

# SECRETARY OF DEFENSE ENVIRONMENTAL RESTORATION AWARD – INSTALLATION

HILL AIR FORCE BASE, UTAH  
FY 2002



HILL CONTINUES TO  
DEMONSTRATE ITS  
LEADERSHIP IN THE  
ENVIRONMENTAL  
RESTORATION PROGRAM!

## Introduction

HAFB Air Force Base (HAFB) is the center of Utah's defense industry, and one of the largest employers in the state, with nearly 20,000 civilian and military personnel and an annual payroll of about \$750 million. Located approximately 30 miles north of the state capitol, Salt Lake City, HAFB is an integral part of a unique geographic and economic setting. The area is part of a five-county region containing 68 percent of the state's population and generating 75 percent of the total economy. The impact of HAFB on Utah's economy is \$2 billion annually.

The host organization at the base is the Ogden Air Logistics Center (OO-ALC), one of three such centers assigned to the **Air Force Materiel Command**. The OO-ALC provides worldwide engineering and logistics management for the **F-16 Fighting Falcon** and **A-10 Thunderbolt II** aircraft and the **Minuteman III** and **Peacekeeper** intercontinental ballistic missiles. Activities at HAFB include depot maintenance, repair, and overhaul of the F-16, A-10, and **C-130 Hercules** aircraft. The center is the Air Force Center of Industrial and Technical Excellence for low observable "stealth" aircraft structural composite materials and provides support for the **B-2 Spirit** multi-role bomber.

HAFB also supports more than 40 tenant units apart from the OO-ALC, including two premier F-16 fighter wings: the 388th Fighter Wing and the 419th Fighter Wing.

HAFB is located in a topographically flat area within the Great Salt Lake Valley. About four miles to the east, the Wasatch Mountains rise abruptly from the valley floor to an elevation of about 9,500 feet. The Great Salt Lake, at an elevation of about 4,200 feet, is approximately 12 miles west of HAFB. Groundwater is obtained from three primary aquifers, and the interaction between groundwater, surface water, and geology is varied and complex.

HAFB's property includes facilities in Utah, Wyoming, and Nevada. The land mass consists of 6,666 acres on the main base and more

than 955,000 acres contained within a major aircraft range (Utah Test and Training Range (UTTR)).

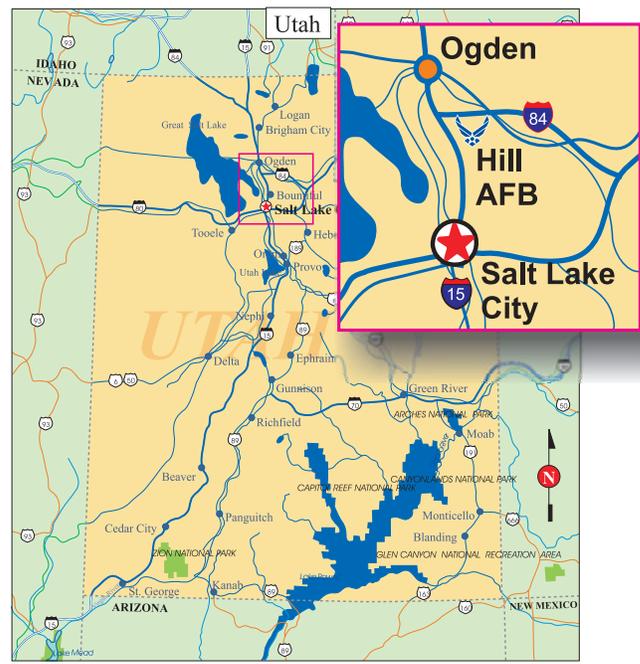
Since the 1930s, HAFB operations have included aircraft depot maintenance and storage of parts and munitions. Over the years, hundreds of thousands of gallons of solvents and other chemicals were used for cleaning and degreasing parts, stripping and repainting aircraft, and dozens of other processes involved in aircraft depot maintenance. As was the acceptable practice at the time, waste chemicals were disposed of in pits and trenches or dumped out the "back door," becoming the sources of contaminated groundwater and soils now found on and off base.

HAFB has implemented one of the most proactive environmental restoration programs in the Department of Defense (DoD). Beginning in 1982 with an investigation of hazardous waste sites, HAFB had the most urgent interim remedies in-place by 1986.

The program has continued at full speed so that today 86 of the 108 Installation Restoration Program (IRP) sites have completed the necessary studies and are in the remedial design or remedial action (RA) phases or have no further response action planned. All sites are scheduled to be closed or have final remedy in place by 2008 — seven years ahead of the Department of Defense Cleanup Performance Goals 2014.



HAFB is located approximately 30 miles north of Salt Lake City.



# Background

## Environmental Restoration Challenges

Since receiving a cease and desist order from the Utah Department of Health (UDOH) in 1984, HAFB has addressed and overcome the most difficult environmental challenges, and has developed a mature and model program. HAFB continues to aggressively and creatively meet many management and technical challenges to ensure the present and future success of its IRP. These challenges are described below.

### Property Access

Groundwater contaminant plumes extend into seven of the communities surrounding the base. Approximately 900 acres of off-base property have been affected by this contamination, with most of this off-base acreage in heavily populated areas. Real estate agreements are necessary to facilitate access to off-base properties, achieve efficient placement of testing locations and restoration systems, and ensure minimal impacts to the landowner.

### Regulatory Interfaces

The HAFB restoration program functions best when representatives from the U.S. Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality (UDEQ) are integrated into the decision-making process and a sentiment of trust and understanding exists. The success of HAFB's IRP is attributed in large measure to the cooperative spirit fostered between the base and the regulatory agencies. In this way, all parties make a significant commitment to reach milestones together.

### Treatment Technologies

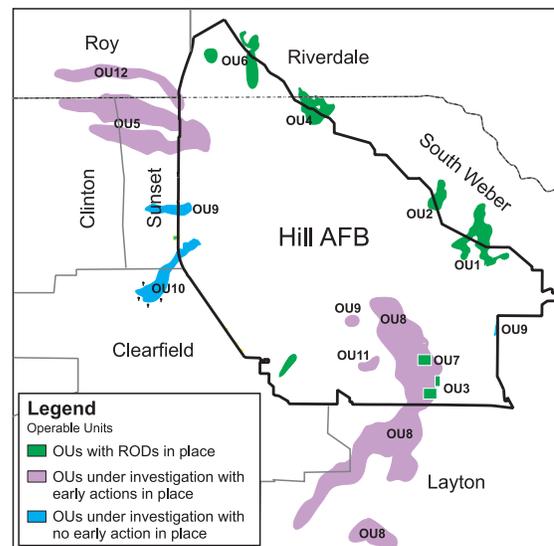
Efficient technologies to restore groundwater contaminated with solvents like those found at HAFB continue to be a significant challenge in achieving cleanup at sites around the base. Complex groundwater flow regimes and recalcitrant chemicals result in significant challenges for traditional pump-and-treat approaches. With nearly 1,500 acres of ground-

water contamination, traditional approaches must be challenged. Staff engineers and scientists are forging ahead with new technologies and partnerships with researchers anticipating significantly more efficient groundwater remedies.

### Restoration Program Staffing

Within the OO-ALC Environmental Management Directorate (EM), the Restoration division (EMR) is responsible for executing HAFB's IRP. EMR's history of attracting highly qualified staff to manage restoration projects is an important factor in the success of the restoration program at HAFB. The majority of the staff has advanced academic degrees and 70 percent have professional certifications. During this award period, the base was the focus of an outsourcing study of several base support functions under Office of Management and Budget Circular A-76. EM is now implementing the changes outlined in the government's winning proposal. A lengthy decision process created a sense of employment uncertainty with restoration engineers and scientists, resulting in significant staff turnover during the award period.

To meet these challenges, EMR uses proven strategy for optimizing its administrative and operational structure and prioritizing and implementing its restoration program. This winning strategy includes stakeholder involve-



*This map shows HAFB's 12 Operable Units and their associated groundwater contamination plumes. Nearly all of Hill's OUs have either final or interim cleanup actions in place. The areas shaded green indicate residential areas. This presents a tremendous community relations challenge for HAFB's Restoration Program staff.*

ment, early actions, innovation, cost reduction, effective data management, and performance monitoring and verification.

## Management Approach

In January 1999, the administrative and operational structure of EMR was changed to address changing technical and management needs of a maturing program. The new structure is centered on two program managers—one focused on investigations and the other on treatment system design, construction, and operation. Their responsibilities include establishing short- and long-term strategies, integrating actions both inside and between operable units (OUs) and developing remedial action objectives and performance verification criteria. This allows project managers to focus on the details of investigation approaches, feasibility studies, treatment system optimization, design, and construction. Program Managers may have responsibility for similar projects across a number of OUs. The change greatly improved focus on achieving cleanup goals and is the fundamental catalyst for recent improvement and accomplishments.

An integral part of HAFB's restoration program involves the use of a variety of contracts and contracting approaches to execute projects, including the Air Force Center for Environmental Excellence resources. Combined, these afford EMR a tremendous capability to help achieve program goals.

## Program Overview

The first indications of environmental contamination at HAFB came in 1978, when a resident noticed a colored discharge from a spring just a few hundred feet from the base boundary. The discharge was eventually traced to a nearby landfill located on base.

Preliminary assessments and site inspections (PA/SIs) began at this and other sites around the base in 1982. The initial investigations identified several sites that were contaminated with organic solvents, heavy metals, and petroleum products. PA/SI work continued until 1987. In July of that year, HAFB was added to the National Priorities List. To date, investigations have identified 108 sites and many

require no further cleanup actions or have remedies in place. However, 42 sites were grouped into one of 12 OUs and are currently being addressed under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

HAFB, UDOH (now UDEQ), and EPA signed an interagency agreement (IAG) in 1991. This agreement identifies the Air Force as the lead agency in the cleanup and defines the oversight role of both state and federal regulatory agencies. The cleanup at HAFB continues to operate within the framework of the IAG.

To date, HAFB has Records of Decision (RODs) signed at OUs 1-4 and 6-7. All remedies at these OUs are in-place and functioning. Interim actions are in-place and functioning at OUs 5 and 8. Spring collection and treatment systems are functioning at multiple locations around the base.

Separate from the CERCLA cleanup actions (but still part of HAFB's IRP) are cleanup actions for underground storage tanks. During the course of this program, 54 sites were discovered and investigated. Cleanup actions were taken at 37 sites and cleanup continues at three sites.

The investigations and cleanup at HAFB are supported by a vast groundwater monitoring network both on and off base. In 2002, samples were collected from more than 600 wells and more than 100 springs, seeps, and ponds. HAFB has also taken indoor air samples (132 in 2002) and fruit and vegetable samples (367 in 2002). To date, nearly 20,000 surface

*HAFB's Source Removal System at OU2 was constructed in 1992 to remove thousands of gallons of waste solvent pooled 40 feet beneath the former chemical disposal pit. Today, surfactants are being used to enhance the system's operating efficiency. To date, more than 43,000 gallons of solvents have been removed from the site.*



water and groundwater samples have been collected. The data are managed in a large database connected to a geographic information system.

Community involvement has always been an important part of HAFB's cleanup program. In 1995, HAFB was one of the first DoD facilities to establish a Restoration Advisory Board (RAB). This board, consisting of 25

members from local communities and regulatory agencies, has advised HAFB through five of the six RODs, and will play an important role in the second comprehensive five-year program review due in September 2003. By developing trust with community leaders and the public at-large, HAFB is able to develop investigative and cleanup strategies that meet the public's expectations and needs.



*"Our Air Force's record of environmental stewardship has evolved into a tremendous success story, and that success is a result of efforts at all levels of installation and headquarters leadership and management. The achievements of the HAFB Installation Restoration Program team reflect the best of the best...constant innovation, attention to detail, and persistent professionalism across-the-board have made them the acknowledged leaders in the restoration arena."*

—Major General Earnest O. Robbins II, Air Force Civil Engineer



## Program Summary

During the award period, the base reduced on-site treatment costs through partnerships with local sewer districts, completed final RAs at six sites, and closed eight sites. Progress continued on an innovative cleanup agreement for the UTTR. The schedule for the second five-year review was maintained. The program was fully compliant with state and federal regulations affecting the IRP—there were zero violations.

The installation continued to partner with regulatory agencies and to foster RAB involvement. The RAB meets quarterly. In addition to its regular meetings, eight RAB training meetings and site tours were held in 2001 and 2002. RAB members attended and assisted with eight InfoFairs in affected communities. Periodic updates were provided to seven different city councils, and regular meetings with state and federal regulators kept HAFB project managers informed and involved.

Anticipating a DoD Military Munitions Response Program data call, a comprehensive range inventory was initiated at UTTR. This inventory was designed to be an annual, iterative effort. To generate data for the inventory, HAFB prepared a detailed questionnaire. The base collected data on the types of munitions used, the range's environmental status, and the type and level of external stakeholder interest.

To judge HAFB's restoration program im-

provement and accomplishment, it is best to use as a baseline the restoration program mission statement, vision, and objectives as published in HAFB's 2000 restoration program Management Action Plan.

### Restoration Mission

The mission of the HAFB IRP is to execute environmental restoration activities in accordance with applicable laws and regulations and within the scope of the Air Force mission. These activities will serve the public interest by protecting human health and the environment, reducing potential risk to affected populations, involving stakeholders in the decision-making process, and wisely using limited taxpayer resources.

### Restoration Vision

Through a desire for excellence, EMR pursues the following to accomplish its mission:

- Achieve results through a proactive approach
- Assert leadership in the environmental field
- Accept responsibility for their stewardship
- Earn the trust of those with whom they work
- Challenge the boundaries of technology

The EMR strategy for implementing its mission is to focus on integrating, prioritizing, and optimizing appropriate response ac-

tions at HAFB and its off-base properties.

## Restoration Objectives

EMR's specific IRP objectives include:

- ☑ Protect human health and the environment.
- ☑ Maintain a RAB as a forum for restoration stakeholders to advise HAFB of their concerns.
- ☑ Conduct all IRP activities in compliance with the law.
- ☑ Meet IAG requirements.
- ☑ Establish priorities by focusing on highest potential risk sites.
- ☑ Facilitate partnerships with researchers and technology vendors to demonstrate technologies that will improve cleanup efficiency and reduce costs.
- ☑ Maintain an up-to-date understanding and documentation of the environmental condition of HAFB and its off-base properties.
- ☑ Evaluate and understand potential risks posed by contaminated sites.
- ☑ Complete studies as soon as practicable for each site and implement cleanup activities.

- ☑ Develop, screen, and select RAs that reduce potential risks and meet cleanup standards.
- ☑ Implement early cleanup actions when appropriate.
- ☑ Implement selected remedial actions to control, eliminate, or reduce potential risks to manageable levels in source areas.
- ☑ Operate remediation systems to optimize performance, reduce cost, and achieve remediation goals and site closure as soon as practicable.
- ☑ Manage resources and conduct RAs in a fiscally responsible manner.
- ☑ Continue to implement an effective community relations program.

EMR has enabled HAFB to identify contaminated sites and take effective steps towards RAs and site closure. A few sites will require long-duration (many decades) cleanup activities; others have been and will be restored and closed quickly. The accomplishments highlighted in the next section clearly demonstrate HAFB's outstanding progress toward achievement of each IRP objective be it technical, programmatic, regulatory, or just the right thing to do.



*"Utah is cleaner because of Hill Air Force Base's outstanding work to cleanup and restore the environment. Their quick action has improved the quality of life for many Utahns living, working, and recreating near the base. Their commitment to protecting human health and the environment is impressive and serves as a model for others to follow. As one of their partners, DEQ is pleased with their work and supports their continued efforts."*

—Dianne R. Nielson, Ph.D., Executive Director, Utah Department of Environmental Quality



## Accomplishments

### Fast Track Cleanup

Having pioneered many DoD benchmarks for fast track cleanup since 1984, EMR's recent focus has shifted to innovative and consolidated investigation approaches and treatment system optimization to streamline the IRP process and realize improved accelerated cleanup.

For example, at OU12, EMR used flexible contracts, innovative technologies, and close teaming with city officials and the community to accelerate a complex remedial investi-

gation (RI) in a populated off-base area. The entire process was completed in 25 percent of normal time, saving \$500,000 while building significant public trust as a good neighbor. Novel actions that saved time and money included:

- Early field development and updating of the site conceptual model
- Cone penetrometer testing (CPT) and Hydropunch® sampling to define the plume prior to well installation
- Direct push monitoring well—*micro-*

well—application

- Early computer groundwater model development
- Flexible contracting strategies allowing adjustment to challenges in the field
- Outside research funding allowing use of a down-hole wire-line sampler in conjunction with a mobile field laboratory to rapidly characterize source areas

EMR's approach cut years off the time traditionally needed to characterize such a complex site at two-thirds the traditional cost. A similar consolidated investigation approach was applied at UTTR disposal sites with common characteristics. The result was reduced sampling and documentation efforts that saved \$1.3 million and saved years of investigation time. Such fast track techniques have saved time and money at numerous sites and have been especially effective at meeting the cleanup challenge at over 800 acres of off-base property located in heavily populated areas.

HAFB has focused on optimizing remedial systems operations to save time and money. At OU1, the free-product recovery system was optimized, increasing production by eight percent, removing over 4,750 gallons of oils and solvents and avoiding \$8.3 million in future treatment costs. Optimization of the OU6 pumping system resulted in a 350 percent increase in pumping efficiency. The result was elimination of off-base treatment due to drop in contaminant concentrations. Optimization of the aeration curtain in OU5 improved efficiency of treatment by 30 percent.

EMR has developed enhanced operational plans and implemented them to focus on measuring and achieving results—treatment systems are actively managed to ensure they are achieving performance expectations.

Remedial process optimization pays dividends and accelerates cleanup.

Additional fast track cleanup accomplishments include:

- Aggressive upgradient groundwater treatment at OU6 restored uninhibited use of a private pond and eliminated the need for a pond treatment system.
- Unique application of soil vapor extraction to remove free product at OU11 will close

the site four years earlier than anticipated.

## Innovative Technology Demonstration/Validation and Implementation

HAFB has hosted experts from all over the world to test 16 innovative technologies in search for improved treatment approaches that reduce cleanup time and costs. Ten were selected for implementation on a broader scale. *HAFB is promoting the transferability of remediation technology to cleanup sites worldwide.*

HAFB investigators and collaborators have published more than 14 technical papers, the purpose of which were to highlight innovative approaches and new methodologies that have been tested and implemented at HAFB. *EMR is leading the charge for improvements in cleanup.*

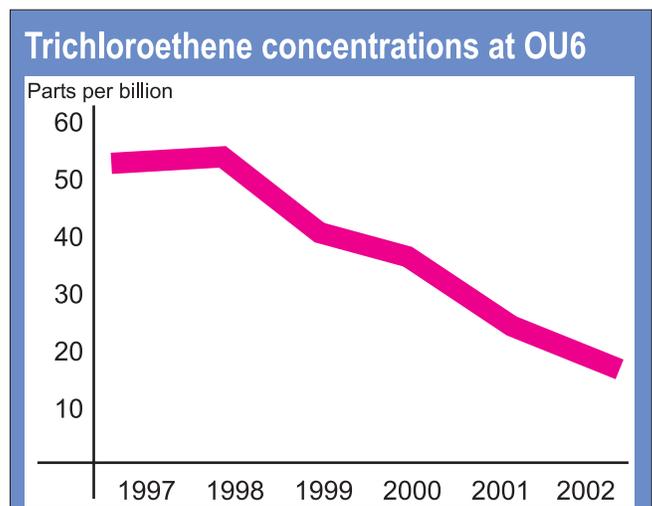
HAFB's innovative technology demonstrations are largely funded by outside agencies. In all, more than \$12 million worth of remediation research has been conducted at HAFB at little or no cost to the base. Accomplishments include:

- **Surfactant Enhanced Aquifer Remediation saves time and money.** At OU2, HAFB successfully tested and introduced full-scale deployment of an innovative surfactant-enhanced extraction system, a first for cleaning up chlorinated solvents. Tests proved the system removed more than 98 percent of residual solvents from soil—a figure considered unachievable just a few years ago. The technique uses surfactants to break the forces that trap solvent globules in the soil. Once free of the soil, the solvents can be removed using pump and treatment systems already in place. More than



Small trees, such as these shown above, are part of a phytoremediation study being conducted by HAFB and Utah State University. The purpose of the study is to determine if trees can be used to extract contaminated groundwater.

As a result of increased pumping efficiencies, concentrations at OU6 have dropped dramatically in recent years.



**Innovative Technologies Pioneered at HAFB**

Wire line sampling (OU2)	Implemented
Phytoremediation (OU4)	Implemented
Direction trapping mass spec	Implemented
Surfactant Enhanced Aquifer Remediation (SEAR) (OU2)	Implemented
Mass flux measurements (OU2)	Implemented
Groundwater siphon (OU8)	Implemented
3-D ground penetrating radar mapping of subsurface clay (OU1)	Implemented
Micro-well sampling (OU5)	Implemented
SVE characterization (OU5, OU12)	Field Pilot Testing
3-D seismic refraction (OU2)	Implemented
Radio tracer partitioning interwell tracer test (OU2)	Implemented
Barometric pumping (UTTR)	Field Pilot Testing
Fuel fluorescence LNAPL detection (OU1)	Field Pilot Testing
Cometabolic bioventing (OU2)	Lab Tested/ Testing
Enhanced reductive dechlorination (OU5)	Lab Tested/ Testing

1,200 gallons of solvents have been removed saving \$5 million and decades of cleanup time over conventional extraction systems. The new technology will allow recovery of most, if not all, the residual solvent. *HAFB is leading the way on cleanup of highly complex sites.*

- **Innovative Miro-wells OK with EPA.** In the western portions of the OU12 plume, innovative monitoring wells with 1.25-inch diameter, known as *micro-wells*, were installed to depths up to 50 feet below ground surface using direct-push technology. A short-duration study proved to EPA that *micro-wells* yielded results comparable with conventional wells. *Micro-wells* are installed for two-thirds the cost of conventional shallow wells and reduce the sampling time by 34 percent. *Over \$400,000 in investigation costs were saved at OU12.*
- **Phytoremediation shines at HAFB.** EMR

implemented an innovative phyto-remediation approach to contain contaminated groundwater using natural vegetation at OU4 resulting in elimination of regulatory requirement for a \$6.8 million groundwater treatment system. *HAFB pioneers innovative, natural solutions to cleanup that the community favors!*

Additional innovative technology accomplishments include:

- An array of innovative artesian siphon extraction wells demonstrated containment of the trichloroethene (TCE) plume at OU8 eliminating the requirement for conventional groundwater pumps and associated operation and maintenance costs—a \$400,000 reduction in future capital costs
- Developed local intranet-based contamination mapping system that allows base planners and facility managers to recognize conflicts between cleanup sites and facility projects early in the planning process

**Partnerships Addressing Environmental Cleanup Issues Between DoD and Other Entities**

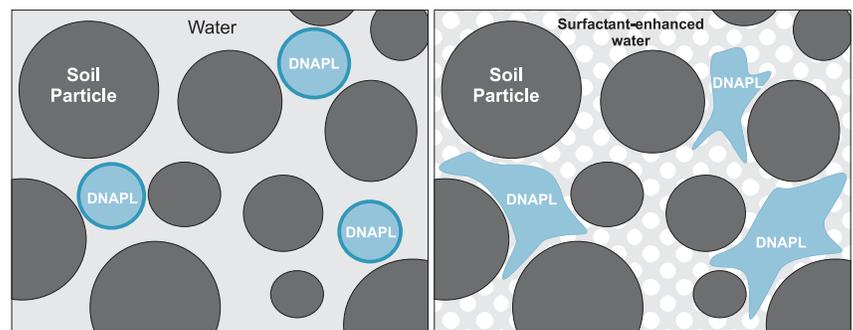
Beneficial partnerships have long been an integral part of EMR’s program. A common dimension of successful teams is the importance given to protecting human health and the environment and earning mutual trust among the team members.

EMR partnered with regulators, communities, other HAFB organizations, and contractors to focus on site closure and remedy goals. For example, EMR entered into agreements with off-base sewer districts to allow direct discharge of groundwater from cleanup sites at



Members of HAFB’s Restoration Advisory Board observe as a monitoring well is drilled as part of the OU12 Investigation in Roy, UT.

At OU2, surfactants were used to release solvent globules embedded between soil particles. Using surfactants, unprecedented amounts of chlorinated solvents were removed from the soil.



OUs 4 and 6 and, soon, OU8 into sewer systems with treatment being handled at the local sewer plants. This reduces operational costs dramatically. HAFB also uses extraction systems with direct discharge to local sewer lines and treatment plants for final treatment. This has dramatically reduced operation and maintenance costs associated with building and operating separate treatment systems. Life-cycle savings are in the multi-millions of dollars. *HAFB's partnerships save taxpayer dollars.*

Working with EPA Region 8, EMR improved its strategy to mitigate indoor air contamination in an off-base community neighborhood by applying best practice lessons learned from a private-sector site in Colorado. HAFB eliminated an unnecessary treatment step saving \$1,000 per home and the nuisance of ongoing intrusion in homes. EMR and HAFB's Public Affairs Office professional staff implemented the strategy by going door-to-door to ensure that citizens were able to take advantage of air sampling for TCE. One hundred fifty homes were visited, 79 homes were sampled, and six vapor removal systems were installed. Exposure to TCE vapors was eliminated. The demonstration of a high level of concern by the HAFB team substantially strengthened trust within the community. *Benchmarking with partners pays financial dividends and uses experience of others to benefit HAFB stakeholders.*

HAFB's mission and day-to-day operations were sustained by EMR's exceptional outreach to coordinate IRP activities with other HAFB organizations such as civil engineering, procurement, public affairs, legal, bioenvironmental engineering, planning, and facility management. For example, close integration with base planners allowed cleanup sites to be used for compatible activities such as aged aircraft storage on closed/capped landfills and parking areas. *EMR is supporting the Air Force mission.*

Additional examples of partnering successes include:

- Aggressive approach developed with regulators allowing pragmatic closure of 72 of 105 sites and areas of concern at the UTTR by 2004—less than two years! *Demonstrating a focus on goals and partnerships works.*

- Focus on practical solutions with regulatory partners eliminated need for incineration of contaminated sediments at OU3 saving \$600,000 in treatment. *Partnerships working to achieve no-nonsense results.*

## Restoration Advisory Board

Establishing a RAB in 1995 significantly increased the level of stakeholder involvement by members of the surrounding community. The RAB meets at least four times each year. Nine RAB meetings during the reporting period gave HAFB critical early input throughout the cleanup process at a number of sites.

Eight RAB training meetings provided stakeholders with a valuable understanding of the cleanup process and complexities of cleanup. In addition, five RAB working groups focused on community concerns of risk, property values, cleanup methods, real estate, and outreach at multiple sites. RAB members made site visits to off- and on-base work areas to educate themselves about work being completed. These activities proved an invaluable experience for EMR to understand community concerns and address them.

HAFB teamed with the RAB and local governments to host eight InfoFairs in affected communities to take cleanup information directly to the people—more than 500 attendees. Response to citizen questions and concerns by HAFB staff and the RAB has increased citizen confidence and trust in the Air Force. One resident noted, “I appreciated the RAB citizens—they were more likely to answer questions without placating or patronizing.”

RAB members met with a Utah State University group studying the effects of TCE in groundwater on fruits and vegetables grown with this water. RAB members



Contractors install a sump at OU1 as part of the groundwater collection system installed at the site.

HAFB regularly holds InfoFairs in the community to provide information about the progress of the cleanup. In the last two years, more than 500 citizens have attended an InfoFair.



actively followed this issue and made several recommendations to the Air Force, such as adding vegetables to the study because of resident concerns.

EMR developed a health risk booklet to assist the RAB in understanding and discussing risk with their neighbors—an immediate “best seller,” it demonstrably improved communication of actual site hazards, reduced concern, and minimized fears.

EMR collaborated with the RAB to fast-track access to critical off-base property to construct a cleanup system. *Partnership and community trust make a significant difference in achieving results.*

RAB members originated a request to put more than 340,000 pages of administrative record documents into a searchable electronic format. This vast archive of data is available publicly at a local university. *A tremendous resource—first in DoD.*

## Opportunities for Small Businesses and Small Disadvantaged Businesses

EMR has always recognized the intrinsic value of using small businesses for site cleanup work. Agility and cognizance of new technical developments often give small businesses a significant competitive advantage. In each award year, approximately \$2 million was awarded to Small Business (SB) and Small Disadvantaged Business (SDB) firms for restoration projects at HAFB. Several small businesses are routinely used in site characterization activities including drilling, geoprobe work, and surveying.

During the RI at OUs 5 and 12, EMR used several SB and SDB services including CPT testing and Hydropunch® sampling, monitoring well installation, monitoring well and extraction well development and repair, surveying and geotechnical support, and chemical analytical support. The firms completed over 200 CPT and Hydropunch® sampling locations (several miles of footage), installed and developed over 150 monitoring wells, and provided soil and groundwater analysis. Their rapid response and quality work saved HAFB

money and completed investigations well ahead of normal schedule.

An SB drilling company installed a series of 15 multi-level sampling wells capable of sampling groundwater at seven different isolated depths in a single borehole. Direct-push technology made well installation very quick. The SB also developed continuous sampling equipment allowing a very detailed look at the subsurface lithology. The wells were used in a bromide tracer study to determine dispersion coefficients and plume travel velocity—key data used in the OU5 flow and transport model.

Of HAFB's five full-service environmental architect/engineer services contracts, two were awarded to SB or SDB firms. Two of five IRP construction contracts were awarded to SB or SDB firms. In addition, SB and SDB firms are accessed through subcontracts issued by large business (LB) prime contractors. All EMR LB contractors have met or exceeded their SB and SDB goals on HAFB-issued contracts.

EMR's LB contractors coordinate closely with the regional Small Business Liaison Office and base procurement office to ensure that small businesses are routinely contacted, fairly considered, and actively recruited. Solicitations, purchase orders, and subcontracts contain required clauses and notifications concerning the use of small businesses. An active outreach program ensures that subcontract opportunities are packaged in an optimized, small business-centered manner. EMR's LB contractors maintain up-to-date lists of potential small businesses by using the Small Business Administration's (SBA) PRO-NET website, the local SBA contacts, and by maintaining contacts with local professional organizations which assist small businesses. EMR's LB contractors have maintained a record of more than 50 percent of their total subcontracted dollars going to local small business concerns.

Since 1984, the IRP has created hundreds of jobs in-house and in the community. During FY01 and FY02, it was estimated that nearly 50 additional jobs were created as a result of ongoing aggressive cleanup activities at HAFB.

HAFB's prime contractors' SB and SDB



*“Lessons learned from environmental restoration technology evaluations at HAFB have helped clean up hazardous waste sites throughout the world.”*  
—Joe Martone, Ph.D., CIH, QEP, President-elect Air & Waste Management Association, former DoD/EPA liaison officer and Hill consultant since 1991.

*A team collects a sample from a monitoring well overlooking the community of South Weber. Sampling is one of many functions of HAFB's Restoration Program conducted by small businesses.*



track record has not gone unnoticed. During the award period, primes have won SBA's Frances Perkins Vanguard Award, Dwight D. Eisenhower Award for Excellence, and Award of Distinction.

## Reducing Risk to Human Health and the Environment

Both the RAB and EMR focus on sites that pose the highest potential risk to human health or the environment, regardless of the regulatory framework. By attacking the worst sites first, taxpayer dollars flow to projects that will provide the greatest and most immediate benefit to the entire on- and off-base community. Risk reduction at HAFB has been accomplished by implementing swift and effective interim actions and final actions accompanied by dramatic improvement in site management and characterization techniques. Some prime examples follow:

- EMR achieved containment of contamination by treating 56.6 million gallons of contaminated groundwater from 16 containment systems. Containment systems at three newly discovered sites will be in place by 2004.
- EMR completed construction of a groundwater collection and containment system at OU1. The optimized system removed



*F-16 Fighting Falcons from HAFB's 388th Tactical Fighter Wing take to the sky with picturesque Weber Canyon serving as a backdrop. The town of South Weber lies below, a key community in HAFB's Restoration Program.*

4,150 gallons of solvents—an amount that would unacceptably contaminate 16.52 billion gallons of water.

- EMR completed their first Performance Standard Verification Plans (PSVP) for OUs 1-4 and 6-7 to enable collection and analysis of valid data to assess progress toward achieving remedial action objectives. The PSVP approach embraced at HAFB may set the standard for all DoD remedial programs.
- EMR completed cleanup at eight sites bringing the number of sites cleaned to 78 out of a total of 108 IRP sites—*HAFB's cleanup timeline is well ahead of DoD goals!* HAFB's early RAs are preventing or reducing public exposure to contaminants by precluding off-base migration into 800 acres of heavily populated area.



## Conclusion

The success achieved at Hill has been recognized within the Air Force. In addition, many ideas conceived and implemented at Hill are adopted throughout the DoD. The restoration team at Hill has a proven strategy for prioritizing and implementing its restoration

program. These efforts include stakeholder involvement, early actions, innovation, cost reduction, effective data management, and performance monitoring and verification. *The results are clear—Hill is getting the job done in top-notch fashion!*