotected maintenance worker and recreational trespasser. Four analytes were retained as COCs in groundwater because they exceeded the SSTLs for the unprotected maintenance worker: benzene, tetrachloroethene, TCE, and vinyl chloride. Benzene and vinyl chloride were detected in only two samples and are not likely to be representative of overall site conditions. TCE, however, was much more ubiquitous, having been detected in 25 of 27 groundwater samples.



The human health risk assessment on the March/April 2008 groundwater data concluded that in groundwater, three analytes were retained as COCs because they exceeded the SSTLs for the unprotected maintenance worker: tetrachloroethene, trichloroethene, and vinyl chloride.

An ecological risk assessment performed on the 2004 data concluded:

- For soil, tetrachloroethene, trichloroethene, and xylene were retained as COCs because they exceeded EPA Region 4 benchmarks.
- For sediment, acetone was retained as a COC because it exceeded the EPA Region 5 benchmark.

SES recommends further action to remove the free product from G4MW002 well by excavating the area around the well and replacing the one-inch diameter well with a two-inch (or larger) diameter well. After free product removal, SES recommends continued monitoring of the groundwater for BTEX at the site until laboratory test results from two semi-annual sampling events indicate the potential contaminants are below their respective IWQS. An additional groundwater monitoring should be performed to document the TCE levels do not rise above the IWQS. After groundwater levels remain below their respective IWQS, no further action (NFA) will be requested for the site.



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*Scanned at Sent Algeana, Waples, Kioja,  
CC Tressa, Tony, Sandra*  
**Georgia Department of Natural Resources**

2 Martin Luther King Jr. Drive, S.E., Suite 1470, Atlanta, Georgia 30334  
Noel Holemb, Commissioner  
Environmental Protection Division  
Carol A. Couch, Ph.D., Director  
404-463-0080

May 08, 2008

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Mr. Thomas V. Maulden  
Acting Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Request for an extension until June 30, 2008 to complete and response to comments for the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions Report for the Underground Storage Tank (UST) No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005; Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Sir:

The Hazardous Waste Management Branch of the Georgia Environmental Protection Division (GA EPD) is in receipt of a request by Fort Stewart, GA (Maulden to Ghazi) dated April 21, 2008 for an extension until June 30, 2008. The purpose of this request is to have adequate time to respond to comments by GA EPD (Rabon to Biering) on the Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions Report for the Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005. Considering the extent and complexity of responding to these comments, specifically, comment Number 4 of Section B, which involves the installation of seven (7) new monitoring wells for additional delineation of Trichloroethylene (TCE), GA EPD hereby approves the requested extension.

Should you have any questions concerning this correspondence, please contact Mo Ghazi of my staff at (404) 463-7507.

Sincerely,



Amy Potter  
Unit Coordinator

Hazardous Waste Management Branch

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)

File: Fort Stewart (G)

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J.K.  
N.K.



**DEPARTMENT OF THE ARMY**  
US ARMY INSTALLATION MANAGEMENT COMMAND  
US ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

REPLY TO  
ATTENTION OF

APR 21 2008

Directorate of Public Works

CERTIFIED MAIL

Georgia Environmental Protection Division  
Attention: Mr. Mohammad Ghazi  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

Dear Mr. Ghazi:

Reference Fort Stewart's letter dated March 6, 2008 regarding a request for an extension until June 30, 2008 to complete the response to comments for the Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IAs) Report for the Underground Storage Tank (UST) No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005; Fort Stewart; EPA ID No. GA9 210 020 872, the Georgia Environmental Protection Division's (GA EPD's) correspondence dated April 7, 2008, and your April 14, 2008 email.

Fort Stewart appreciates GA EPD's time and consideration in the telephone conference call held on April 2, 2008 with yourself and Ms. Amy Potter to discuss the progress of the response to comments for the RFI and IAs report for SWMU 39, the field work to fully delineate the Trichloroethene (TCE), and completion of the Revised RFI. Fort Stewart looks forward to the implementation of GA EPD's recommendation to hold future Partnering Sessions to improve lines of communication and to enhance the remedial cleanup actions for all sites at Fort Stewart.

As discussed in our conference call, remaining funds with the existing contract associated with SWMU 39 has allowed Fort Stewart to further extend its Trichloroethylene (TCE) delineation. The RFI Work Plan recommended that eight (8) additional monitoring wells [five (5) shallow and three (3) deep] be installed to monitor the TCE contamination at this site; however, due to budget constraints, only seven (7) monitoring wells [six (6) wells at twenty (20) feet deep and one (1) well at forty-five (45) feet deep] were installed during the week of March 24, 2007 at extended locations beyond the physical limits of the motor pool area wherein USTs 59 and 60 were formerly located. Development of these wells were conducted on March 31, 2008 and sampling was completed on April 2, 2008. Estimated availability of the validated lab results is expected by April 30, 2008. In the event analysis indicates that all TCE levels sampled are below the recommended remedial level for the delineation of TCE, our response to Comment Number 4 of Section B of the letter from GA EPD (Rabon to Biering) dated May 30, 2006 will be considered complete.



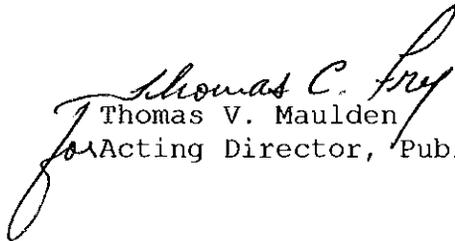
Fort Stewart appreciates GA EPD's verbal extension of time to submit the response to comments and the Final RFI for SWMU 39 by June 30, 2008 rather than by May 7, 2008 as requested in GA EPD's April 7, 2008 correspondence. In the event lab results (anticipated by April 30, 2008) from the sampled perimeter monitoring wells exceed the remedial level for the TCE delineation, Fort Stewart will proceed with the submission of the RFI and IAs report with completed responses by June 30, 2008. As mentioned during our teleconference, and in our letter dated March 6, 2008, the Revised RFI would not be complete if submitted prior to the June 2008 requested extension. Your approval to extend the submittal date to June 30, 2008 affords Fort Stewart the best opportunity to complete the Revised RFI based on pending lab results from the recent perimeter well sampling event at this site. However, if it is found that additional sampling is required to complete the TCE delineation, it will be performed under a separate contract and will include an RFI Addendum. Upon the receipt of approval of the completed RFI Report, and/or an RFI Addendum Report, the Corrective Action Plan (CAP) will be submitted in accordance with GA EPD response to comments.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Mr. Dale Kiefer at (912)767-4629 or Ms. Tressa Rutland, Directorate of Public Works Environmental Division, at (912)767-2010, should questions arise regarding the enclosed report.

Sincerely,

  
Thomas V. Maulden  
Acting Director, Public Works

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2 Martin Luther King Jr. Drive, S.E., Suite 1470, Atlanta, Georgia 30334  
Noel Holcomb, Commissioner  
Environmental Protection Division  
Carol A. Couch, Ph.D., Director  
404-656-2833

RECEIVED  
APR 11 2008  
PAGE 1 OF 1

April 7, 2008

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Michael W. Biering, P.E.  
Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Request for Revised Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions Report at Solid Waste Management Unit (SWMU) 39 Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Mr. Biering:

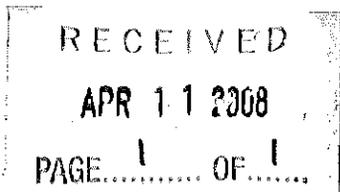
On November 5, 2007, the Georgia Environmental Protection Division (GA EPD) received from Fort Stewart the requested response to comments (Rabon to Biering, dated May 30, 2006) from our review of "Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions Report for SWMU 39." However, our files do not indicate that this office ever received a revised RFI report for SWMU 39. Please submit, within thirty (30) days of receipt of this letter, two copies the revised RFI report.

Should you have any questions concerning this correspondence, please contact Mo Ghazi of my staff at 404-463-7507.

Sincerely  
  
Amy Potter  
Unit Coordinator  
Hazardous Waste Management Branch

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)  
File: Fort Stewart (G)  
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4 Apr - Already Sent & Scanned as Copy

# Georgia Department of Natural Resources

2 Martin Luther King Jr. Drive, S.E., Suite 1470, Atlanta, Georgia 30334  
Noel Holcomb, Commissioner  
Environmental Protection Division  
Carol A. Couch, Ph.D., Director  
404-656-2833

April 2, 2008

## CERTIFIED MAIL RETURN RECEIPT REQUESTED

Michael W. Biering, P.E.  
Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Final Work Plan for Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report at Solid Waste Management Unit 39, Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Mr. Biering:

The Hazardous Waste Management Branch of the Georgia Environmental Protection Division (GA EPD) is in receipt of the above-referenced document submitted with correspondence (Biering to Ghazi) dated November 5, 2007. From our review, it appears that the above document has been prepared appropriately.

Should you have any questions concerning this correspondence, please contact Mo Ghazi of my staff at 404-463-7507.

Sincerely

Amy Potter  
Unit Coordinator  
Hazardous Waste Management Branch

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)

File: Fort Stewart (G)

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**DEPARTMENT OF THE ARMY**  
US ARMY INSTALLATION MANAGEMENT COMMAND  
US ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

REPLY TO  
ATTENTION OF

Office of the Directorate

MAR 06 2008

CERTIFIED MAIL

Georgia Environmental Protection Division  
Attention: Mr. Mohammad Ghazi, Ph.D., Geologist  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

Dear Mr. Ghazi:

Reference Fort Stewart letter dated October 31, 2007 regarding installation response to Georgia Environmental Protection Division (GA EPD) correspondence regarding the Request for Comments and Revised Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IAs) Report for the Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005; Fort Stewart; EPA ID No. GA9 210 020 872, dated September 18, 2007.

In Fort Stewart's correspondence (Biering to Ghazi) dated October 31, 2007, Fort Stewart provided two copies and a CD-Rom of the Final Work Plan for Resource Conservation and Recovery Act Facility Investigation at the Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated October 2007. SWMU 39 field work was initiated February 2008. At that time, it was estimated the field work could be completed in February and the RFI/CAP would be completed in June 2008. On February 22, 2008, preliminary lab analysis indicated the Trichloroethylene (TCE) plume extends beyond the limits of the contractor's existing scope of work. Funding for the additional field work/sampling is not available at this time. Therefore, the contractor was instructed to complete the RFI/CAP report based on the data obtained from the completed field work so it can be submitted to GA EPD by June 30, 2008. An Addendum to the RFI/CAP will be completed and submitted to GA EPD in 2009.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

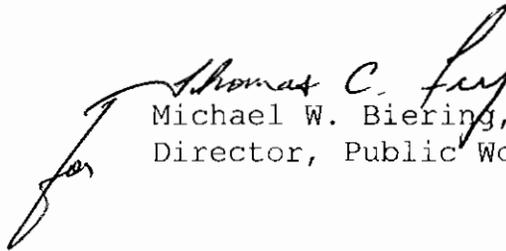
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the



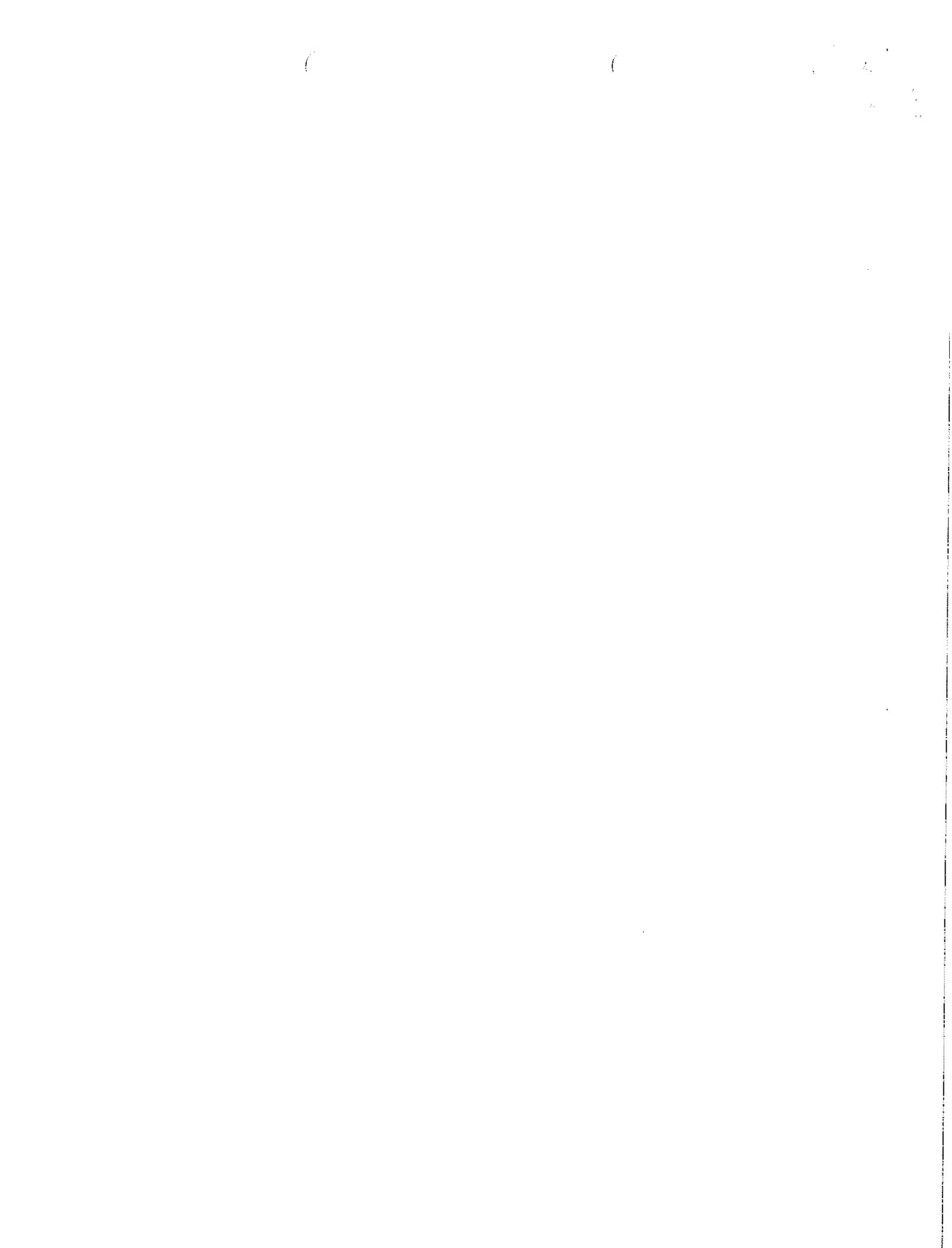
information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Mr. Dale Kiefer at (912)767-4629 or Ms. Tressa Rutland, Directorate of Public Works Environmental Division, at (912)767-2010, should questions arise regarding this extension.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael W. Biering". The signature is written in a cursive style with a long, sweeping underline that extends to the left.

Michael W. Biering, P.E., CFM  
Director, Public Works





REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
US ARMY INSTALLATION MANAGEMENT COMMAND  
US ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314

OCT 31 2007

Office of the Directorate

CERTIFIED MAIL

Georgia Environmental Protection Division  
Attention: Mr. Mohammad Ghazi  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

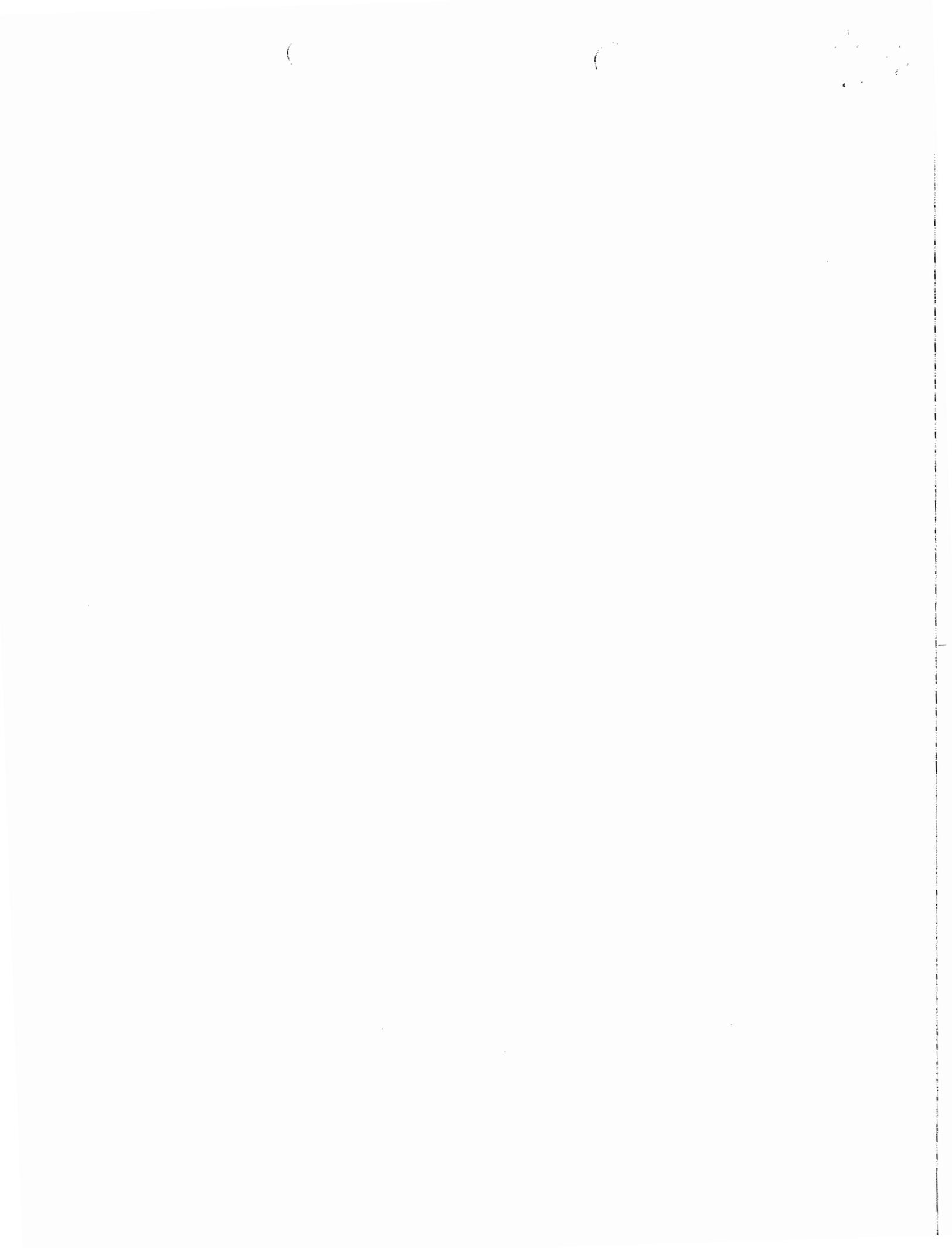
Dear Mr. Ghazi:

Fort Stewart is pleased to receive the Georgia Environmental Protection Division's (GA EPD) correspondence dated September 18, 2007 regarding the Request for Comments and Revised Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IAs) Report for the Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005; Fort Stewart; EPA ID No. GA9 210 020 872, dated September 18, 2007.

In an email correspondence (Stevenson to Causse) dated July 26, 2006; Fort Stewart originally requested an extension to respond to comments for this report until August 25, 2006. Prior to the extension deadline Fort Stewart reported to Mr. Causse, that additional sampling would be necessary in order to address several of the comments received from GA EPD in the letter (Rabon to Biering) dated May 30, 2006 and that due to the unavailability of funds, Fort Stewart would be unable to perform the additional field work within the allotted extension time.

Fort Stewart has received funding for the additional field work necessary to comply with the original comments received on May 30, 2006 and enclosed are two copies and a CD-Rom of the Final Work Plan for Resource Conservation and Recovery Act Facility Investigation at the Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated October 2007. This work plan outlines the proposed field activities and completion schedule necessary to complete the RFI. Also enclosed, are two copies of the response to comments for the letter received (Rabon to Biering) dated May 30, 2006. Upon approval of the Work Plan, Fort Stewart will perform proposed field work and the revised Final Facility Investigation (RFI) and Interim Actions (IAs) Report for the Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] will be submitted.

file  
SWMU 39  
26 Nov 07

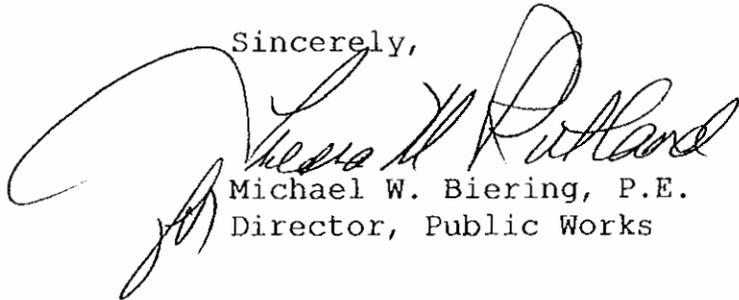


In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Mr. Dale Kiefer at (912)767-4629 or Ms. Tressa Rutland, Directorate of Public Works Prevention and Compliance Division, at (912)767-2010, should questions arise regarding the enclosed report.

Sincerely,



Michael W. Biering, P.E.  
Director, Public Works

Enclosure



Placed file in SWMU 39  
8-29-07  
H.K.  
(No Transmittal  
letter found for  
extension)

**RESPONSE TO COMMENTS**

*Final  
Resource Conservation and Recovery Act  
Facility Investigation and Interim Actions Report  
for Solid Waste Management Unit 39  
Fort Stewart, Georgia*

---

**Comments From:** Benoit Causse

**Organization:** Georgia Department of Natural Resources, Environmental Protection Division,  
Hazardous Waste Management Branch, DoD Remediation Unit

**Comments Dated:** May 30, 2006 (letter from Brent Rabon, Coordinator, DoD Remediation Unit,  
Hazardous Waste Management Branch, GA EPD, to Michael W. Biering, PE, Director, Public Works,  
Fort Stewart, GA)

**General Comments**

**Comment 1:** *Introduction* – Please insert the time period covered by the report, i.e., April through November 2004 in Section 1 (page 1).

**Response:** Text will be added.

**Comment 2:** *Soil and surface water analytical results* – Samples 04106U03M and 04240U03M, shown in Table 7-1 and 7-2, are not listed in Table 5-1 and 5-5; please correct and add a subscript to Tables 5-1, 5-5, 7-1, 7-2, and 7-4 to explain the significance of the letter “M” next to the sample number.

**Response:** Text will be changed to provide a better explanation of the letter M.

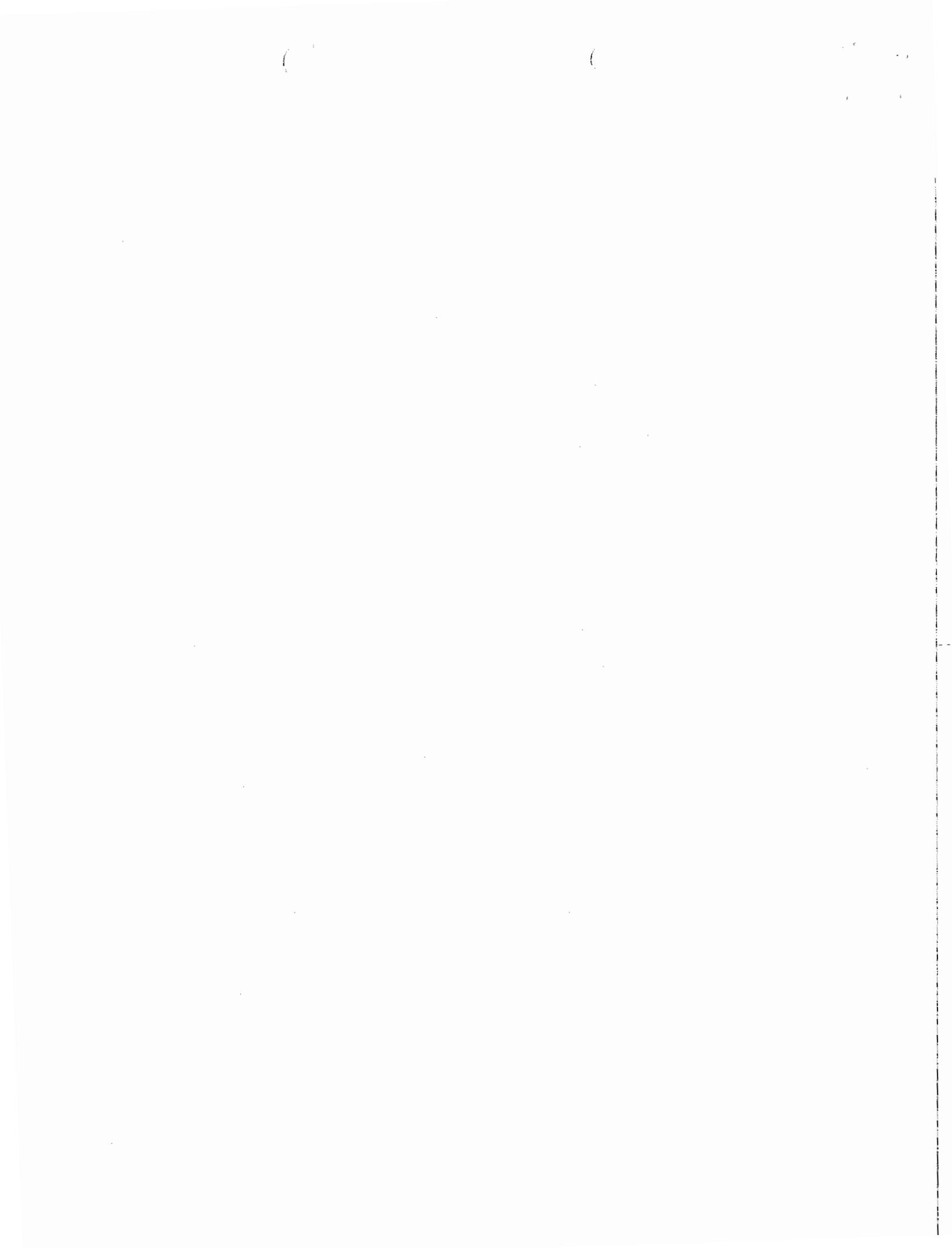
**Comment 3:** *Previous Investigations at SWMU 39* – Please insert subsections in section 4.2 (page 8) when describing previous investigations performed at SWMU 39. Each subsection should correspond to a specific field activity: 4.2.1 UST Closure – December 1997, 4.2.2 UST and HOT Investigations – February-June 2001, 4.2.3 RCRA Facility Investigations – November 2002, etc.

**Response:** Text will be changed.

**Comment 4:** *Groundwater analytical results* – Section 5-1 (page 17) states that “two existing monitoring wells, G4MW002 and G4MW007, contained free product and were not sampled” in April 2004. However, Table 7-5 (page 37) and Appendix C (Form IVOA 48 to 51) present analytical results from G4MW002. Please explain this discrepancy.

**Response:** G4MW002 was not sampled during the April 2004, sampling event. Table 7-5 will be changed to indicate sample 04119G13 was collected from G4MW021.

**Comment 5:** *RCRA corrective action process and terminology* – Although OSWER directive 9902.3-2A, dated May 1994, recommends the development of Corrective Measures Study (CMS) and Corrective Measures Implementation (CMI) reports when implementing RCRA corrective actions at a site, GA EPD uses a single document entitled Corrective Action



Plan (CAP) that merges the CMS/CMI steps into one. Please correct *corrective measures study* throughout the report to read *corrective action plan (CAP)* to be consistent with GA EPD procedure.

Response: Text will be corrected.

Comment 6: *Field parameters* – Please provide pH, temperature, turbidity, and conductivity measurement results in future reports.

Response: Field parameters will be included in the revised report.

#### Corrective Action

Comment 1: *Isolation of two concrete flow-through vaults* – Fort Stewart did not submit to our agency the interim measures (IM) work plan requested in correspondence (Rabon to Biering) dated June 1, 2004. Please provide in Section 5.2.3 (page 20) the rationale for filling the concrete vaults with concrete and plugging underground pipes with fuel-resistant caulking, as opposed to the complete removal of the underground installations, as suggested in the above-referenced correspondence. Also explain if the vaults and the piping system were free of residual used oil when sealed with concrete.

Response: **Algeana This Comment is For You**

Comment 2: *Ecological risk assessment* – Exposure threats to ecological receptors must be assessed in an RFI report. Please include an ecological risk screening assessment in the report OR, if it was previously demonstrated that no ecological receptors are at risk at the site, complete section 4.2 (page 8) to provide the reference of the demonstration.

Response: **Algeana This Comment is For You (An Ecological Risk Assessment was not in the Scope of Work for this project).**

Comment 3: *Remedial Levels (RL)* – Please include in section 10 (page 75) the recommended remediation levels for each contaminant, sorted by medium. Note that the remedial levels have to be derived from the human health risk assessment and the ecological risk assessment; the lesser of the two values will be used as the final remedial level that is protective of both human and ecological receptors.

Response: Text will be revised to include Remedial Levels for human receptor(s).

Comment 4: *Further delineation of contamination* – Section 10 (page 75) recommends “a corrective measures study (i.e., corrective action plan) including further delineation of the TCE contamination to determine the best corrective action”. This proposal is not consistent with Chapter III of OSWER directive 9902.3-2A, dated May 1994 and section II.2 of GA EPD guidance for selecting media remediation levels at RCRA solid waste management units, dated November 1996. According to the latter, an RFI report should “...characterize the nature and extent of releases, perform an assessment of risk posed by the releases, and identify potential media remediation levels”; therefore, GA EPD requests complete delineation of contamination to be performed before the submittal of a corrective action plan. Please, conduct additional field work as described in section 9.0 (page 70) and include the results in the present report.



Response: We propose two rounds of additional groundwater sampling. One sampling event should occur during the wet season and the other being during a dry season. Of course this work would be based on the availability of funds. The two rounds of data would then be used to conduct the risk assessment.

#### Risk Assessment

Comment 1: *Conceptual Site Model.* – The following receptors and exposure pathways should be added or justification for omission of the pathways should be provided. These pathways should be addressed in the text and added to the Conceptual Site Model in Figure 8-1.

Receptor	Exposure Pathway(s)
Maintenance Worker (Current & Future)	Direct ingestion and dermal absorption of groundwater should be included for future, but omitted for current.
	Surface water ingestion and dermal contact
Trespasser (Future)	Incidental surface water ingestion and dermal contact.

Response: After further discussions with Fort Stewart and the State of Georgia, the following conclusions were made. In addition to the receptors in the report, the receptors that are to be evaluated are a current and future maintenance worker and current and future trespasser. The current and future maintenance worker should be evaluated for both ingestion and dermal contact with surface water (in addition to other pathways). The report should list all receptors considered and all exposure pathways for each receptor. If there are no COPCs in a given media, the exposure pathway can be eliminated from further consideration. If all exposure pathways for a receptor are eliminated, then that receptor does not need to be evaluated quantitatively. If COPCs are screened out for a medium, justification of why a receptor is not evaluated needs to be included in the report.

Comment 2: *Risk-Based Screening Levels.* – According to GA EPD guidance, the maximum detected concentrations in surface water should be compared to the Water Quality Standards (WQS) for human health.<sup>1</sup> However, if there are no WQS for a COPC then screening against Region 9 tap water PRGs is acceptable. Additionally, Section 8.2 does not provide an adequate description of how the RBSL were selected for different media. Please revise.

<sup>1</sup>Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins. EPA Region 4, originally published November 1995, Website version last updated May 30, 2000.

Response: Screening will be changed to use WQS where available. Text will be added to provide description of selection of RBSLs.

Comment 3: *Toxicity Factors.* – Some of the toxicity factors used in the report are not consistent with the values used by GA EPD. Please revise the applicable risk calculations using the values listed below. Additionally, as noted in OSWBR Directive 9285.7-53 (dated December 5, 2003), the updated EPA hierarchy is as follows.



- Tier 1 – EPA's Integrated IRIS
- Tier 2 – EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs)
- Tier 3 – Includes additional EPA sources (e.g., historic HEAST and NCEA provisional values) and non-EPA sources of toxicity information (e.g., California EPA toxicity values).

Hazardous Constituent	GA EPD Value	
Tetrachloroethene	RfDi = 0.14 mg/kg-day (N)	SFo = 0.54 (mg/kg-day) <sup>-1</sup> (N) SFi = 0.021 (mg/kg-day) <sup>-1</sup> (N)
Vinyl Chloride	RfDi = 0.286 mg/kg-day (I)	SFo = 1.4 (mg/kg-day) <sup>-1</sup> (I) SFi = 0.03 (mg/kg-day) <sup>-1</sup> (I)

(I)-IRIS  
(N)-NCEA

**Response:** After further discussions with Fort Stewart and the State of Georgia, the following conclusions were made. For PCE use a SFo-0.54 mg/kg-day, SFi-0.021 mg/kg-day, RfDo- 0.01 mg/kg-day, RfDi-0.14 mg/kg-day.

**Comment 4:** *Exposure Parameters.* – Please provide the exposure parameters that were used in the risk equations. GA EPD recommends the values taken from the *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins*. EPA Region 4, originally published November 1995, Website version last updated May 30, 2000. Additionally, since the exposure parameters for the maintenance worker were not provided, GA EPD cannot determine if exposure to the current maintenance worker will be protective of future receptors not evaluated in the RFI (i.e. future maintenance worker, future construction worker).

**Response:** Text will be added.

**Comment 5:** *Risk Calculations.* – Please provide the risk equations used to calculate the site-specific target levels.

**Response:** Text will be added.



**SWMU 39 – Fort Stewart  
Clarification of Comments from the Georgia Department of Natural Resources**

The initial questions relate to specific comments from Georgia Environmental Protection Division (GA EPD) dated May 30, 2006. Issues raised later may make some of these questions irrelevant.

***Comment C. Risk Assessment #1 Conceptual Site Model***

- Are the receptors to be evaluated a current maintenance worker, future maintenance worker, and future trespasser? The document as it presently exists evaluates current exposures to the maintenance worker and the trespasser. Please note that Comment #4 also mentions a future construction worker.
- Under the exposure pathways for the maintenance worker, are surface water ingestion and dermal contact to be included for both the current maintenance worker and the future maintenance worker?

**Comment C. Risk Assessment #1 Conceptual Site Model:** In addition to the receptors in the report, the receptors that are to be evaluated are a current and future maintenance worker and current and future trespasser. The current and future maintenance worker should be evaluated for both ingestion and dermal contact with surface water (in addition to other pathways). The report should list all receptors considered and all exposure pathways for each receptor. If there are no COPCs in a given media, the exposure pathway can be eliminated from further consideration. If all exposure pathways for a receptor are eliminated then that receptor does not need to be evaluated quantitatively. If COPCs are screened out for a media justification of why a receptor is not evaluated needs to be included in the report.

***Comment C. Risk Assessment #2 Risk-based Screening Levels***

- The comment indicates that surface water should be compared to the Water Quality Standards (WQS). EPA lists WQS for Georgia at the following URL:  
[http://www.epa.gov/waterscience/standards/wqslibrary/ga/ga\\_4\\_wqs.pdf](http://www.epa.gov/waterscience/standards/wqslibrary/ga/ga_4_wqs.pdf)

On page 12 of that document the WQS is listed as 8.85 µg/L for PCE and 81 µg/L for TCE. Are these the screening values we should use?

**Comment C. Risk Assessment #2 Risk-based Screening Levels:** Yes, the WQS for PCE is 8.85 µg/L and for TCE 81 µg/L.

***Comment C. Risk Assessment #3 Toxicity Factors***

- For tetrachloroethene, the SFI is listed as 0.021 mg/kg-day; in a subsequent e-mail from Jill Clark the SFI = 0.21 mg/kg-day. Which is correct? This was already addressed in an email from Benoit dated Sunday July 30, 2006.

When surface water concentrations for SWMU 39 are screened against the Georgia in-stream WQS in the risk assessment, no COPCs remain. Because there are no COPCs in surface water, soil, or sediment, the recreational trespasser scenario is no longer valid. The unprotected maintenance worker is now the only receptor.

In the past we have been instructed to screen groundwater against the Georgia in-stream WQS as well. Should we screen groundwater at SWMU 39 against the WQS or Region 9 PRGs for the risk assessment?



If groundwater is screened against the WQS, only two COPCs (cis-1,2-dichloroethene and tetrachloroethene) remain.

**Comment C. Risk Assessment #3 Toxicity Factors:** For PCE use a SFO- 0.54 mg/kg-day, SFi- 0.021 mg/kg-day, RfDo- 0.01 mg/kg-day, RfDi- 0.14 mg/kg-day

As for the remaining comments... Groundwater should be screened by using Region 9 Tap water PRGs. If groundwater recharges to surface water a comparison to WQS should be made. Fate and Transport modeling can be used when converting groundwater concentrations to surface water concentrations prior to screening versus WQS.

***Comment B Corrective Action #4 Further Delineation of Contamination***

The comment indicates that we should conduct additional field work to completely delineate the extent of TCE contamination and include the results in the present report. If, in fact, GA EPD is requesting further delineation and the merging of the Corrective Measures Study/Corrective Measures Implementation into one document (Corrective Action Plan), should we wait to complete the risk assessment using the additional (and most recent) data collected?

**Comment B Corrective Action #4 Further Delineation of Contamination:**

The general "guideline" about data to be included is as follows:

**Soil:** Use data from all the sampling events since concentration in soil is not likely to vary over a short period of time and, therefore, older results are still representative.

**Groundwater:** Use the latest data available.

However, since the additional sampling (as presented in section 9, page 70-71) will address only the peripheral area (i.e., lower concentrations expected), data from November 2004 sampling event should also be used. If Fort Stewart decides to re-sample highly contaminated areas in addition to the peripheral area, then the latest data only could be used.

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CC: Tressa

**Georgia Department of Natural Resources**

2 Martin Luther King Jr. Drive, S.E., Suite 1470, Atlanta, Georgia 30334  
Noel Holcomb, Commissioner  
Environmental Protection Division  
Carol A. Couch, Ph.D., Director  
404-656-2833

This was scanned in Sept —

*Received*  
*9-25-07*

September 18, 2007

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Michael W. Biering, P.E.  
Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Request for Comments and Revised Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IAs) Report for the Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005; Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Mr. Biering:

In reviewing our files on Solid Waste Management Unit (SWMU) 39, it has come to our attention that on May 30, 2006, the enclosed correspondence (Rabon to Biering) was mailed to your office. In this correspondence, the Georgia Environmental Protection Division (GA EPD) requested that Fort Stewart submit a revised Final RCRA Facility Investigation (RFI) Report for SWMU 39 addressing the enclosed comments within sixty (60) days of receipt of that correspondence. However, our files do not indicate that this office received any response to comments, or the revised Final RFI Report. Please provide the requested revised RFI Report for SWMU 39 addressing our comments in the May 30, 2006 attached correspondence within thirty (30) days of receipt of this letter.

Should you have any questions concerning this correspondence, please contact Mo Ghazi of my staff at 404-463-7507.

Sincerely



Amy Potter  
Unit Coordinator  
Hazardous Waste Management Branch

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)

File: Fort Stewart (G)

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**DEPARTMENT OF THE ARMY**  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT STEWART/HUNTER ARMY AIRFIELD  
DIRECTORATE OF PUBLIC WORKS  
1587 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-5048

REPLY TO  
ATTENTION OF

Office of the Directorate

Express Mail

Georgia Environmental Protection Division  
Attention: Mr. William Powell  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia 30334-9000

JUL 17 2007

Dear Mr. Powell:

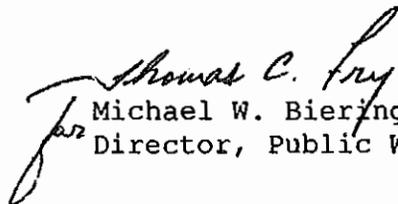
Fort Stewart is pleased to submit two copies of the Final Report for Interim Remedial Action at Solid Waste Management Unit 39, Underground Storage Tanks 59 and 60, Fort Stewart, Georgia, dated June 2007. The purpose of this report is to document the interim remedial action and replacement of two monitoring wells for this site.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Mr. Dale Kiefer at (912) 767-4629, or Ms. Tressa Rutland, Directorate of Public Works Environmental Branch, at (912) 767-2010, should questions arise regarding the enclosed report.

Sincerely,

  
Michael W. Biering, P.E., CFM  
Director, Public Works

Enclosure

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MAY 31 2006

PAGE...2... OF...5...

# Georgia Department of Natural Resources

2 Martin Luther King Jr. Drive, S.E., Suite 1470, Atlanta, Georgia 30334

Noel Holcomb, Commissioner

Environmental Protection Division

Carol A. Couch, Ph.D., Director

404-656-2833

May 30, 2006

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Michael W. Biering, P.E.  
Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Algeana Stevenson)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

RE: Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Interim Actions (IAs) Report for the Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] dated December 2005; Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Mr. Biering:

The Hazardous Waste Management Branch of the Georgia Environmental Protection Division (GA EPD) is in receipt of the above-referenced document submitted with correspondence (Biering to Causse) dated February 8, 2006. Based upon our review, GA EPD has generated the following comment(s):

**A. General Comments**

1. *Introduction* – Please insert the time period covered by the report, i.e., April through November 2004 in Section 1 (page 1).
2. *Soil and surface water analytical results* – Samples 04106U03M and 04240U03M, shown in Table 7-1 and 7-2, are not listed in Table 5-1 and 5-5; please correct and add a subscript to Tables 5-1, 5-5, 7-1, 7-2 and 7-4 to explain the significance of the letter “M” next to the sample number.
3. *Previous investigations at SWMU 39* – Please insert subsections in section 4.2 (page 8) when describing previous investigations performed at SWMU 39. Each subsection should correspond to a specific field activity: 4.2.1. UST Closure – December 1997, 4.2.2 UST and HOT Investigations – February-June 2001, 4.2.3. RCRA Facility Investigations – November 2002, etc.
4. *Groundwater analytical results* – Section 5-1 (page 17) states that “two existing monitoring wells, G4MW002 and G4MW007, contained free product and were not sampled” in April 2004. However, Table 7-5 (page 37) and Appendix C (Form I VOA 48 to 51) present analytical results for G4MW002. Please explain this discrepancy.



MAY 31 2006

PAGE.....3..... OF.....5.....

Mr. Michael W. Biering

May 30, 2006

Page 2

5. *RCRA corrective action process and terminology* – Although OSWER directive 9902.3-2A, dated May 1994, recommends the development of Corrective Measures Study (CMS) and Corrective Measures Implementation (CMI) reports when implementing RCRA corrective actions at a site, GA EPD uses a single document entitled Corrective Action Plan (CAP) that merges the CMS/CMI steps into one. Please, correct *corrective measures study* throughout the report to read *corrective action plan (CAP)* to be consistent with GA EPD procedure.
6. *Field parameters* – Please provide pH, temperature, turbidity, and conductivity measurement results in future reports.

#### B. Corrective Action

1. *Isolation of two concrete flow-through vaults* – Fort Stewart did not submit to our agency the interim measures (IM) work plan requested in correspondence (Rabon to Biering) dated June 1, 2004. Please provide in Section 5.2.3 (page 20) the rationale for filling the concrete vaults with concrete and plugging underground pipes with fuel-resistant caulking, as opposed to the complete removal of the underground installations, as suggested in the above-referenced correspondence. Also explain if the vaults and the piping system were free of residual used-oil when sealed with concrete.
2. *Ecological risk assessment* – Exposure threats to ecological receptors must be assessed in an RFI report. Please include an ecological risk screening assessment in the report OR, if it was previously demonstrated that no ecological receptors are at risk at the site, complete section 4.2 (page 8) to provide the reference of the demonstration.
3. *Remedial Levels (RL)* – Please include in section 10 (page 75) the recommended remediation levels for each contaminant, sorted by medium. Note that the remedial levels have to be derived from the human health risk assessment and the ecological risk assessment; the lesser of the two values will be used as the final remedial level that is protective of both human and ecological receptors.
4. *Further delineation of contamination* – Section 10 (page 75) recommends “a corrective measures study (i.e., corrective action plan) including further delineation of the TCE contamination to determine the best corrective action”. This proposal is not consistent with Chapter III of OSWER directive 9902.3-2A, dated May 1994 and section II.2 of GA EPD guidance for selecting media remediation levels at RCRA solid management units, dated November 1996. According to the latter, an RFI report should “... characterize the nature and extent of releases, perform an assessment of risk posed by the releases, and identify potential media remediation levels”; therefore, GA EPD requests complete delineation of contamination to be performed before the submittal of a corrective action plan. Please, conduct additional field work as described in section 9.0 (page 70) and include the results in the present report.

#### C. Risk Assessment

1. *Conceptual Site Model*. The following receptors and exposure pathways should be added or justification for omission of the pathways should be provided. These pathways should be addressed in the text and added to the Conceptual Site Model in Figure 8-1.

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PAGE 4 OF 5

Mr. Michael W. Biering  
 May 30, 2006  
 Page 3

Receptor	Exposure Pathway(s)
Maintenance Worker (Current & Future)	Direct ingestion & dermal absorption of groundwater should be included for future, but omitted for current.
	Surface water ingestion and dermal contact
Trespasser (Future)	Incidental surface water ingestion and dermal contact

2. *Risk-Based Screening Levels.* According to GA EPD guidance, the maximum detected concentrations in surface water should be compared to the Water Quality Standards (WQS) for human health.<sup>1</sup> However, if there are no WQS for a COPC then screening against Region 9 tap water PRGs is acceptable. Additionally, Section 8.2 does not provide an adequate description of how the RBSL were selected for different media. Please revise.

<sup>1</sup>*Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins.* EPA Region 4, originally published November 1995, Website version last updated May 30, 2000.

3. *Toxicity Factors.* Some of the toxicity factors used in the report are not consistent with the values used by GA EPD. Please revise the applicable risk calculations using the values listed below. Additionally, as noted in OSWER Directive 9285.7-53 (dated December 5, 2003), the updated EPA hierarchy is as follows.

- Tier 1 - EPA's Integrated IRIS
- Tier 2 - EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs)
- Tier 3 - Includes additional EPA sources (e.g., historic HEAST and NCEA provisional values) and non-EPA sources of toxicity information (e.g., California EPA toxicity values).

Hazardous Constituent	GA EPD Value	
Tetrachloroethene	RfDi = 0.14 mg/kg-day (N)	SFo = 0.54(mg/kg-day) <sup>-1</sup> (N) SF <sub>i</sub> = 0.021 (mg/kg-day) <sup>-1</sup> (N)
Vinyl Chloride	RfDi = 0.286 mg/kg-day (I)	SFo = 1.4 (mg/kg-day) <sup>-1</sup> (I) SF <sub>i</sub> = 0.03 (mg/kg-day) <sup>-1</sup> (I)

(I)-IRIS (N)- NCEA

4. *Exposure Parameters.* Please provide the exposure parameters that were used in the risk equations. GA EPD recommends the values taken from the *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins.* EPA Region 4, originally published November 1995, Website version last updated May 30, 2000. Additionally, since the exposure parameters for the maintenance worker were not provided GA EPD can not determine if exposure to the current

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Mr. Michael W. Biering  
May 30, 2006  
Page 4

maintenance worker will be protective of future receptors not evaluated in the RFI (i.e. future maintenance worker, future construction worker).

5. Risk Calculations. Please provide the risk equations used to calculate the site-specific target levels.

The revision for the SWMU 39 RFI report, appropriately addressing the comments above, should be submitted to GA EPD within sixty (60) days from receipt of this correspondence in the form of revised/new pages or a totally revised document. Note that two (2) copies of the revised report are requested by GA EPD in accordance with Condition IV.G.2 in your Hazardous Waste Facility Permit #HW-045(S&T). Should Fort Stewart decide to submit revised or new pages, please number with appropriate page numbers and the date revised, e.g., Page 6 (Revised 01/30/2006).

Should you have any questions concerning this correspondence, please contact Benoit Cause of my staff at 404-463-7513.

Sincerely,



Brent Rabon, Coordinator  
DoD Remediation Unit  
Hazardous Waste Management Branch

c: Darrell Crosby, Manager, GA EPD-Coastal District  
Tressa Rutland, Fort Stewart (via facsimile)  
Anita Shipley, EPA Region IV, RCRA Programs Branch

File: Fort Stewart (G)

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DEPARTMENT OF THE ARMY  
HEADQUARTERS, FORT STEWART  
DIRECTORATE OF PUBLIC WORKS  
1550 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-4927

REPLY TO  
ATTENTION OF

FEB 08 2006

Office of the Directorate

EXPRESS MAIL

Georgia Environmental Protection Division  
Attention: Mr. Benoit Causse  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1470  
Atlanta, Georgia

Dear Mr. Causse:

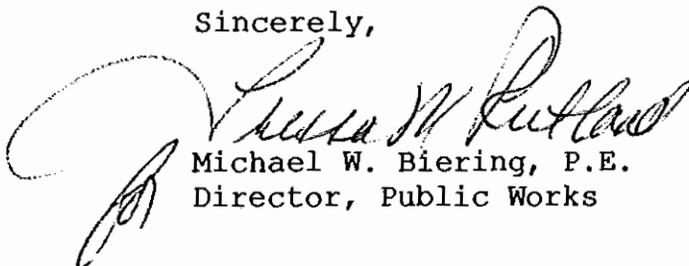
Fort Stewart is pleased to submit two copies of the Final Resource Conservation and Recovery Act Facility Investigation and Interim Actions Report for Solid Waste Management Unit 39 at Fort Stewart Military Reservation, Fort Stewart, Georgia, dated December 2005, for your review and approval.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Algeana Stevenson at (912)315-4226 or Ms. Tressa Rutland, Directorate of Public Works Environmental Division, at (912)767-2010 should questions arise regarding the enclosed report.

Sincerely,



Michael W. Biering, P.E.  
Director, Public Works

Enclosures

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U.S. Army

**Final**  
**Resource Conservation and Recovery Act**  
**Facility Investigation and Interim Actions Report**  
**for Solid Waste Management Unit 39**  
**Fort Stewart, Georgia**

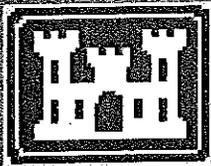


IMA

December 2005

**Submitted to:**  
**Fort Stewart Directorate of Public Works**  
**Environmental and Natural Resources Division**  
**Environmental Branch**

**Submitted by:**  
**U.S. Army Corps of Engineers**  
**Savannah District**  
**Contract No. DACA01-03-D-0010**  
**Deliver Order No.. CV06**  
**Contract No. W912HN-04-D-0019**  
**Delivery Order No. 0001**



**Prepared by:**  
**Solutions To Environmental Problems, Inc.**  
**1006 Floyd Culler Court**  
**Oak Ridge, Tennessee 37830**



## 10. CONCLUSIONS AND RECOMMENDATIONS

The investigations at SWMU 39 included the isolation of two concrete flow-through vaults; multi-phase extraction for free product removal; soil, sediment, surface water, and groundwater sampling; and a human health risk evaluation. The flow-through vaults were sealed during the second field sampling event in August/September 2004. Free product still exists in monitoring wells G4MW007 and G4MW013. TCE is present in 17 of the 24 wells sampled at SWMU 39 with concentrations exceeding the Federal and Georgia DWS of 5 µg/L.

In groundwater, cis-1,2-dichloroethene was eliminated as a COC. Four analytes were retained as COCs because they exceeded the SSTLs for the unprotected maintenance worker: benzene, tetrachloroethene, TCE, and vinyl chloride. Benzene and vinyl chloride were detected in only two samples and are not likely to be representative of overall site conditions; therefore they were eliminated as COCs. However, TCE was much more ubiquitous, being detected in 25 of 27 groundwater samples.

Tetrachloroethene in sample 04307G07 from monitoring well G4MW016 appears to be an anomaly for the November 2004 sampling event. Although only groundwater data from the most recent sampling event (November 2004) were used in the risk evaluation, examination of results of the April 2004 sampling event showed a tetrachloroethene concentration of 27 µg/L in G4MW016. Therefore, tetrachloroethene does pose a potential risk to human health from that one area.

TCE is also present in the surface water and sediment in the drainage ditch associated with SWMU 39. The human health risk evaluation showed that of the two analytes in surface water that were further evaluated for exposure to the unprotected maintenance worker and the recreational trespasser, tetrachloroethene was eliminated as a COC because the maximum concentration was less than the SSTLs for both receptors. TCE, however, exceeded the SSTLs for both receptors and was retained as a COC.

The results of the 2004 investigations determined that there is no potential human health risk in the soil and sediment at SWMU 39. However, TCE poses a potential human health risk in surface water and should be further evaluated.

Based on the results of the 2004 investigations, STEP recommends further action to remove the free product from those monitoring wells where it remains. Monitoring well G4MW007 should be removed



and replaced with a two inch or larger diameter well. A larger well will enable use of multiple technologies for free product removal in future. STEP also recommends a corrective measures study, including further delineation of the TCE contamination to determine the best available corrective action. Finally, STEP recommends comparing future analytical results to health-based criteria to determine whether concentrations of contaminants continue to pose human health risks.

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DEPARTMENT OF THE ARMY  
HEADQUARTERS, 3D INFANTRY DIVISION (MECHANIZED) AND FORT STEWART  
DIRECTORATE OF PUBLIC WORKS  
1550 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-4927

REPLY TO  
ATTENTION OF

AUG 06 2003

Office of the Directorate

EXPRESS MAIL

Georgia Environmental Protection Division  
Attention: Mr. Bruce Khaleghi  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1154  
Atlanta, Georgia 30334-9000

Dear Mr. Khaleghi:

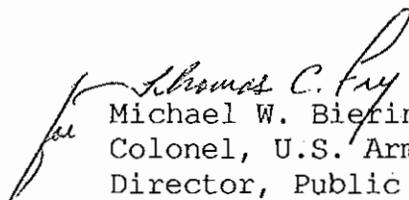
Fort Stewart is pleased to submit two copies of the Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated April 2003 for your review and approval.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. LeAnn Taylor or Ms. Tressa Rutland, Directorate of Public Works Environmental Branch, at (912)767-2010, should questions arise regarding the enclosed work plan.

Sincerely,

  
Michael W. Biering  
Colonel, U.S. Army  
Director, Public Works

Enclosures

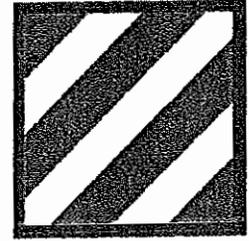
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IMA

**FINAL  
RESOURCE CONSERVATION AND  
RECOVERY ACT  
FACILITY INVESTIGATION REPORT**



3d Inf Div (Mech)

**SOLID WASTE MANAGEMENT UNIT 39  
FORT STEWART, GEORGIA**

**APRIL 2003**

**Submitted to:  
Directorate of Public Works  
Environmental and Natural Resources Division  
Environmental Branch**

**Submitted by:  
ADVANCED INFRASTRUCTURE MANAGEMENT TECHNOLOGIES  
Oak Ridge, Tennessee 37831-7606  
managed by:  
BWXT Y-12, L.L.C.  
for the  
U.S. DEPARTMENT OF ENERGY  
under contract DE-AC05-00OR22800**





9. CONCLUSIONS AND RECOMMENDATIONS

The previous investigation at SWMU 39 revealed that free product was present in monitoring well G4MW07 and trichloroethene concentrations exceed the Federal DWS in monitoring wells G4MW01 and G4MW08. During the RFI, free product was observed in two wells, G4MW02 and G4MW07, and trichloroethene concentrations exceeded the Federal and Georgia DWS of 5 µg/L in all groundwater samples. The human health risk evaluation revealed that two analytes (2-methylnaphthalene and 1,2-dichloroethene) found in the soils that were further evaluated for exposure to the unprotected maintenance worker and the recreational trespasser, were eliminated as COPCs because the maximum concentration was less than the SSTLs for both receptors. A third analyte, phenanthrene, had no screening value and was retained as a COPC. Three VOCs and two SVOCs found in the groundwater were evaluated for exposure to the unprotected maintenance worker, all analytes having SSTLs were eliminated as COPCs. Only phenanthrene, which has no SSTL, was retained as a COPC in groundwater.

The results of the risk assessment indicate that the only analyte to present a potential problem is phenanthrene, which has no screening value. Because remedial actions are not likely to be triggered by potential contaminants having no screening values, risk managers would not likely require any action at SWMU 39.

STEP recommends further action to remove the free product; inspect and remove the non-regulated flow-through vessels from service, if necessary; and conduct a corrective measures study, to include further delineation of the trichloroethene contamination and determine the best available corrective action for SWMU 39.

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DEPARTMENT OF THE ARMY  
HEADQUARTERS, 3D INFANTRY DIVISION (MECHANIZED) AND FORT STEWART  
DIRECTORATE OF PUBLIC WORKS  
1550 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-4927

OX 1107 28 232

REPLY TO  
ATTENTION OF

Office of the Directorate

EXPRESS

Georgia Environmental Protection Division  
Attention: Mr. Bruce Khaleghi  
2 Martin Luther King Jr. Drive, Southeast  
Floyd Towers East, Suite 1154  
Atlanta, Georgia 30334-9000

*3  
Date  
Ltr.*

Dear Mr. Khaleghi:

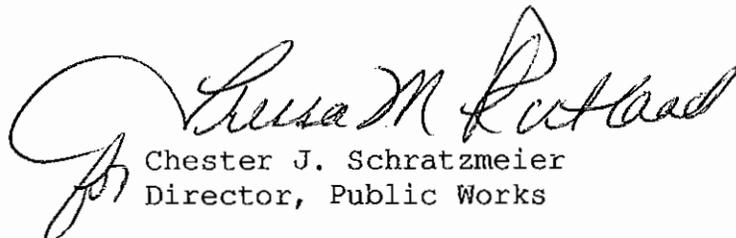
Fort Stewart is pleased to submit two copies of the Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Solid Waste Management Unit (SWMU) 39, Fort Stewart, Georgia, dated September 2002 for your review and approval.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

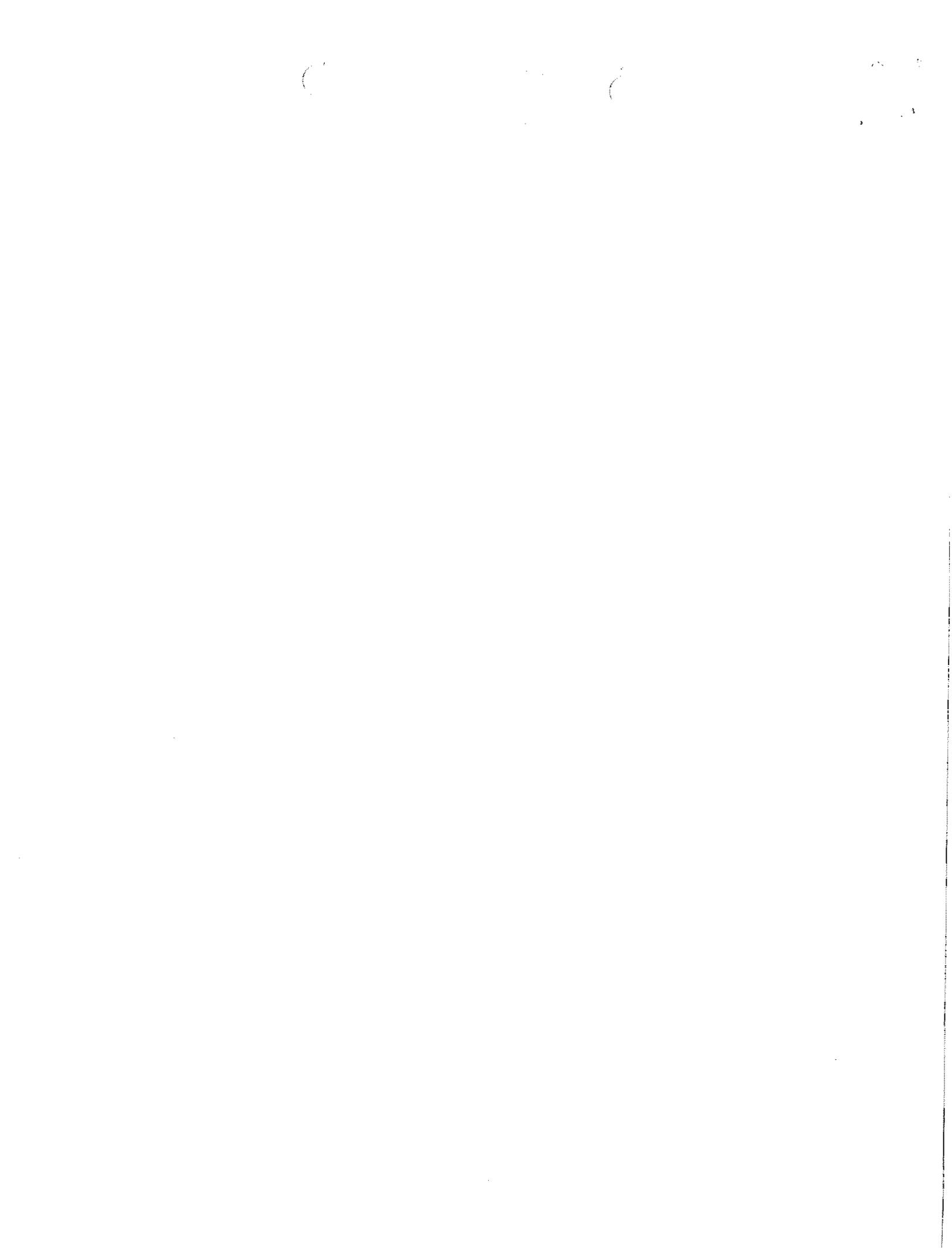
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. LeAnn Taylor or Ms. Tressa Rutland, Directorate of Public Works Environmental Branch, at (912)767-2010, should questions arise regarding the enclosed work plan.

Sincerely,

  
Chester J. Schratzmeier  
Director, Public Works

Enclosures



# Georgia Department of Natural Resources

205 Jesse Hill Drive, S.E., Suite 1162, Atlanta, Georgia 30334  
Lonnie O. Barrott, Commissioner  
Environmental Protection Division  
Harold F. Reheis, Director  
404/656-2833

Post-It <sup>®</sup> Fax Note	7671	Date	02/05	# of pages	1
To	TRESSA RUTLAND	From	BRENT RABON		
Co./Dept	FORT STEWART	Co.	GA EPD		
Phone	912 767 7919	Phone	404 656 2833		
Fax #	9779	Fax #			

February 5, 2002

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Gregory V. Stanley, Colonel, U.S. Army  
Director, Public Works  
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart  
Directorate of Public Works, Building 1137  
Environmental Branch (ATTN: Tressa Rutland)  
1550 Frank Cochran Drive  
Fort Stewart, GA 31314-4927

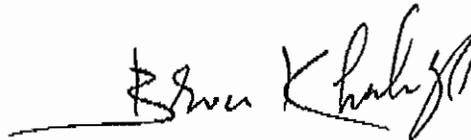
RE: SWMU Assessment Report for Underground Storage Tank No. 60 at Building 1160 [Solid Waste Management Unit (SWMU) 39] provided in correspondences (Stanley to Khaleghi) dated May 7, May 9 and October 9, 2001; Fort Stewart; EPA ID No. GA9 210 020 872.

Dear Colonel Stanley:

The Hazardous Waste Management Branch of the Georgia Environmental Protection Division (GA EPD) is in receipt of the above-referenced document submitted in accordance with Section IV.B in the Fort Stewart Hazardous Waste Facility Permit #HW-045(S&T) (Permit). Based upon our review and as required by Permit Condition IV.D.1.a, Fort Stewart must submit a RCRA Facility Investigation (RFI) Work Plan for SWMU 39 to our agency within ninety (90) days from receipt of this correspondence. (May 6, 2002)

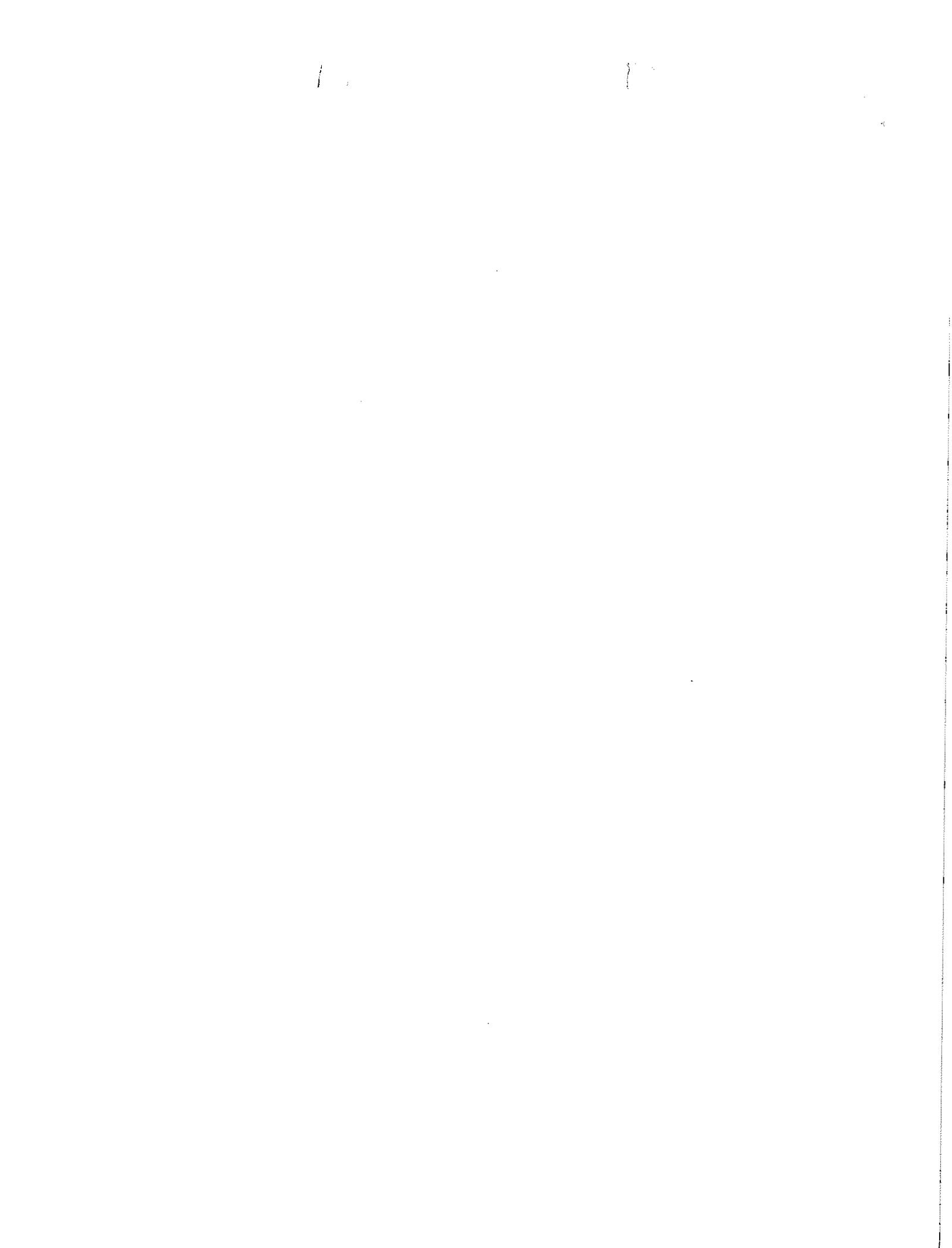
Please note that the Underground Storage Tank No. 60 at Building 1160 (SWMU 39) will be listed in Appendix A of your Permit, after completion of a forty-five (45) day public comment period, by our issuance of a Notice of Decision documenting the Permit's next modification. Should you have any questions concerning this correspondence, please contact Brent Rabon of my staff at (404)656-2833.

Sincerely,



Bruce Khaleghi, Unit Coordinator  
Hazardous Waste Management Branch

c: Mr. Larry Rogers, GA EPD-Southeast Regional Office  
File: Fort Stewart(R)  
RABRENTRSTEWARTSWMU39CALLFORRFIWP





DEPARTMENT OF THE ARMY  
HEADQUARTERS, 3D INFANTRY DIVISION (MECHANIZED) AND FORT STEWART  
DIRECTORATE OF PUBLIC WORKS  
1557 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-4928

*File Copy*

OCT 09 2001

REPLY TO  
ATTENTION OF

Directorate of Public Works

CERTIFIED MAIL

Georgia Environmental Protection Division  
Environmental Protection Division  
Attention: Mr. Bruce Khaleghi  
205 Butler Street, Southeast  
Suite 1154  
Atlanta, Georgia 30303

Dear Mr. Khaleghi:

Fort Stewart is pleased to submit supplemental information to the Solid Waste Management Unit (SWMU) Assessment Report (SAR) submitted in April 2001 for former Underground Storage Tank (UST) #60, Building 1160. The specifics of how the area was identified, and the ensuing actions taken by the Environmental Office, were summarized in the "PHYSICAL DESCRIPTION AND CONDITION" section of the April 2001 SAR. At the time of submittal, Fort Stewart recommended that an additional round of groundwater sampling be conducted to confirm or deny the presence of trichloroethene above the MCL of 5 ug/L. The additional sampling was conducted in May 2001, and the analytical data is provided with this correspondence and is intended to supplement the April 2001 SAR information.

Based on the information collected to date on the UST #60 site, Fort Stewart recommends that a RCRA Facility Investigation (RFI) be conducted at the site to determine the extent of groundwater contamination, only (i.e., additional soil sampling is not required). Based on fiscal year 2002 budget constraints, Fort Stewart requests that discussions be held with GA EPD to determine a mutually agreeable schedule for the required field work and submittal of required reports.

Please contact Ms. Melanie Little or Ms. Tressa Rutland, Directorate of Public Works Environmental Branch, at (918) 296-9492 or (912) 767-2010, respectively, should questions arise regarding the enclosed documents.

Sincerely,

Enclosures

*for Thomas C. Fry*  
Gregory V. Stanley  
Colonel, U.S. Army  
Director, Public Works





DEPARTMENT OF THE ARMY  
HEADQUARTERS, 3D INFANTRY DIVISION (MECHANIZED) AND  
DIRECTORATE OF PUBLIC WORKS  
1550 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-4927

MAY 09 2001

REPLY TO  
ATTENTION OF

Office of the Directorate

EXPRESS MAIL

Georgia Environmental Protection Division  
Attention: Mr. Bruce Khaleghi  
205 Butler Street, Southeast  
Suite 1154  
Atlanta, Georgia 30334

Dear Mr. Khaleghi:

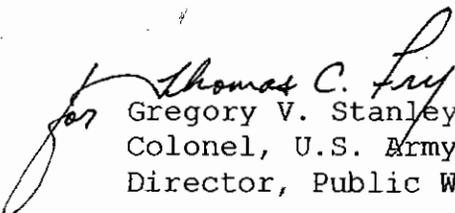
Fort Stewart is pleased to provide the Georgia Environmental Protection Division (GA EPD) two copies of the analytical data packet and the site map which is the supporting data for the Solid Waste Management Unit (SWMU) Assessment Report (SAR) submitted under separate cover to GA EPD on March 7, 2001. I apologize for the oversight in omitting the enclosed information.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

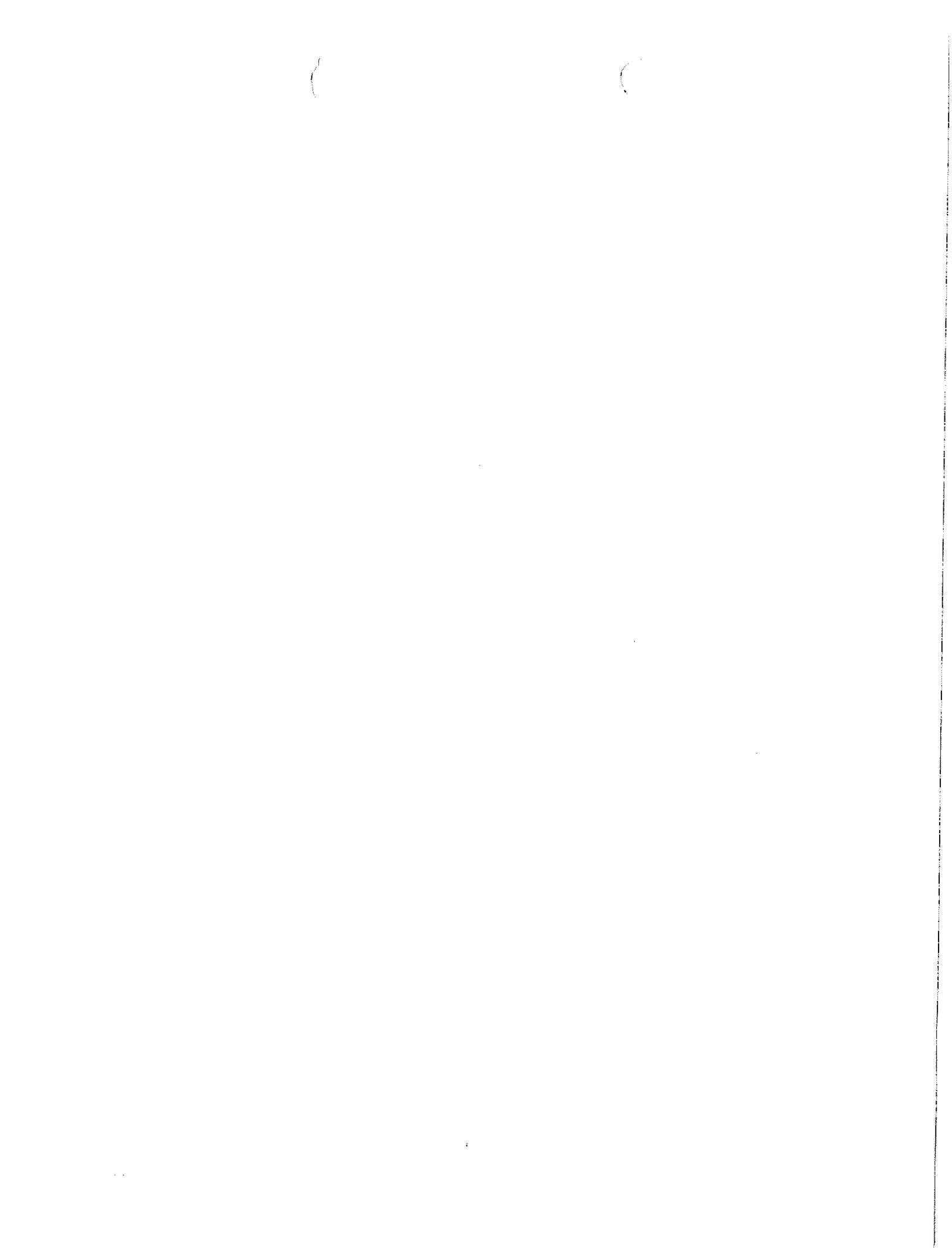
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact Ms. Melanie Little or Ms. Tressa Rutland, Directorate of Public Works Environmental Branch, at (405) 364-8461 or (912) 767-7919, respectively, should questions arise regarding the enclosed documents.

Sincerely,

  
Gregory V. Stanley  
Colonel, U.S. Army  
Director, Public Works

Enclosures





DEPARTMENT OF THE ARMY  
HEADQUARTERS, 3D INFANTRY DIVISION (MECHANIZED) AND FORT STEWART  
DIRECTORATE OF PUBLIC WORKS  
1557 FRANK COCHRAN DRIVE  
FORT STEWART, GEORGIA 31314-4928

MAY 07 2001

REPLY TO  
ATTENTION OF

Directorate of Public Works

Georgia Environmental Protection Division  
Environmental Protection Division  
Attention: Mr. Bruce Khaleghi  
205 Butler Street, Southeast  
Suite 1154  
Atlanta, Georgia 30334

Dear Mr. Khaleghi:

Fort Stewart is pleased to submit a Solid Waste Management Unit (SWMU) Assessment Report (SAR) for a possible area of concern (AOC) identified by the Installation in February 2001. The specifics of how the area was identified, and the ensuing actions taken by the Environmental Office, are summarized in the "PHYSICAL DESCRIPTION AND CONDITION" section of the enclosed SAR.

Submittal of the SAR satisfies Condition IV.B.2 of Fort Stewart's Hazardous Waste Management Permit #HW-045(S&T). Fort Stewart has sampled the site. Analytical data is provided as Enclosure 2. Based on the sample results, Fort Stewart recommends that an additional round of groundwater samples be obtained at the site, prior to determining whether or not a RCRA Facility Investigation is warranted. This recommendation is presented in the "COMMENTS" section of the SAR.

Please contact Ms. Melanie Little, Directorate of Public Works Environmental Branch, at (405) 364-8461 or Ms. Tressa Rutland, Directorate of Public Works Environmental Branch, at (912) 767-7919, should questions arise regarding the enclosed documents.

Sincerely,

*for* *Thomas C. Fry*  
Gregory V. Stanley  
Colonel, U.S. Army  
Director, Public Works

Enclosures

*Need codes  
in box  
SWMU  
AOC - US 60  
Bldg 1160*

*express*  
CERTIFIED MAIL

