

**Travis Air Force Base
Environmental Management
Building 570, Travis AFB, California
Environmental Restoration Program
Remedial Program Manager's
Meeting Minutes**

25 February 2009, 0930 Hours

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 25 February 2009 at 0930 in the Base Civil Engineer's Conference Room, Building 570, Travis AFB, California. Attendees included:

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|--------------------|--|
| • Mark Smith | Travis AFB |
| • Lonnie Duke | Travis AFB |
| • Glenn Anderson | Travis AFB |
| • Gregory Parrott | Travis AFB |
| • Mary Snow | TechLaw |
| • James Chang | U.S. Environmental Protection Agency (USEPA) |
| • Alan Friedman | California Regional Water Quality Control Board (CRWQCB) |
| • Jose Salcedo | Department of Toxic Substances Control (DTSC) |
| • Dezso Linbrunner | USACE, Omaha District |
| • Mike Wray | CH2M Hill |
| • Chuck Elliott | CH2M Hill |
| • Leslie Royer | CH2M Hill |
| • Rachel Hess | Innovative Technical Solutions, Inc. (ITSI) |

Handouts distributed at the meeting and presentations included:

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|----------------|--|
| • Attachment 1 | Meeting Agenda |
| • Attachment 2 | Master Meeting, Teleconference, and Document Schedules |
| • Attachment 3 | SBBGWTP Monthly Data Sheet (January 2009) |
| • Attachment 4 | CGWTP Monthly Data Sheet (January 2009) |
| • Attachment 5 | NGWTP Monthly Data Sheet (January 2009) |
| • Attachment 6 | Annual RPO Report |
| • Attachment 7 | Program Schedule Overview |

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 28 January 2009 RPM meeting minutes were approved and finalized with no changes.

B. Action Item Review

Action Items from January were reviewed.

Action item one is closed.

Action items two and three are still open pending funds. Funds have been approved but have not been received from AFCEE. Once funding is in place a modification to the contract will be written. This will include work for CAMU maintenance and the sediment sites.

Action item four is closed.

Action item five is still open pending schedule for field work.

One item not on the list, but requested to be added, concerns the upcoming project at LF044, and involves notifying the agencies about the additional underground fuel storage tanks the base wants to install there.

C. Master Meeting and Document Schedule Review

The Travis AFB Master Meeting, Teleconference, and Document Schedules were discussed during this meeting (see Attachment 2).

Travis AFB Annual Meeting and Teleconference Schedule

— The next RPM meeting will be 25 March either at Travis, or possibly a teleconference if there aren't going to be any presentations. Mr. Smith announced he will not be able to attend the next RPM meeting and requested an action item be added to consider the 25 March meeting be a teleconference.

It was stated that efforts have been made to coordinate response to comments meetings with the RPM meetings.

Looking ahead, Mr. Salcedo will not be able to attend the 17 June RPM meeting. The meeting may be changed to 24 June 2009, which would also change the date of the suppliers teleconference to 23 June 2009.

Travis AFB Master Document Schedule

— Basewide GW ROD, Potrero Hills Annex ROD: No change.

- HSP Update: Document has been finalized; electronic version has been sent out to the agencies.
- QAPP Update: Draft is out for review.
- Comprehensive Site Evaluation Phase II Work Plan: Schedule for this document will be revised significantly. Internal review has produced many comments that will need to be addressed; it is not ready for agency review.
- LF008 Rebound Study WP, Action Plan: No change.
- Site ST027 Plume Delineation Work Plan: No comments from the Water Board or DTSC. Once EPA comments are resolved, plan can be finalized and field work can begin.
- LF007C Groundwater Work Plan: Response to comments sent out on Monday.
- Phases 1 & 2 Vapor Intrusion Report: EPA comments are behind schedule.
- SS016 IRA Work Plan: Dates on schedule have been pushed out. Attempting to use existing wash racks as a staging area.
- Site ST032 Tech Memo: Document out for agency review.
- Site SS030 Work Plan: Document out for agency review.
- 2008 Annual RPO Report: Document presents data and options for optimization. Presentation on progress will be given today.
- Field Sampling Plan Addendum: Part of the Basewide Plan. Dates have changed for internal review.
- SS014 Tier 1 POCO Evaluation Work Plan: Behind schedule. Dates will be updated in schedule.
- Natural Attenuation Assessment Report (NAAR): No change.
- Passive Diffusion Bag (PDB) Tech Memo: Results from the two sampling methods will be presented side by side. Would like to use PDB in the active flight line, where access is limited/restricted.
- Quarterly Newsletter (Guardian): This edition does support the upcoming RAB so it will need to be issued on time.
- 2007/2008 GSAP Annual Report: Comments have been received from the EPA and responses have been compiled.

2. CURRENT PROJECTS

A. Treatment Plant Operation and Maintenance Update

Mr. Duke reported on the water treatment plant status.

South Base Boundary Groundwater Treatment Plant

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 3.5 million gallons of groundwater were extracted and treated during the month of January 2009. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 78.8 gallons per minute (gpm) and electrical power usage was 18,669 kWh; 25,577 pounds of CO₂ was created (based on DOE calculation). Approximately 2.4 pounds of volatile organic compounds (VOCs) was removed during January. The total mass of VOCs removed since the startup of the system is 358 pounds (see Attachment 3).

No shutdowns occurred in January. The results of the rebound study have been received. Wells EW734x05 and EW735x05 shall continue to operate for containment of the southern part of the plume, as well as EW01x05 through EW03x05; all others shall remain off. Scale buildup in the plant is being controlled, most likely due to less water being put through the plant because of the rebound study.

No optimization activities were conducted during January.

Central Groundwater Treatment Plant

The Central Groundwater Treatment Plant (CGWTP) performed at 96.5% uptime with approximately 3.0 million gallons of groundwater extracted and treated during the month of January 2009. All treated water was diverted to the storm drain. The average flow rate for the CGWTP was 70.5 gpm and electrical power usage was 20,307 kWh for all plants; 27,820 pounds of CO₂ was created. Natural gas usage for the ThOx was 2,767 therms. Approximately 8.3 pounds of VOCs were removed from groundwater, and 6.0 pounds from vapor, during January. The total mass of VOCs removed since the startup of the system is 11,015 pounds. (see Attachment 4).

There were two shutdowns connected with the CGWTP in January, both due to a UV/Ox low water flow alarm. The flow rate at EW01x16 was reduced to minimize this problem.

No optimization activities were conducted in January 2009.

North Groundwater Treatment Plant

The North Groundwater Treatment Plant (NGWTP) performed at 100% uptime with approximately 230,000 gallons of groundwater extracted and treated during the month of January 2009. All treated water was discharged to the duck pond. The average flow for the NGWTP was 5.1 gpm and electrical power usage was 12,674 kWh; 17,363 pounds of CO₂ was created. Approximately one ounce of VOCs was

removed during January. The total mass of VOCs removed since the startup of the system is 5,414 pounds (see Attachment 5).

No shutdowns occurred in January.

No optimization activities were conducted during January.

B. Vapor Intrusion Assessment Status

Mr. Anderson gave an update on the VI Assessment status. TAFB is awaiting comments from EPA. Mr. Chang hopes to push for next week.

C. Phyto Area Study Schedule

Mr. Anderson reported on the phyto area study schedule. This is the tree planting area at DP039. The trees were planted more than ten years ago. Project is funded by the AFCEE/Tech Transfer division. Document will be put into schedule; it is currently undergoing internal review. Fairchild AFB is the other base in this same study. When ready, core samples and groundwater samples will be taken, as well as transpiration tests that will be performed.

D. Munitions Response Work Plan

Mr. Anderson covered the update on this plan in the above discussion (1C), under "Travis AFB Master Document Schedule".

3. PRESENTATIONS

A. Annual RPO Report (Formerly Called GWTP Annual Report)

Mr. Elliott gave a presentation on the annual RPO report (see Attachment 6). Agencies will receive the document for review in about a month (20 March 2009). Some conclusions in the report are tentative; still working on the recommendations for going forward. Changes that occurred in 2008, conclusions and recommendations for each system (central, north and south) were presented.

Central system: Levels of volatile organic compounds (VOCs) have tapered off. Mr. Elliott presented slides showing the placement of wells on base relative to the treatment plant. Horizontal extraction well at site SS016 has many problems. It pumps the water table down too quickly and is in a silty-sand matrix. It had been off for many years; work has been done on it and currently the pump is set to a low flow to minimize it shutting down; however it cycles on and off as it draws down groundwater and recharges. Construction will be occurring south of DP039 which may affect the placement of wells (about a year out from now). Also, the change out of the GAC vessel is in progress.

North system: Vapor can't be collected due to the high water table. This system is very expensive to run. Currently, treated water is being sent to the duck pond, but may be used to water the CAMU in the future. The results of the rebound study show only three wells above 100 ppb.

South system: Mr. Smith asked Mr. Elliott to point out on the map which wells have been turned off for rebound study. There are changes in groundwater contours at SS030; also there has been an increase in TCE in some of the east wells at this site. Groundwater sampling will begin in April. Scientists from the US Army Corps of Engineers (COE) will be on base during the sampling.

B. Program Schedule Overview

Mr. Wray presented the program schedule overview (see Attachment 7). In keeping with the triad approach to the project, this presentation is given to keep everyone informed on what's been done and what's upcoming.

Mr. Smith stated his appreciation of the presentation, and emphasized the importance of remaining aware of what is on the horizon.

4. NEW ACTION ITEM REVIEW

Possible teleconference in March.

5. PROGRAM/ISSUES/UPDATE

TAFB is attempting to push funding through the Air Force and COE.

6. POTENTIAL RESPONSE TO COMMENTS MEETINGS

A. LF007C Groundwater RPO Work Plan

Response to comments sent on Monday.

B. Phases 1 and 2 Vapor Intrusion Report

No comments from DTSC, awaiting comments from EPA.

C. 2007/2008 GSAP Annual Report

Mr. Chang stated there wasn't anything to discuss except this one issue. There was a concern about lithology (comment #2) and cross sections, especially concerning the vertical extent definition. Mr. Chang accepted the response to his comment; however, he reiterated that this information would need to be collected prior to

developing the GW ROD. Ms. Snow added that she is happy with all the responses to her comments. Mr. Wray added that for all the borings in the work plans, the plan is to attempt to drill to bedrock.

Mr. Chang stated that to follow up on these Basewide plans (FSP, QAPP, etc), EPA will need to schedule a field audit. This would include being present at field activities and collecting a QA split sample. Mr. Linrunner added that COE will be doing the same, to verify that all protocols stated in the plan are being followed. Mr. Chang agreed, stating that data quality is the key for all decisions. For these field activities, two hardcopies of the plans will be provided to the agencies.

D. Site ST027 Plume Delineation Work Plan

Response to comments sent on Monday.

Mr. Chang commented that the response to comments have been good and thorough. Efforts to this end have been appreciated.

Mr. Smith reminded the team that field work should start in May. He asked for everyone to refer to the Comments spreadsheet for the schedule. Mr. Duke will update it and send it out to the agencies.

5. Action Items

ITEM	RESPONSIBLE	ACTION ITEM	DUE DATE	STATUS
1.—	Air Force	Update document schedule to include dates for GW ROD	Jan 2009	Closed
2.	Air Force	Update document schedule to include dates for Work Plan for Sediment Sites	Jan 2009	Open
3.	Air Force	Update document schedule to include dates for interim plans for FT005	Jan 2009	Open
4.—	Air Force	Update document schedule to include dates for Vapor Intrusion Assessment	Jan 2009	Closed
5.	Air Force	Coordinate site visit of sediment excavations with RAB members	TBD	Open
6.	Air Force	Notification to agencies about upcoming work at LF044	March 2009	OPEN
7.	Air Force	Changing March RPM meeting to teleconference	March 2009	OPEN

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
REMEDIAL PROGRAM MANAGER'S MEETING
25 Feb 2009, 9:30 A.M.
AGENDA

1. ADMINISTRATIVE

- A. PREVIOUS MEETING MINUTES
- B. ACTION ITEM REVIEW
- C. MASTER MEETING AND DOCUMENT SCHEDULE REVIEW

2. CURRENT PROJECTS

- A. TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE (LONNIE)
- B. VAPOR INTRUSION ASSESSMENT STATUS (GLENN)
- C. PHYTO AREA STUDY SCHEDULE (GLENN)
- D. MUNITIONS RESPONSE WORK PLAN (GLENN)

3. PRESENTATIONS

- A. ANNUAL RPO REPORT (FORMERLY CALLED GWTP ANNUAL REPORT)
- B. PROGRAM SCHEDULE OVERVIEW

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

6. POTENTIAL RESPONSE TO COMMENTS MEETINGS

- A. LF007C GROUNDWATER RPO WORK PLAN (GLENN)
- B. PHASES 1 AND 2 VAPOR INTRUSION REPORT (GLENN)
- C. 2007/2008GSAP ANNUAL REPORT (LONNIE)
- D. SITE ST027 PLUME DELINEATION WORK PLAN (LONNIE)

Travis AFB Master Document Schedule
Annual Meeting and Teleconference Schedule

Suppliers Teleconference (8:30 a.m. - 10:00 a.m.)	Monthly RPM Meeting (Begins at 9:30 a.m.)	RPM Teleconference (Begins at 9:30 a.m.)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
1-27-09	1-28-09		—
2-24-09	2-25-09		—
3-24-09	3-25-09		—
4-21-09	4-22-09		4-23-09
5-19-09	5-20-09		—
6-16-09	6-17-09		—
7-21-09	7-22-09		—
8-25-09	8-26-09		—
9-22-09	9-23-09		—
10-20-09	10-21-09		10-22-09
—	—	11-16-09	—
12-08-09	12-09-09		—

Travis AFB Master Document Schedule

	PRIMARY DOCUMENTS					
	Basewide Groundwater Travis, Glenn Anderson		Potrero Hills Annex Travis, Glenn Anderson	HSP Update Travis, Glenn Anderson CH2M Hill, Stephanie DeWitt	QAPP Update Travis, Glenn Anderson CH2M Hill, Mark Fesler	Comprehensive Site Evaluation Phase II Travis, Glenn Anderson Sky Research, John Maus
Life Cycle	Proposed Plan	ROD	ROD	Plan	Plan	Work Plan
Scoping Meeting	NA	1-24-07	180 days after Water Board Order Rescinded	NA	NA	NA
Predraft to AF/Service Center	12-04-09	3-26-10	+ 360 days	11-12-08	12-18-08	01-15-09
AF/Service Center Comments Due	12-28-10	4-28-10	+ 420 days	11-26-08	1-09-09	02-12-09
Draft to Agencies	1-08-10	5-28-10	+ 480 days	12-22-08	2-06-09	03-05-09
Draft to RAB	1-08-10	5-28-10	+ 480 days	12-22-08	2-06-09	03-05-09
Agency Comments Due	2-17-10	7-30-10	+ 540 days	2-23-09 (1-20-09)	4-10-09	04-09-09
Response to Comments Meeting	2-24-10	8-13-10	+ 555 days	2-25-09 (NA)	4-22-09	04-22-09
Agency Concurrence with Remedy	3-08-10	NA	+ 570 days	NA	NA	NA
Public Comment Period	4-14-10 / 05-14-10	NA	+ 615 to 645 days	NA	NA	NA
Public Meeting	4-22-10	NA	+ 625 days	NA	NA	NA
Response to Comments Due	3-08-10	8-30-10	+ 640 days	2-12-09	05-20-09	04-29-09
Draft Final Due	3-08-10	8-30-10	+ 640 days	NA	NA	04-29-09
Final Due	4-07-10	9-30-10	+ 700 days	2-12-09	05-20-09	05-29-09

SECONDARY DOCUMENTS					
Life Cycle	LF008 Rebound Study Work Plan Travis, Lonnie Duke; CH2M Hill, Doug Berwick	Action Plan Travis, Glenn Anderson CH2M HILL, Chuck Elliott	Site ST027 Plume Delineation Work Plan Travis, Lonnie Duke CH2M HILL, Gavin Heinrich	Bioreactor Work Plan Travis, Glenn Anderson CH2M HILL, Travis Young	LF007C Groundwater Travis, Glenn Anderson CH2M Hill, Loren Krook
Scoping Meeting	NA	NA	NA	NA	NA
Predraft to AF/Service Center	10-24-08	11-21-08	11-21-08	10-21-08	11-28-08
AF/Service Center Comments Due	10-31-08	1-09-09	11-28-08	10-28-08	12-5-08
Draft to Agencies	11-13-08	1-28-09	12-9-08	10-21-08	12-10-08
Draft to RAB	11-13-08	1-28-09	12-9-08	10-21-08	12-10-08
Agency Comments Due	12-17-08	3-26-09	1-16-09 (2-11-09)	10-28-08	2-10-08 (2-11-09)
Response to Comments Meeting	1-06-09	4-9-09	1-25-09	NA	2-25-09
Response to Comments Due	1-20-09	4-30-09	2-05-09*	11-18-08	3-10-09
Draft Final Due	NA	NA	NA	NA	NA
Final Due	1-20-09	4-30-09	2-05-09*	1-29-09	3-10-09
Public Comment Period	NA	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA	NA

*Will reschedule when all comments are received.

SECONDARY DOCUMENTS

Life Cycle	Phases 1 and 2 Vapor Intrusion Report Travis, Glenn Anderson CH2M HILL, Leslie Royer	SS016 IRA Work Plan Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick	ST032 Tech Memo Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich	SS030 Work Plan Travis, Lonnie Duke CH2M HILL, Loren Krook	2008 Annual RPO Report Travis AFB, Lonnie Duke CH2M HILL, Daniel Chern
Scoping Meeting	NA	NA	NA	NA	NA
Predraft to AF/Service Center	12-08-08	4-17-09	1-23-09	1-8-09	2-27-09
AF/Service Center Comments Due	12-15-08	5-01-09	2-06-09	1-15-09	3-06-09
Draft to Agencies	1-12-09	5-15-09	2-19-09	2-09-09	3-20-09
Draft to RAB	1-12-09	5-15-09	2-19-09	2-09-09	3-20-09
Agency Comments Due	2-17-09	6-15-09	3-23-09	3-11-09	4-20-09
Response to Comments Meeting	2-25-09	6-17-09	3-25-09	3-25-09	4-22-09
Response to Comments Due	3-25-09	7-01-09	4-03-09	4-08-09	5-06-09
Draft Final Due	NA	NA	NA	NA	NA
Final Due	3-25-09	7-01-09	4-03-09	4-08-09	5-06-09
Public Comment Period	NA	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA	NA

SECONDARY DOCUMENTS

	Field Sampling Plan Addendum Travis AFB, Glenn Anderson CH2M HILL, Loren Krook	SS014 Tier 1 POCO Evaluation Work Plan Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich	Natural Attenuation Assessment Report Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer	Passive Diffusion Bag (PDB) Tech Memo Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer
Life Cycle				
Scoping Meeting	NA	NA	NA	NA
Predraft to AF/Service Center	3-06-09	2-26-09	3-13-09	3-2-09
AF/Service Center Comments Due	3-13-09	3-05-09	3-27-09	3-8-09
Draft to Agencies	3-20-09	3-27-09	4-10-09	3-11-09
Draft to RAB	3-20-09	3-27-09	4-10-09	3-11-09
Agency Comments Due	4-17-09	4-27-09	5-11-09	4-10-09
Response to Comments Meeting	4-22-09	5-04-09	5-18-09	4-12-09
Response to Comments Due	5-08-09	5-11-09	5-25-09	4-15-09
Draft Final Due	NA	NA	NA	NA
Final Due	5-08-09	5-11-09	5-25-09	4-15-09
Public Comment Period	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA

INFORMATIONAL DOCUMENTS		
Life Cycle	Quarterly Newsletters (Apr 2009) Travis, Glenn Anderson	2007/2008 GSAP Annual Report Travis, Lonnie Duke CH2M HILL, Leslie Royer
Scoping Meeting	NA	NA
Predraft to AF/Service Center	NA	10-22-08
AF/Service Center Comments Due	NA	11-05-08
Draft to Agencies	3-19-09	12-01-08
Draft to RAB	NA	12-01-08
Agency Comments Due	4-02-09	2-02-09
Response to Comments Meeting	TBD	2-25-09
Response to Comments Due	4-06-09	3-16-09
Draft Final Due	NA	NA
Final Due	4-13-09	3-16-09
Public Comment Period	NA	NA
Public Meeting	NA	NA

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 102

Reporting Period: 1 – 31 January 2009

Date Submitted: 16 February 2009

This data sheet includes the following: results for the operation of the South Base Boundary Groundwater Treatment Plant (SBBGWTP); a summary of flow rates for the individual extraction wells; a brief description of any shutdowns or significant events related to the system; and a summary of analytical results for selected samples collected.

Operations Summary – January 2009

Operating Time: **744 hours**

Percent Uptime: 100%

Electrical Power Usage: 18,669 kWh

Gallons Treated: **3.5 million gallons**

Gallons Treated Since July 1998: **639 million gallons**

Volume Discharged to Union Creek: **3.5 million gallons**

Volume Used for Dust Suppression: **0 gallons**

VOC Mass Removed: **2.4 pounds^a**

VOC Mass Removed Since July 1998: **358 pounds**

Rolling 12-Month Cost per Pound of Mass Removed: \$3,325^b

Monthly Cost per Pound of Mass Removed: \$2,231^b

^a Calculated using January 2009 EPA Method SW8260B analytical results.

^b Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.

Flow Rates

Average Groundwater Total Flow Rate: 78.8 gpm^a

Average Flow Rate (gpm) ^b							
FT005				SS029		SS030	
EW01x05	3.2	EW736x05	3.6	EW01x29	1.2	EW01x30	9.9
EW02x05	1.7	EW737x05	Off line ^c	EW02x29	10.2	EW02x30	4.9
EW03x05	4.4	EW742x05	Off line ^c	EW03x29	Off line ^d	EW03x30	Off line ^d
EW731x05	Off line ^c	EW743x05	Off line ^c	EW04x29	8.7	EW04x30	Off line ^e
EW732x05	Off line ^c	EW744x05	Off line ^c	EW05x29	0.9	EW05x30	11.7
EW733x05	Off line ^c	EW745x05	Off line ^c	EW06x29	14.0	EW06x30	Off line ^f
EW734x05	Off line ^f	EW746x05	Off line ^c	EW07x29	Off line ^e	EW711x30	Off line ^e
EW735x05	3.3						
FT005 Total:		16.2		SS029 Total: 35.0		SS030 Total: 26.5	

^a The average groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the operating time of the plant.

^b Extraction well flow rates are based on the average of the weekly readings.

^c Extraction well was shutdown for a one-year rebound study in December 2007 based on the *Work Plan for RPO Actions at Sites SD031, FT004, and FT005* (CH2M HILL, 2007).

^d Extraction well was off line due to low VOC concentrations.

^e Extraction well was not operational during January 2009 due to malfunctioning equipment.

^f Extraction well was not operational during January 2009 due to recharging well.

gpm—gallons per minute

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
SBBGWTP (water)	NA	NA	NA	NA	No shutdowns during the month of January 2009
NA = not applicable SBBGWTP = South Base Boundary Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater sampling at the SBBGWTP was performed on 5 January 2009. Sample results are presented in Table 1. The total VOC concentration (83.5 µg/L) in the influent sample has increased slightly since the December 2008 sample (70.8 µg/L). 1,2-Dichloroethane, the indicator chemical for Site FT005, was not detected in the influent sample. VOCs were not detected in the effluent sample.

In January 2009, the level transmitter for EW01x29 was malfunctioning due to corrosion on the wire connections. The transmitter was cleaned and repaired. The flow meter for EW01x29 was also removed and cleaned. No other maintenance activities were performed in January 2009.

Optimization Activities

On 4 December 2007, nine extraction wells (EW731x05, EW732x05, EW733x05, EW737x05, and EW742x05 through EW746x05) were shut down for rebound testing in accordance with the *Work Plan for Remedial Process Optimization (RPO) Actions at Sites SD031, FT004, and FT005* (CH2M HILL, 2007). These extraction wells remained off-line for one year. These wells were sampled in May and November/December 2008 as part of the GSAP events.

Based on the groundwater results of the rebound study, 1,2-DCA does not appear to have rebounded at Site FT005 and the plume appears to be relatively stable. 1,2-DCA concentrations have decreased to levels less than the IRG in most of the extraction wells and monitoring wells. EW734x05 and EW735x05 shall continue to operate in an effort to contain the southern part of the contaminant plume. EW01x05 through EW03x05 shall remain on line to prevent any residual contamination from migrating off-base. All other extraction wells at FT005 should remain off-line and be included in routine monitoring events in order to accurately project long-term trends. A detailed assessment of the rebound and plume stability at Sites FT004 and SD031 are presented in the *South Base Boundary Groundwater Treatment Plant 2008 Annual Remedial Process Optimization Report* (CH2M HILL, 2009).

No other optimization activities were conducted in January 2009.

Table 1

Summary of Groundwater Analytical Data for January 2009 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)	N/C	5 January 2009 (µg/L)	
				Influent	Effluent
Halogenated Volatile Organics					
Bromodichloromethane	5.0	0.17	0	ND	ND
Carbon Tetrachloride	0.5	0.18	0	ND	ND
Chloroform	5.0	0.17	0	ND	ND
Dibromochloromethane	5.0	0.17	0	ND	ND
1,1-Dichloroethane	5.0	0.24	0	ND	ND
1,2-Dichloroethane	0.5	0.22	0	ND	ND
1,1-Dichloroethene	5.0	0.24	0	ND	ND
cis-1,2-Dichloroethene	5.0	0.23	0	5.2	ND
trans-1,2-Dichloroethene	5.0	0.54	0	ND	ND
Methylene Chloride	5.0	0.61	0	ND	ND
Tetrachloroethene	5.0	0.20	0	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND
Trichloroethene	5.0	0.20 – 1.0	0	78.3	ND
Vinyl Chloride	0.5	0.24	0	ND	ND
Non-Halogenated Volatile Organics					
Benzene	1.0	0.091	0	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND
Toluene	5.0	0.098	0	ND	ND
Xylenes	5.0	0.093 – 0.24	0	ND	ND
Other					
Total Petroleum Hydrocarbons – Gasoline	50	32	0	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	84.6	0	NM	ND
Total Suspended Solids (mg/L)	NE	2.5	0	9.5	NM

^a In accordance with Appendix B of the *Travis AFB South Base Boundary Groundwater Treatment Plant Operations and Maintenance Manual* (CH2M HILL, 2004).

J = analyte concentration is considered an estimated value

mg/L = milligrams per liter

N/C = number of samples out of compliance with discharge limits

ND = not detected

NE = not established

NM = not measured

µg/L = micrograms per liter

Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 114

Reporting Period: 1 – 31 January 2009

Date Submitted: 16 February 2009

This data sheet includes the following: results for the operation of the Central Groundwater Treatment Plant (CGWTP), West Treatment and Transfer Plant (WTTP), and thermal oxidation (ThOx) system (previously referred to as the two-phase extraction [TPE] system). A summary of flow rates for the CGWTP, WTTP, ThOx, and extraction wells EW01x16, EW02x16, EW03x16, EW605x16, and EW610x16; a brief description of any shutdowns or significant events related to the systems, and a summary of analytical results for selected samples collected are also included on this data sheet.

Operations Summary – January 2009

Operating Time:

CGWTP: 718 hours

WTTP: Water: 716 hours

Vapor: 689 hours

ThOx: 743 hours

ThOx: Natural Gas Usage: 2,767 therms

Percent Uptime:

CGWTP: 96.5%

WTTP: Water: 96.2%

Vapor: 92.6%

ThOx: 99.9%

Electrical Power Usage:

CGWTP: 7,606 kWh

WTTP: 20,307 kWh

ThOx: 9,329 kWh

Gallons Treated: **3.0 million gallons**

Gallons Treated Since January 1996: **403 million gallons**

VOC Mass Removed:

8.3 lbs (groundwater only)^a

6.0 lbs (vapor only)^b

VOC Mass Removed Since January 1996:

2,411 lbs from groundwater

8,604 lbs from vapor

UV/Ox DRE: 99.8%

ThOx DRE: 100%

Rolling 12-Month Cost per Pound of Mass Removed: \$684^c

Monthly Cost per Pound of Mass Removed: \$782^c

^a Calculated using January 2009 EPA Method SW8260B analytical results.

^b Total VOC vapor mass removed was calculated using December 2008 EPA Method TO-14 analytical results for the ThOx system and January 2009 EPA Method TO-14 analytical results for the WTTP SVE system.

^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and electric and natural gas costs related to operation of the system.

DRE = destruction removal efficiency

UV/Ox = ultraviolet oxidation

Flow Rates

Average Groundwater Flow Rate: **70.5 gpm^a**

Location	Average Flow Rate	
	Groundwater (gpm) ^b	Soil Vapor (scfm)
EW01x16	23.3	NA
EW02x16	6.6	NA
EW03x16	0.86	NA ^c
EW605x16	13.7	NA ^c
EW610x16	NA ^d	NA ^d
WTTP	24.9 ^e	177
ThOx	0.24 ^e	61.5

^a as measured by the effluent discharge to the storm drain divided by the operating time.

^b as measured by extraction well totalizer divided by the operating time.

^c soil vapor was extracted from this well; however, the flow rates are not measured.

^d the extraction well pump was off-line in January 2009 due to a faulty pressure transmitter and stripped pump motor.

^e as measured by the effluent groundwater pumped to the CGWTP divided by the operating time.

gpm = gallons per minute

NA = not applicable/not available

scfm = standard cubic feet per minute

Flow Rates

Average Flow Rate from the WIOU, DP039, and LF008 Extraction Wells (gpm) ^a							
SD037/ SD043				SD033/SD034/ DP039		LF008/SD036	
EW599x37	3.9	EW705x37	1.2	EW501x33	0.6	EW719x08	Off line ^c
EW700x37	4.4	EW706x37	0.7	EW503x33	1.5	EW720x08	Off line ^c
EW701x37	1.2	EW707x37	1.2	EW01x34	0.3	EW721x08	Off line ^c
EW702x37	1.6	EW510x37	4.0	EW03x34	1.0	EW593x36	2.5
EW703x37	1.0	EW511x37	1.6	EW563x39	Off line ^b	EW594x36	0.8
EW704x37	2.0	EW555x43	0.4	EW782x39	Off line ^b	EW595x36	0.2
gpm—gallons per minute							
^a Extraction well flow rates are based on the average of the weekly readings.							
^b Extraction wells were shut off to facilitate the Bioreactor Sustainability Study at Site DP039.							
^c Extraction wells were shut off to support a rebound study at Site LF008.							

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
CGWTP (Groundwater):					
CGWTP	12 January 2009	20:30	13 January 2009	13:30	UV/Ox low water flow alarm
CGWTP	21 January 2009	01:45	21 January 2009	11:30	UV/Ox low water flow alarm due to EW01x16 cycling on/off.
WTTP (Groundwater):					
WTTP	12 January 2009	20:30	13 January 2009	13:30	CGWTP was shut down
CGWTP	21 January 2009	01:45	21 January 2009	11:45	CGWTP was shut down
WTTP (Vapor):					
WTTP	12 January 2009	20:30	14 January 2009	14:30	CGWTP was shut down and routine O&M
CGWTP	21 January 2009	01:45	21 January 2009	11:45	CGWTP was shut down
CGWTP = Central Groundwater Treatment Plant WTTP = West Treatment and Transfer Plant					

Summary of O&M Activities

Monthly groundwater sampling at the CGWTP and quarterly groundwater sampling at the ThOx and WTPP were performed on 5 January 2009. Groundwater sample results are summarized in Table 1. Confirmation vapor samples were collected at the WTPP SVE system on 26 January 2009. Vapor results are presented in Table 2. For reference, the December 2008 vapor results from the WTPP SVE system are presented in Table 3.

The total VOC concentration (326.2 µg/L) in the January 2009 CGWTP influent groundwater sample has decreased since the December 2008 sampling (426.2 µg/L). Trichloroethene (TCE) was detected in the sample collected directly after the UV/Ox portion of the CGWTP process stream. UV lamp #1 has been operational for over 4,000 hours and may need to be replaced. Cis-1,2-dichloroethene and TCE were present in the treated water samples from the granular activated carbon (GAC) sample points. The detections in these samples may be attributed to desorption from the GAC. Both VOCs were also detected in the system effluent.

The WTPP SVE system continued to treat soil vapor from the WIOU; however, vapor extraction from Site DP039 has ceased in order to facilitate the Bioreactor Sustainability Study. The December 2008 influent VOC vapor concentration was approximately 74 ppbv. The mid-treatment sample exceeded the influent VOC vapor concentration at 315 ppbv. It is possible that these data can be attributed to incorrect sample identification between the influent and mid-treatment samples. Confirmation vapor samples were collected from the WTPP SVE system on 26 January, 2009. The influent VOC vapor concentrations remained relatively steady at 66 ppbv in January 2009 as compared to the December 2008 result. Both samples (December 2008 and January 2009) contain lower concentrations of VOCs than in previous quarters. This decrease corresponds to the shutdown of vapor extraction from Site DP039.

The confirmation samples collected on 26 January again showed the mid-treatment sample (79 ppbv) exceeding the influent VOC vapor concentration (66 ppbv), but the mid-treatment VOC concentration is much lower than the December 2008 result. Higher detections in the mid-treatment sample might be attributed to desorption from the GAC, indicating contaminant desorption from saturated carbon. Continued evidence of carbon desorption will be addressed by scheduling and completing a carbon changeout of at least the primary carbon vessel.

EW01x16 has been cycling on/off frequently and causing fluctuations to the VFD output. The flow rate for EW01x16 was reduced to 21 gpm to minimize the cycling.

Optimization Activities

No optimization activities were conducted in January 2009.

Table 1

Summary of Groundwater Analytical Data for January 2009 – Central Groundwater Treatment Plant

				5 January 2009 (µg/L)					
				Influent	After UV/OX	After Carbon 1 Effluent	After Carbon 2 Effluent	After Carbon 3 Effluent	System Effluent
Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)	N/C						
Halogenated Volatile Organics									
Bromodichloromethane	5.0	0.17	0	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.18	0	ND	ND	ND	ND	ND	ND
Chloroform	5.0	0.17	0	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.22	0	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.082	0	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.10	0	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5.0	0.24	0	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.22	0	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.24	0	0.78	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.23	0	50.8	ND	ND	0.33 J	0.43 J	0.34 J
trans-1,2-Dichloroethene	5.0	0.54	0	3.4	ND	ND	ND	ND	ND
Methylene Chloride	5.0	0.61	0	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5.0	0.20	0	0.66	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND	ND	ND	ND	ND
Trichloroethene	5.0	0.20 – 2.0	0	270	0.59	2.2	2.0	1.7	1.3
Vinyl Chloride	0.5	0.24	0	0.53	ND	ND	ND	ND	ND
Non-Halogenated Volatile Organics									
Benzene	1.0	0.091	0	ND	ND	ND	ND	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND	ND	ND	ND	ND
Toluene	5.0	0.098	0	ND	ND	ND	ND	ND	ND
Total Xylenes	5.0	0.093 - 0.24	0	ND	ND	ND	ND	ND	ND

^a In accordance with Appendix G of the *Travis AFB Central Groundwater Treatment Plant Operations and Maintenance Manual* (URS Group, Inc., 2002).

J = analyte concentration is considered an estimated value

N/C = number of samples out of compliance with discharge limits

ND = not detected

µg/L = micrograms per liter

Table 2

Soil Vapor Analytical Data for January 2009 (Confirmation Samples) – West Transfer and Treatment Plant

Constituent	26 January 2009 (ppbv)		
	SVE Influent	SVE Mid-Treatment	SVE Effluent
Volatile Organics			
Benzene	ND (0.88)	ND (0.22)	ND (0.22)
Carbon Tetrachloride	ND (0.60)	ND (0.15)	0.28 J
Chloroethane	ND (1.9)	ND (0.47)	ND (0.47)
Chloroform	1.4 J	0.53	0.50
Chloromethane	ND (1.48)	0.40 J	0.49 J
cis-1,2-Dichloroethene	5.5	1.7	11
1,2-Dichlorobenzene	ND (0.72)	ND (0.18)	ND (0.18)
1,3-Dichlorobenzene	ND (0.76)	ND (0.19)	ND (0.19)
1,4-Dichlorobenzene	ND (2.0)	ND (0.50)	ND (0.50)
1,2-Dichloroethane	ND (0.88)	ND (0.22)	0.29 J
1,1-Dichloroethene	ND (0.88)	ND (0.22)	1.0
Ethylbenzene	ND (0.44)	ND (0.11)	ND (0.11)
Freon 11	ND (0.96)	ND (0.24)	0.46 J
Freon 12	ND (1.1)	0.54	0.62
Methylene Chloride	ND (0.88)	0.26 J	ND (0.22)
Tetrachloroethene	ND (0.52)	ND (0.13)	ND (0.13)
Toluene	ND (0.60)	2.1	ND (0.15)
1,1,1-Trichloroethane	ND (0.80)	ND (0.20)	0.96
1,1,2-Trichloroethane	ND (0.72)	ND (0.18)	ND (0.18)
1,2,4-Trimethylbenzene	ND (0.80)	ND (0.20)	ND (0.20)
1,3,5-Trimethylbenzene	ND (0.60)	ND (0.15)	ND (0.15)
Trichloroethene	59	73	ND (0.15)
Vinyl Chloride	ND (1.4)	ND (0.34)	ND (0.34)
Xylenes, m,p-	ND (2.0)	0.72 J	ND (0.49)
Xylene, o-	ND (0.96)	ND (0.24)	ND (0.24)
J = analyte concentration is considered an estimated value ND = not detected ppbv = parts per billion by volume SVE = soil vapor extraction () = detection limit			

Table 3

Soil Vapor Analytical Data for December 2008 – West Transfer and Treatment Plant

Constituent	2 December 2008 (ppbv)		
	SVE Influent	SVE Mid-Treatment	SVE Effluent
Volatile Organics			
Benzene	0.40 J	ND (1.1)	ND (1.1)
Carbon Tetrachloride	ND (0.15)	ND (0.74)	ND (0.74)
Chloroethane	ND (0.46)	ND (2.3)	ND (2.3)
Chloroform	0.50	ND (1.1)	ND (1.1)
Chloromethane	0.41 J	ND (1.8)	ND (1.8)
cis-1,2-Dichloroethene	2.7	2.6	20
1,2-Dichlorobenzene	ND (0.18)	ND (0.88)	ND (0.88)
1,3-Dichlorobenzene	0.26 J	ND (0.93)	ND (0.93)
1,4-Dichlorobenzene	ND (0.50)	ND (2.5)	ND (2.5)
1,2-Dichloroethane	ND (0.22)	ND (1.1)	ND (1.1)
1,1-Dichloroethene	24	ND (1.1)	5.2
Ethylbenzene	0.37	ND (0.54)	ND (0.54)
Freon 11	1.1 J	ND (1.2)	ND (1.2)
Freon 12	0.55	ND (1.4)	ND (1.4)
Methylene Chloride	9.3	ND (1.1)	ND (1.1)
Styrene	1.2	ND (0.78)	ND (0.78)
Tetrachloroethene	0.39 J	ND (0.64)	ND (0.64)
Toluene	7.6	ND (0.74)	ND (0.74)
1,1,1-Trichloroethane	ND (0.20)	ND (0.98)	4.3
1,1,2-Trichloroethane	ND (0.18)	2.1	ND (0.88)
1,2,4-Trimethylbenzene	0.35 J	ND (0.98)	ND (0.98)
1,3,5-Trimethylbenzene	0.22 J	ND (0.74)	ND (0.74)
Trichloroethene	23	310	1.6 J
Vinyl Chloride	ND (0.33)	ND (1.7)	ND (1.7)
Xylenes, m,p-	1.2	ND (2.4)	ND (2.4)
Xylene, o-	0.32 J	ND (1.2)	ND (1.2)
J = analyte concentration is considered an estimated value ND = not detected ppbv = parts per billion by volume SVE = soil vapor extraction () = detection limit			

North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 104

Reporting Period: 1 – 31 January 2009

Date Submitted: 16 February 2009

This data sheet includes the following: results for the operation of the groundwater extraction systems; a summary of flow rates for the individual extraction wells; a brief description of any shutdowns or significant events related to the systems; and a summary of analytical results for selected samples collected.

Operations Summary – January 2009

Operating Time: **Water:** 744 hours

Percent Uptime: **Water:** 100%

Electrical Power Usage: **12,674 kWh**

Gallons Treated: **0.23 million gallons**

Gallons Treated Since March 2000: **82.4 million gallons**

Volume Discharged to Duck Pond: **0.23 million gallons**

Volume Discharged to Storm Drain: **0 gallons**

Percentage of Treated Water to Beneficial Use: **100%**

VOC Mass Removed:

VOC Mass Removed Since March 2000:

0.05 lbs (groundwater only)^a

174.2 lbs from groundwater

Rolling 12-Month Cost per Pound of Mass Removed: \$168,662^b

Monthly Cost per Pound of Mass Removed: \$95,971^b

^a Calculated using January 2009 EPA Method SW8260B analytical results.

^b Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system. High costs are due to low influent groundwater concentrations and low flow rates.

Flow Rates

Average Groundwater Total Flow Rate: **5.1 gpm^a**

Location	Average Flow Rate (gpm) ^b
EW565x31	Off line ^c
EW566x31	Off line ^c
EW567x31	Off line ^c
EW576x04	2.3
EW577x04	2.0
EW578x04	Off line ^c
EW579x04	Off line ^c
EW580x04	Off line ^c
EW621x04	3.2
EW622x04	1.6
EW623x04	1.1
EW614x07	0.8 ^d
EW615x07	0.8 ^d

^a The flow rate was calculated using the effluent discharge totalizer divided by the operating time of the plant.

^b Extraction well flow rates are based on the average of the weekly readings.

^c Extraction well was shutdown for a one-year rebound study in December 2007 based on the *Work Plan for RPO Actions at Sites SD031, FT004, and FT005* (CH2M HILL, 2007).

^d LF007 extraction wells were turned on for the dry season on 30 April 2008.

gpm = gallons per minute

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
NGWTP (water)	NA	NA	NA	NA	No shutdowns during the month of January 2009
NA = not applicable NGWTP = North Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater sampling at the NGWTP was performed on 5 January 2009. Sample results are presented in Table 1. The total VOC concentration (29.0 µg/L) in the influent sample has decreased significantly since the December 2008 sample (69.2 µg/L). A similar trend was observed in from December 2007 to January 2008. Cis-1,2-dichloroethene and trichloroethene were detected in the influent sample. The SD031 extraction wells were off line during the rebound study, and therefore, the indicator chemical for the site, 1,1-dichloroethene, was not detected. VOCs were not detected in the effluent sample.

No maintenance activities were performed in January 2009.

Optimization Activities

On 4 December 2007, the six extraction wells (EW565x31, EW566x31, EW567x31, EW578x04, EW579x04, and EW580x04) were shut down for rebound testing. These extraction wells remained off-line for one year. These wells were sampled in May and November/December 2008 as part of the GSAP events. Based on the groundwater results of the rebound study, the groundwater extraction wells at FT004 and SD031 should remain off line. Routine monitoring activities should continue (semi-annual basis for monitoring wells, annual basis for extraction wells) in order to identify plume stability and be able to accurately project long-term trends. A detailed assessment of the rebound and plume stability at Sites FT004 and SD031 are presented in the *North Groundwater Treatment Plant 2008 Annual Remedial Process Optimization Report* (CH2M HILL, 2009).

No other optimization activities were conducted in January 2009.

Table 1

Summary of Groundwater Analytical Data for January 2009 – North Groundwater Treatment Plant

Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)	N/C	5 January 2009 (µg/L)	
				Influent	Effluent
Halogenated Volatile Organics					
Bromodichloromethane	5.0	0.17	0	ND	ND
Bromoform	5.0	0.26	0	ND	ND
Carbon Tetrachloride	0.5	0.18	0	ND	ND
Chloroform	5.0	0.17	0	ND	ND
Dibromochloromethane	5.0	0.17	0	ND	ND
1,3-Dichlorobenzene	5.0	0.08	0	ND	ND
1,4-Dichlorobenzene	5.0	0.10	0	ND	ND
1,1-Dichloroethane	5.0	0.24	0	ND	ND
1,2-Dichloroethane	0.5	0.22	0	ND	ND
1,1-Dichloroethene	5.0	0.24	0	ND	ND
cis-1,2-Dichloroethene	5.0	0.23	0	0.49 J	ND
trans-1,2-Dichloroethene	5.0	0.54	0	ND	ND
trans-1,3-Dichloropropene	5.0	0.12	0	ND	ND
Methylene Chloride	5.0	0.61	0	ND	ND
Tetrachloroethene	5.0	0.20	0	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND
Trichloroethene	5.0	0.20	0	28.5	ND
Vinyl Chloride	0.5	0.24	0	ND	ND
Non-Halogenated Volatile Organics					
Benzene	1.0	0.091	0	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND
Toluene	5.0	0.098	0	ND	ND
Xylenes	5.0	0.093 – 0.24	0	ND	ND
Other					
Total Petroleum Hydrocarbons – Gasoline	50	32	0	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	84.2	0	NM	ND

^a In accordance with Appendix G of the *Travis AFB North Groundwater Treatment Plant Operations and Maintenance Manual*, Sites FT004, SD031, and LF007 Area C (URS Group, Inc., 2005).

J = analyte concentration is considered an estimated value
N/C = number of samples out of compliance with discharge limits
ND = not detected
NM = not measured
µg/L = micrograms per liter

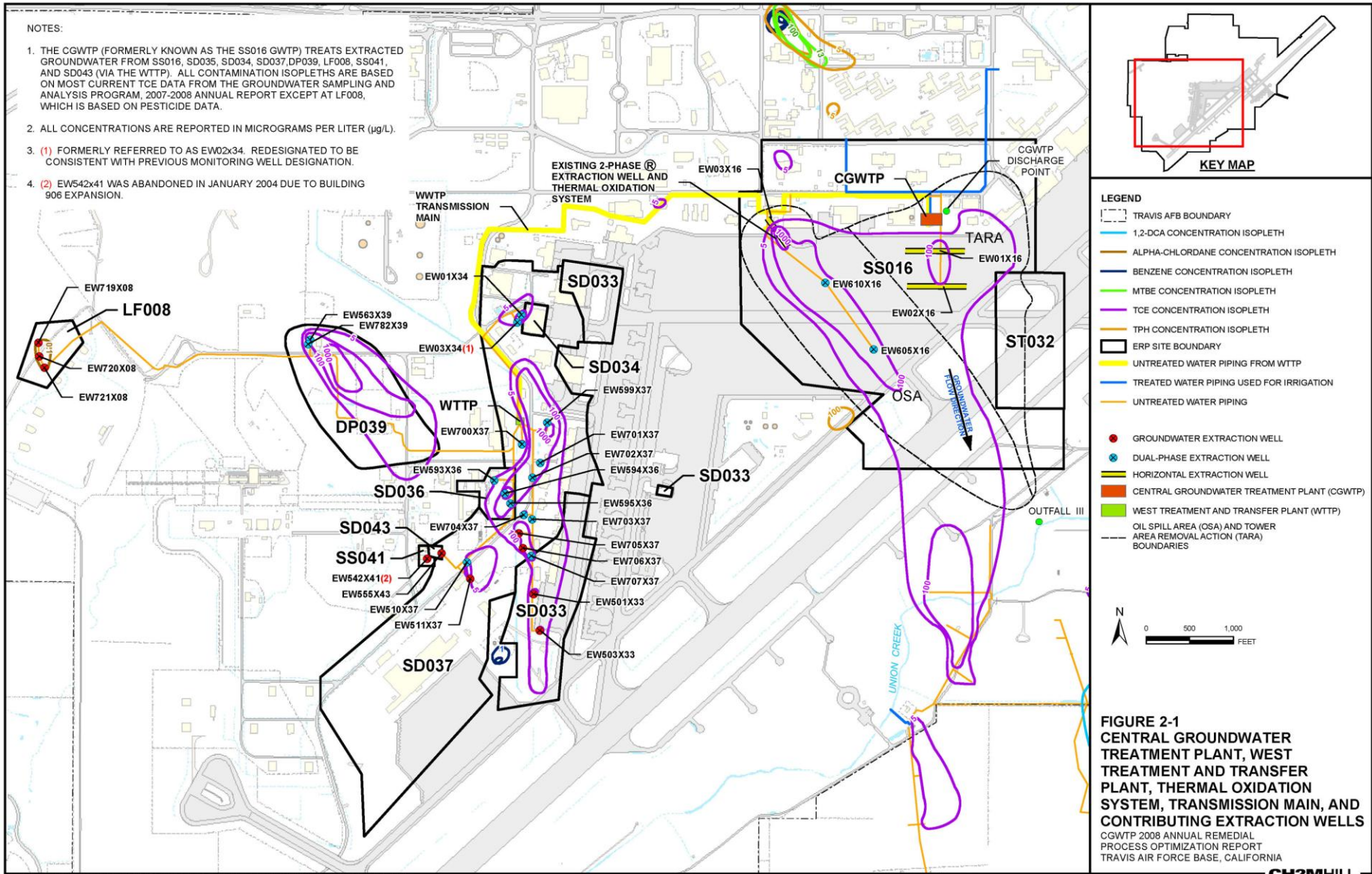
2008 Annual RPO Report

Central Groundwater Treatment Plant System

- Comprises three main treatment units:
 - Thermal Oxidation (ThOx) Unit
 - West Transfer and Treatment Plant (WTTP)
 - Central Groundwater Treatment Plant (CGWTP)
- ThOx Unit
 - extracts groundwater and soil vapor from 5 wells in the Site 16 Oil Spill Area
 - treats soil vapor, pumps water to the CGWTP

NOTES:

1. THE CGWTP (FORMERLY KNOWN AS THE SS016 GWTP) TREATS EXTRACTED GROUNDWATER FROM SS016, SD035, SD034, SD037, DP039, LF008, SS041, AND SD043 (VIA THE WTTP). ALL CONTAMINATION ISOPLETHS ARE BASED ON MOST CURRENT TCE DATA FROM THE GROUNDWATER SAMPLING AND ANALYSIS PROGRAM, 2007-2008 ANNUAL REPORT EXCEPT AT LF008, WHICH IS BASED ON PESTICIDE DATA.
2. ALL CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER ($\mu\text{g/L}$).
3. (1) FORMERLY REFERRED TO AS EW02X34. REDESIGNATED TO BE CONSISTENT WITH PREVIOUS MONITORING WELL DESIGNATION.
4. (2) EW542X41 WAS ABANDONED IN JANUARY 2004 DUE TO BUILDING 906 EXPANSION.



WTTP

- extracts groundwater from 24 extraction wells in the WIOU and WABOU
- extracts vapor from 12 of these wells
- treats the vapor via vapor granular activated carbon (VGAC) and pumps the water on to the CGWTP

CGWTP

- treats water via ultraviolet oxidation (UvOx) and liquid granular activated carbon (LGAC)
- treats groundwater from the WTTP, ThOx, and two other Site SS016 extraction wells
- discharges treated water to the storm sewer

2008 Changes—CGWTP System

- Groundwater and vapor extraction at DP039 shut down to facilitate bioreactor
- Groundwater extraction at LF008 shut down for rebound test
- Vapor extraction at the ThOx restarted at three wells (EW03x16, EW605x16, and EW610x16)

CGWTP Conclusions

- No exceedance of discharge requirements during 2008
- Mass of vapor contaminants removed has reached asymptotic levels
- Influent VOC concentrations have declined over time
- Average percent uptime during 2008 was 91%

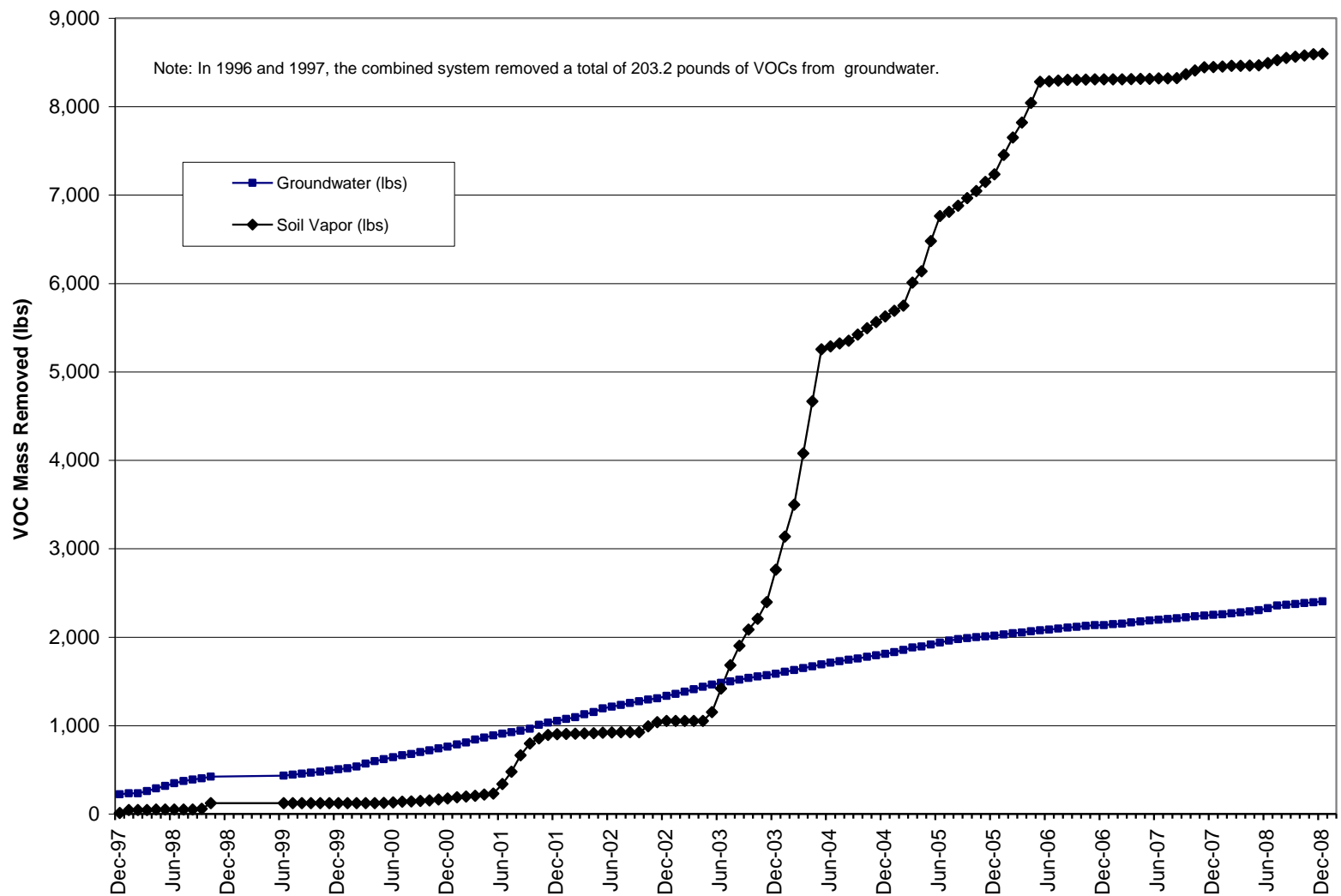
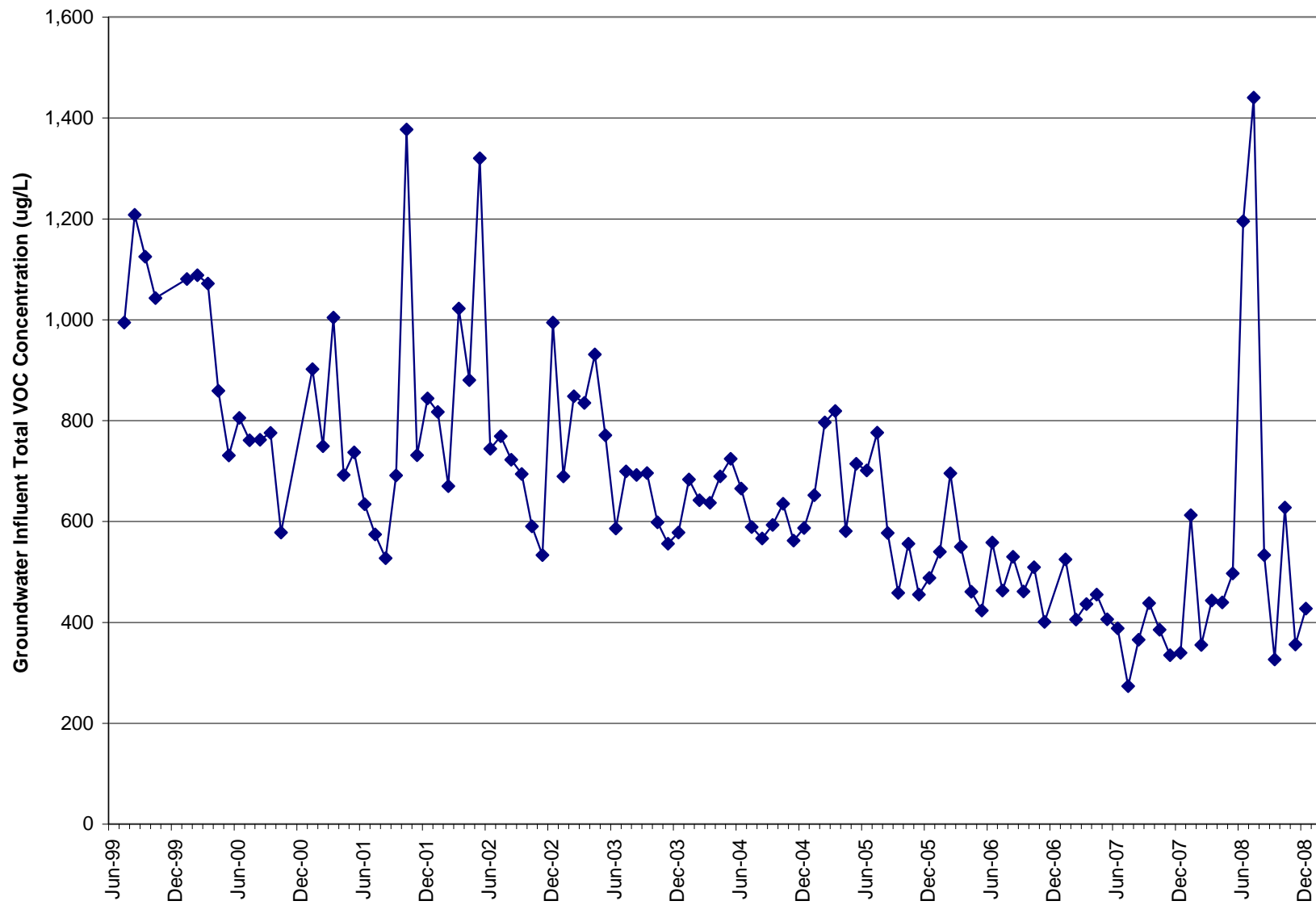


Figure 4-2. Cumulative Groundwater and Soil Vapor VOC Mass Removed, December 1997 – December 2008, Central Groundwater Treatment Plant, Travis AFB



**Figure 9-1. Groundwater Influent Total VOC Concentration vs. Time,
July 1999 - December 2008, Central Groundwater Treatment Plant, Travis AFB**

CGWTP Conclusions, cont'd

- SS016 system achieving design source area capture of VOCs ($> 1,000 \mu\text{g/L}$)
- WIOU system achieving design source capture ($>1,000 \mu\text{g/L}$) and migration control ($>100 \mu\text{g/L}$)
 - all but 3 extraction wells show decreasing trends
 - all but 2 monitoring wells show decreasing trends

CGWTP Conclusions, cont'd

- WABOU sites LF008 and SD043 achieving source control and migration control objectives
- DP039 achieving source control objective. Migration control to be achieved in 2009

Probable CGWTP Optimization Activities in 2009

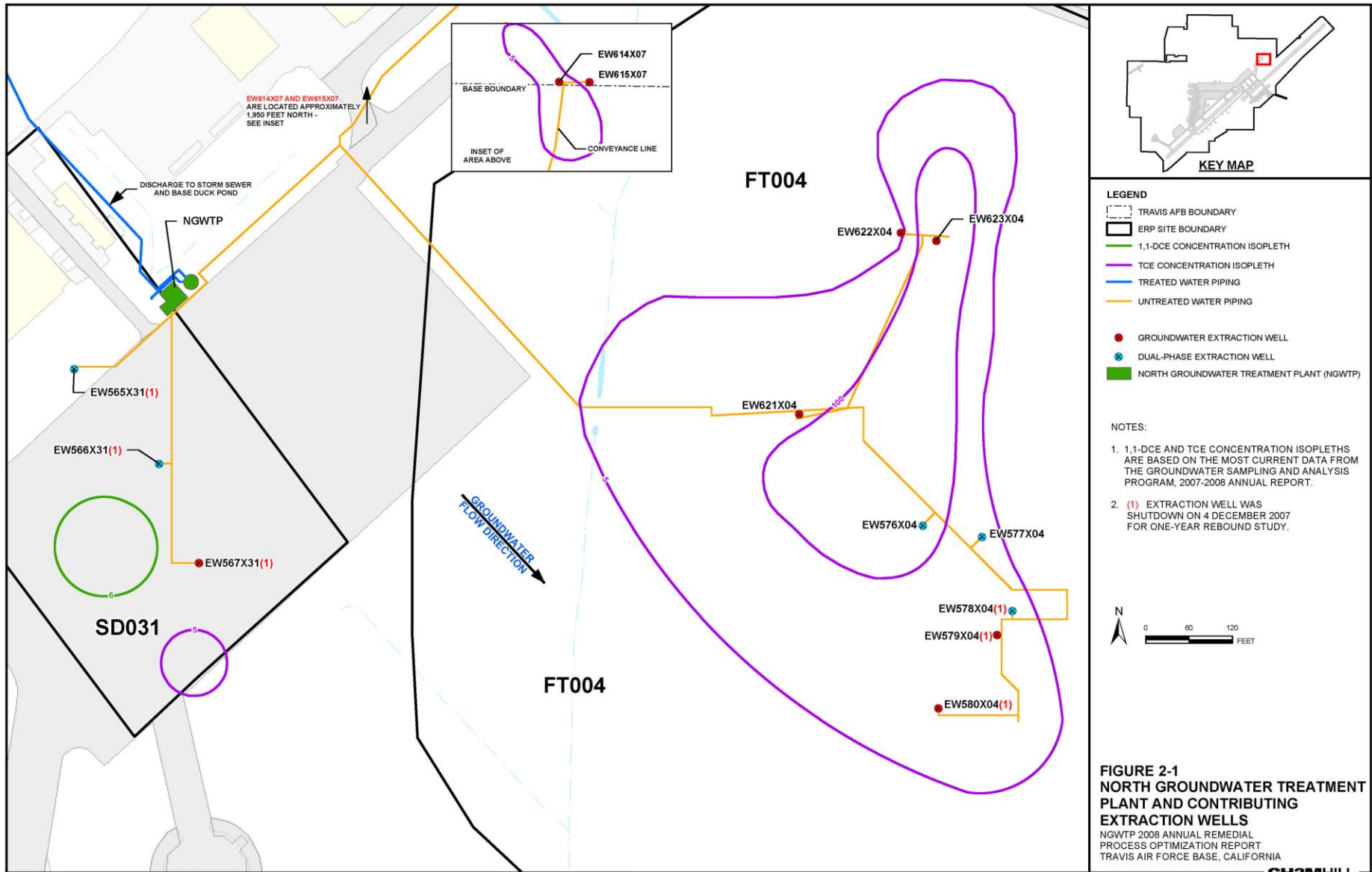
- Collect groundwater and vapor samples from WIOU extraction wells and design rebound studies
- Collect vapor samples from SS016 DPE wells and perform rebound study (likely for rebound—EW605x16 and EW610x16)
- Shut down UvOx and treat groundwater via LGAC only (change out the 20,000-lb carbon vessels)

Probable CGWTP Optimization Activities in 2009, cont'd

- Complete the LF008 rebound study (June 2009)
- Continue DP039 optimization—bioreactor, phytoremediation evaluation, installation of biobarrier
- Perform SS016 source area in situ pilot test using edible oil injection
- Perform sustainability analysis (AFCEE tool?)

North Groundwater Treatment Plant System

- Treats groundwater via air stripper from Sites FT004 (8 EWs), SD031 (3 EWs), and LF007C (2 EWs) and discharges to the Duck Pond
 - vapor extraction shut down in 2007
 - 3 EWs at FT004 and 3 EWs at SD031 have been shut down in 2008 for a rebound study
 - EWs at LF007C operate seasonally to avoid impacts to vernal pools—NGWTP shut down last week for the winter



2008 Changes and Conclusions— NGWTP System

- Rechargeable batteries attached to solar panels at LF007C to enable 24-hour operation
- No exceedance of discharge requirements during 2008
- Mass removal for both vapor and groundwater contaminants at asymptotic levels

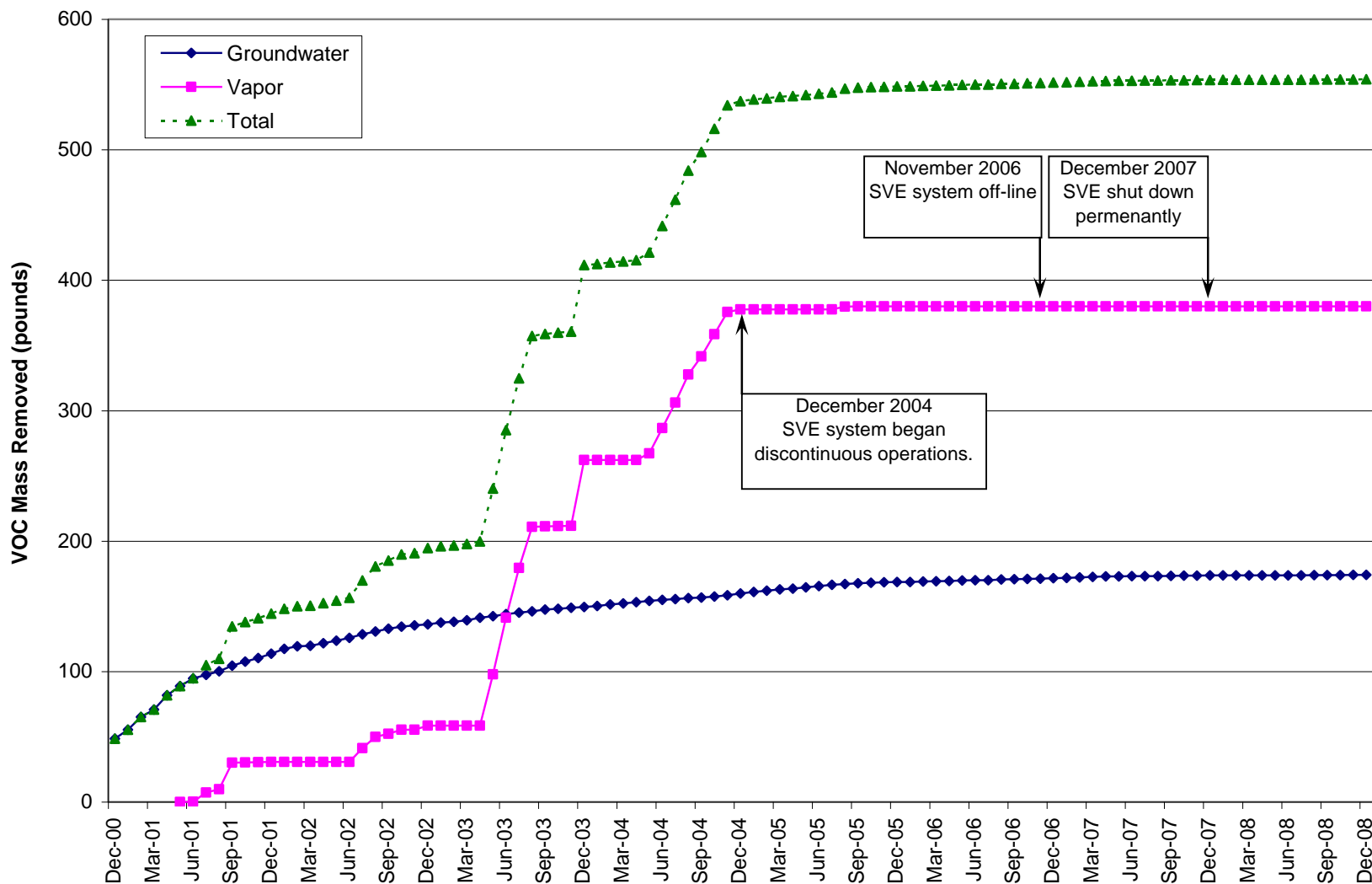
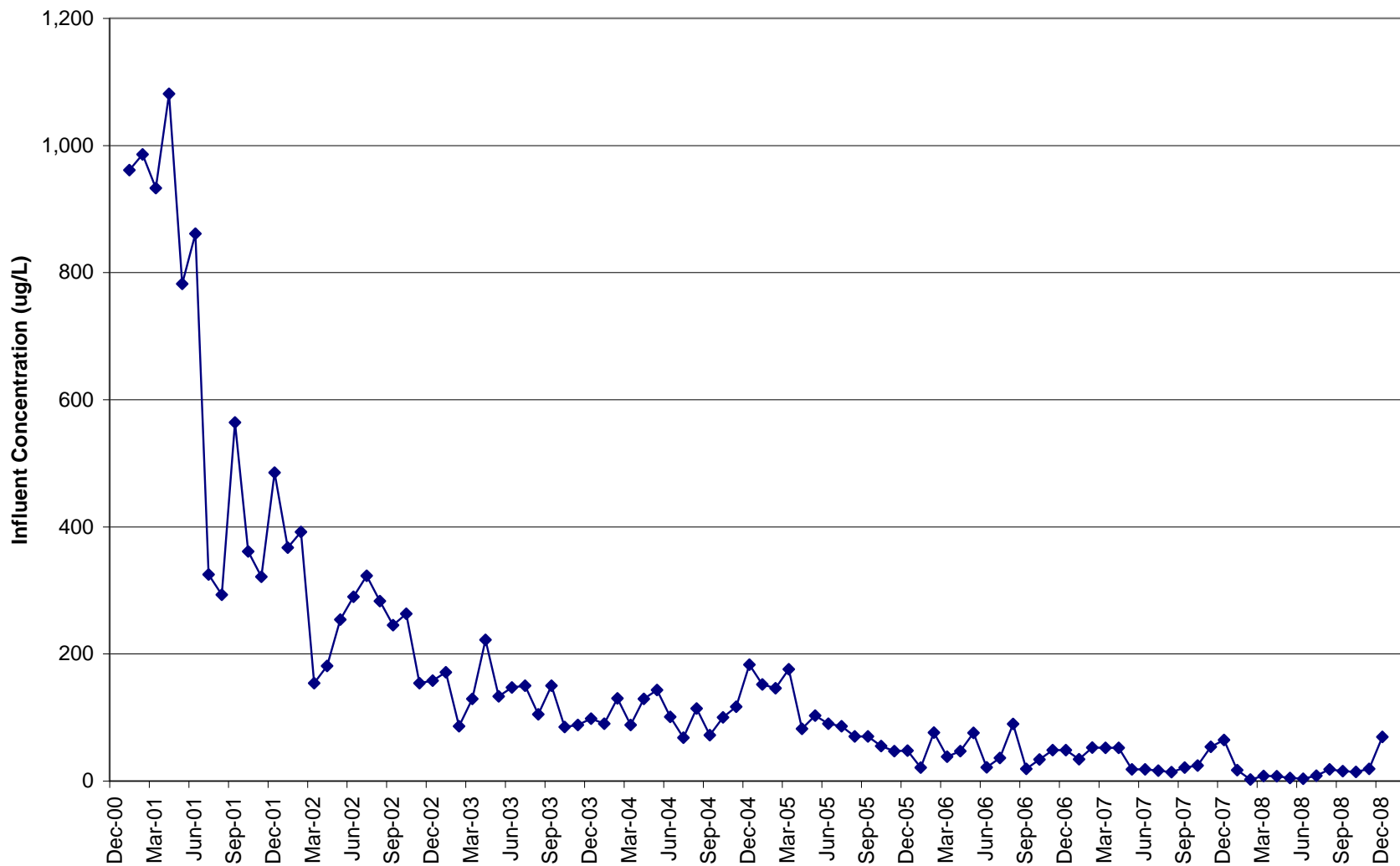


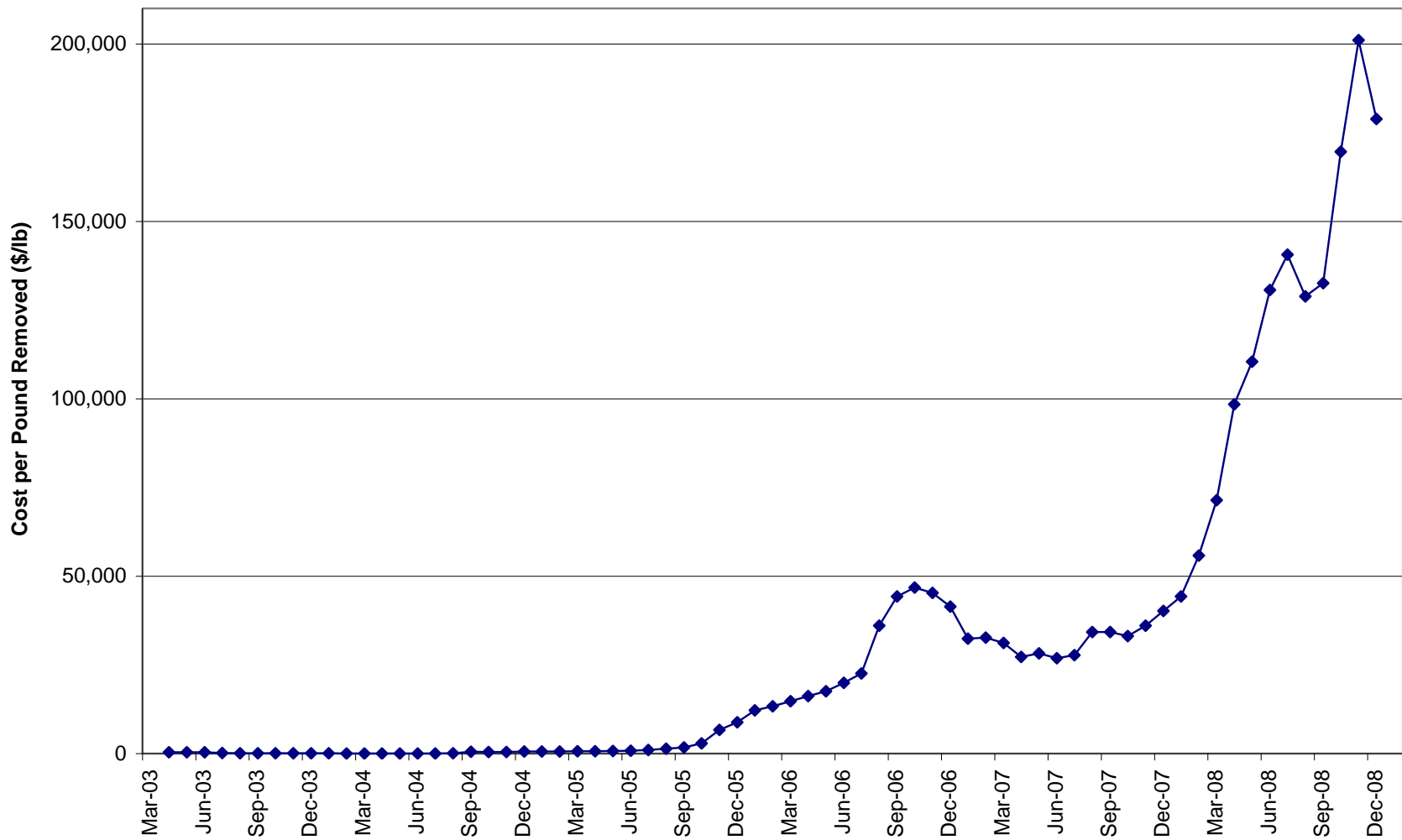
Figure 4-1. Cumulative VOC Mass Removed vs. Time
December 2000 - December 2008, North Groundwater Treatment Plant, Travis AFB

NGWTP Conclusions, cont'd

- Groundwater influent VOC concentrations have declined over time
- Costs per pound of mass removed have reached very high levels
- Average percent uptime during 2008 was 96.2%
- FT004 and SD031 achieved source and migration control ($>100\mu\text{g/L}$) during 2008



**Figure 9-1. Groundwater Influent Concentration vs. Time
January 2001 – December 2008, North Groundwater Treatment Plant, Travis AFB**



**Figure 9-3. Rolling 12-Month Costs per Pound Removed
April 2003 – December 2008, North Groundwater Treatment Plant, Travis AFB**

Probable NGWTP Optimization Activities in 2009

- LF007C Optimization
 - Shut down for the winter
 - Further characterize and model off-base groundwater contamination
 - Design/install additional extraction wells as needed
 - Treat LF007C groundwater on-site via LGAC
 - Pump treated water through existing pipeline to the NGWTP, where booster pump will send it on to the Duck Pond

Results of FT004/SD031 Rebound Test

- All 3 EWs at SD031, and 3 of 8 EWs at FT004, shut down for one year
- All were sampled in December 2008
- Only one EW and two monitoring wells (MWs) contain TCE above design capture of 100 µg/L:
 - EW576x04 (183 µg/L)
 - MW131x04 (131 µg/L)
 - MW266x04 (210 µg/L)

Results of FT004/SD031 Rebound Test, cont'd

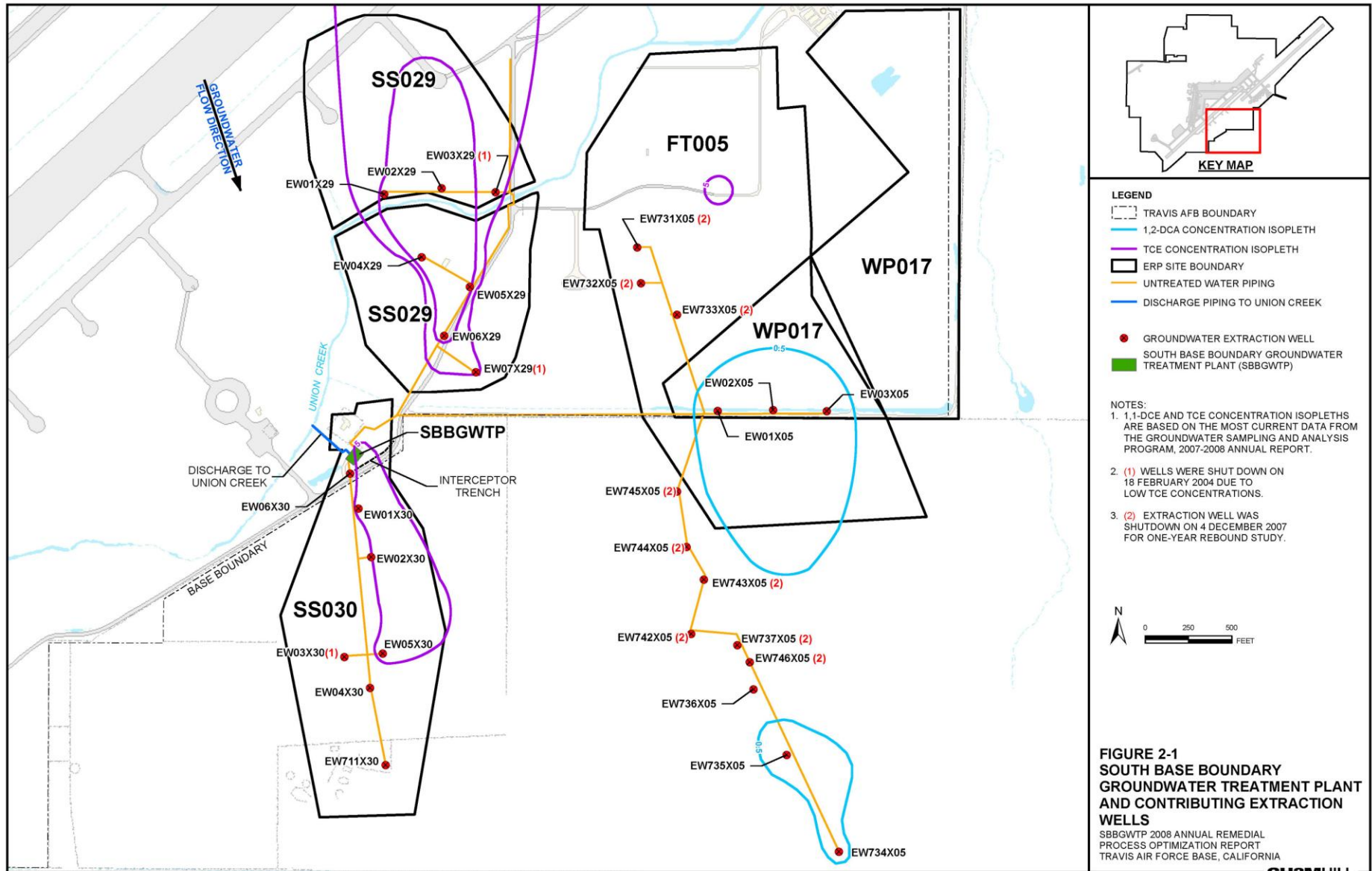
- No wells at SD031 contain TCE above 100 µg/L. Only one well contains TCE above the MCL (MW574x31 at 10.7 µg/L)
- No EW at SD031 contains 1,1-DCE above the MCL (6 µg/L)
- Maximum 1,1-DCE concentration at SD031 is 27.4 µg/L at MW571x31

Results of FT004/SD031 Rebound Test, cont'd

- January 2009 influent concentrations at the NGWTP:
 - TCE = 28.5 µg/L (unusually high)
 - 1,1-DCE = ND
- Current rolling 12-month cost/pound of VOCs removed at NGWTP = \$169,000
- Current Status: shut down for the winter
- Recommendation: continue shut down, monitor, consider MNA in the FS

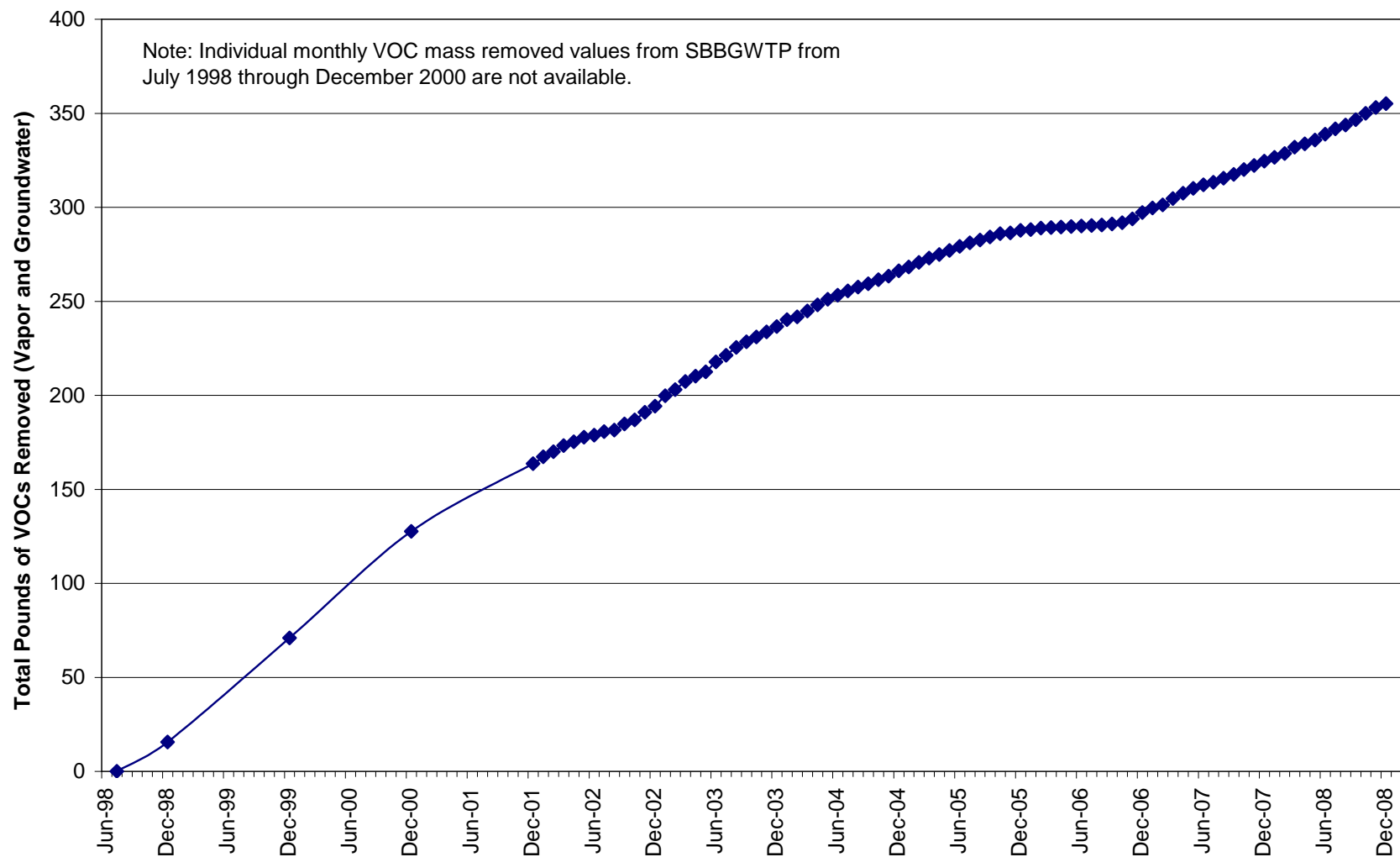
South Base Boundary Groundwater Treatment Plant System

- SBBGWTP extracts and treats groundwater from up to 29 EWs at three sites (FT005, SS029, and SS030)
- Treats water via air stripping (two stand-by LGAC units available) and discharges to Union Creek
- Nine EWs at FT005 have been shut down for one year for rebound testing



SBBGWTP 2008 Conclusions

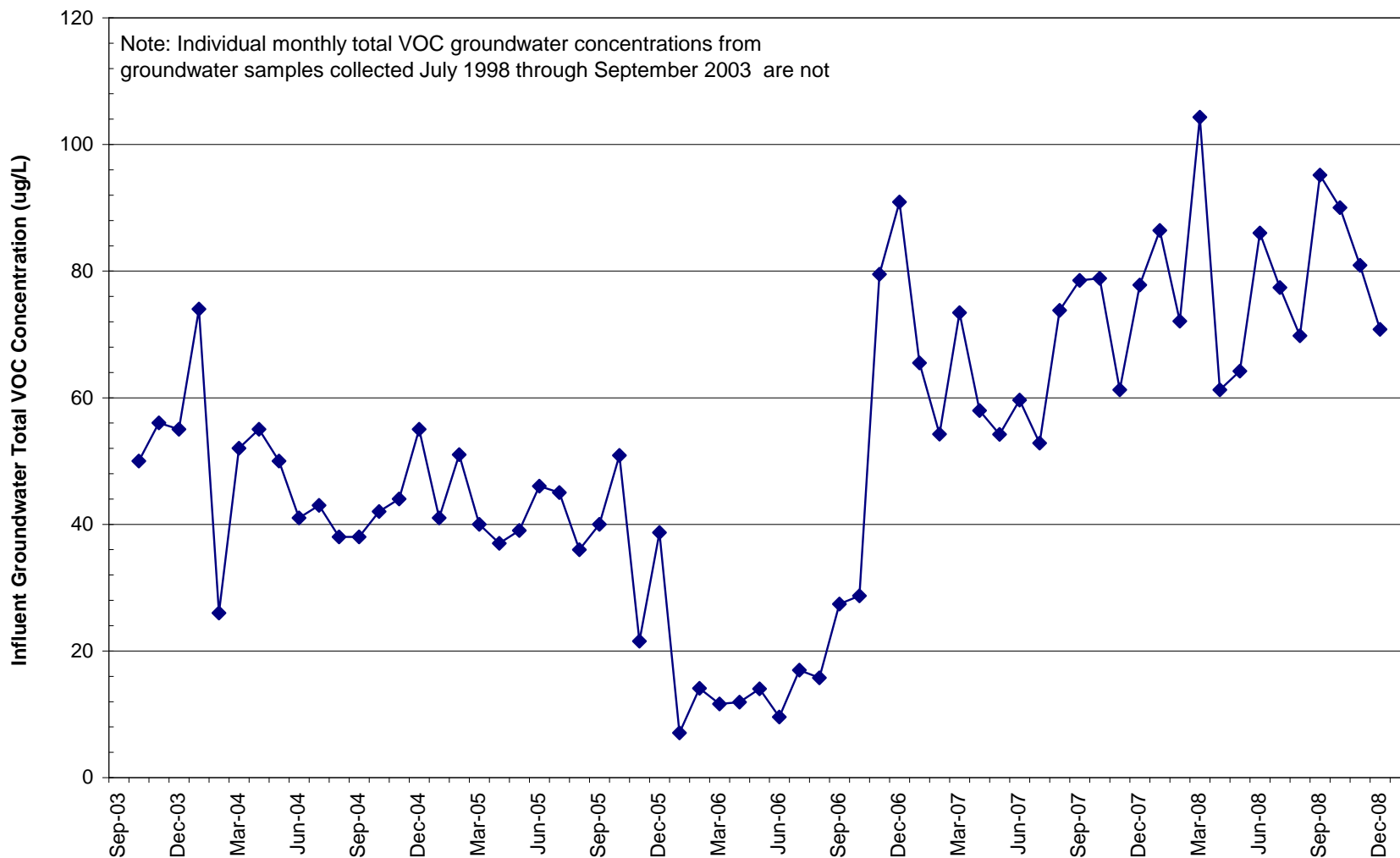
- No exceedance of discharge requirements during 2008
- Cumulative VOC mass removal (about 355 pounds) had leveled off, but has increased at steady rate in recent years
 - improved maintenance and replacement of extraction well pumps?
 - in-migration of groundwater from SS016?



**Figure 4-1. Cumulative VOC Mass Removed vs. Time,
July 1998 - December 2008,
South Base Boundary Groundwater Treatment Plant, Travis AFB**

SBBGWTP 2008 Conclusions, cont'd

- Influent VOC concentrations slowly increasing
- Migration control at base boundary and off-base remediation of 1,2-DCA is being achieved at FT005
- Migration control for TCE being accomplished at SS029
- Uncertainty associated with off-base distribution of TCE at SS030 will be addressed in 2009



**Figure 9-1. Groundwater Influent Total VOC Concentration vs. Time,
October 2003 - December 2008,
South Base Boundary Groundwater Treatment Plant, Travis AFB**

Probable SBBGWTP Optimization Activities in 2009

- SS030 Optimization
 - Further characterize and model off-base groundwater contamination
 - Design/install additional EWs and MWs as needed
 - Continue to treat SS030 groundwater at the SBBGWTP

Results of FT005 Rebound Test

- Nine EWs shut down for one-year rebound study; six EWs continued pumping
- Sampled in December 2008
- 1,2-DCA was detected in only three wells:
 - EW743x05 at 0.51 µg/L
 - EW733x05 at 1 µg/L
 - MW765x05 at 1.2 µg/L
- 1,2-DCA has not been detected at SBBGWTP influent since October

FT005 Rebound Test Recommendations

- Expand shut-down to all FT005 extraction wells
- Continue rebound test
- Sample extraction wells in May 2009
- Evaluate whether to continue shut-down in 2009 RPO Annual Report

Travis AFB Groundwater Program

Management Overview Briefing

RPM Meeting
February 25, 2009

Documents & Tasks Completed

- Basewide Health & Safety Plan
- LF008 Rebound Study Work Plan
- DP039 Bioreactor Work Plan

- ST027B Gore Sorber Survey

Documents & Tasks In Progress

- Action Plan (Draft)
- 2007/2008 Annual GSAP Report (Draft)
- RD/RA QAPP Update (Draft)
- LF007C RPO Work Plan (Draft)
- ST027B Site Characterization WP (Draft)
- SS030 RPO Work Plan (Draft)
- ST032 POCO Technical Memo (Pre-draft)

Documents & Tasks Upcoming

- SS016 IRA Work Plan
- 2008 Annual RPO Report
- Field Sampling Plan (FSP)
- SS014 Tier 1 POCO Evaluation WP
- Natural Attenuation Assessment Report (NAAR)
- Passive Diffusion Bag (PDB) Technical Memo