ENVIRONMENTAL RESTORATION MANAGEMENT UPDATE

90th Space Wing ■ F.E. Warren AFB, WY 82005 ■ Volume 2, Issue 1 ■ Winter 1999

Interim Cleanup of Spill Site 7 Begins

F.E. Warren Air Force Base in Cheyenne, Wyoming, is about to tackle one of the most challenging Installation Restoration Program (IRP) sites on base. Of the 20 IRP sites identified at the base, Spill Site 7 (SS7) is having the most impact on the environment. Its impact on groundwater has placed it high on the U. S. Environmental Protection Agency's (EPA's) National Priority List (NPL) for hazardous waste cleanup. The Interim Remedial Action (IRA) began in December 1998 after the contract was awarded to Montgomery-Watson Americas that same month.

SS7 is located near Building 1294, the Operations Missile Procedures

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Monitoring wells, such as the one pictured above, provide valuable information about the effect SS7 is having on the groundwater at F.E. Warren Air Force Base. The SS7 IRA began in December 1998.

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Cleanup of Landfill 6 to Begin

The cover design for Landfill 6 (LF6) was completed in December 1998 and the contract was awarded. As soon as weather permits in the Spring of 1999, the contractor will begin construction by grading and filling to prepare for the landfill cap. Construction of the landfill cover should be completed by November 1999.

LF6 is located near the western boundary of the base between Missile Drive and Diamond Creek, and covers an area of about 51 acres. From 1971 through 1984 the site was used for base shops and housing refuse disposal. Shop wastes disposed of at LF6 include waste oil, solvents, hydraulic fluid, ethylene glycol, silicone oil, waste JP-4 fuel, pesticides, paints, and asbestos. From 1971 through 1982, batteries and battery acid were also disposed of at the site. Fly ash from the on-base coal-fired heat plant was placed at the site until December 1989. The volume of fill is estimated to be 79.11M cubic feet. The landfill was covered with soil and vegetation.

In 1993 and early 1994, the Air Force conducted a multimedia investigation, concluding with a

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Contractors Begin Interim Remedial Action on Spill Site 7

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Trainer facility. The site was used as a liquid-oxygen production facility for Atlas missiles between 1960 and 1966. Trichloroethene (TCE) was used extensively in the area as a degreaser to prevent oil and gas from reacting explosively with pure oxygen. Until 1988, TCE spills in Building 1294 flowed to a floor drain and then to a subsurface grease trap approximately 50 yards northeast of the building. The trap captured floating oil and grease while water and dissolved solvents discharged through the grease trap to a drainage ditch and eventually migrated into Diamond Creek.

1989 Cleanup Activities

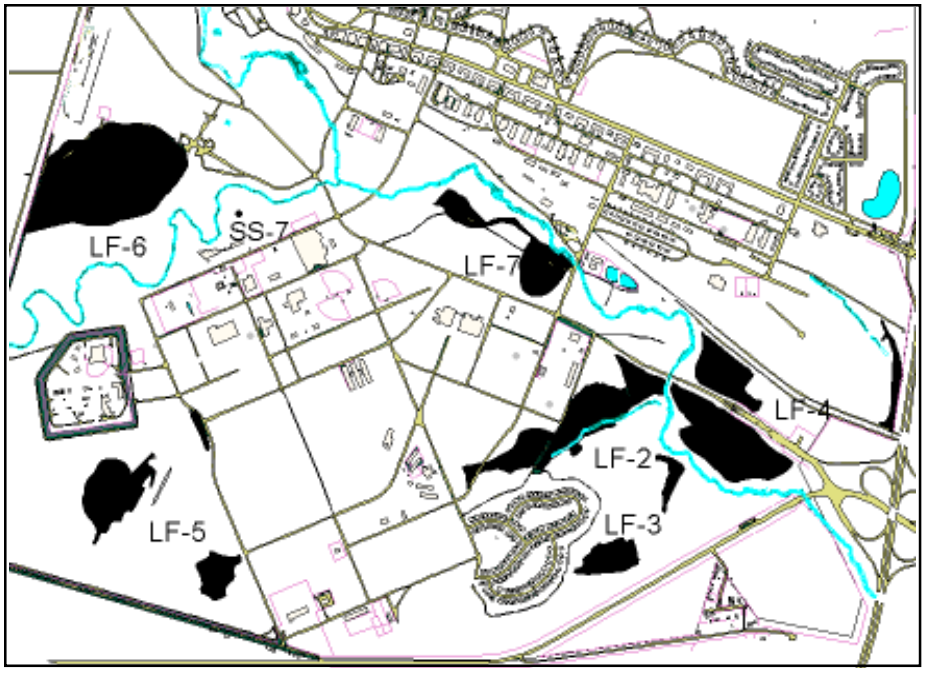
In 1989 the concrete trap, TCE-contaminated oily sludge, and surrounding soil were excavated for proper disposal at an EPA-approved hazardous waste disposal facility. Soil, groundwater, and surface water samples were collected from SS7 during the IRP Remedial Investigation. Within the shallow aquifer, TCE was the primary contaminant detected — TCE was found in 19 of 29 samples taken from monitoring wells in 1992 and 1993. In August 1993 the maximum concentration of TCE was found near the former location of the grease trap. One sample contained a concentration of 12,000 ug/L , well above the drinking water Maximum Contaminant Level (MCL) for TCE, which is 5 ug/L. A TCE by-product, 1,2-Dichloroethene (1,2-DCE), was also reported in one of the 29 samples at 73 ug/L. Both chemicals are suspected carcinogens.

The Air Force performed a focused investigation to identify the extent of groundwater contamination and to determine the risk to human health and the environment from site contamination. The risk assessment indicated human health risks from drinking the groundwater and environmental risk to Diamond Creek. Therefore, the Air Force determined that interim actions were necessary.

1995 /1996 Cleanup Activities

In April 1995, the Air Force began a treatability study to evaluate the effectiveness of using a groundwater collection and treatment system to protect Diamond Creek from shallow groundwater contamination. The system was designed to intercept and treat shallow TCE-contaminated groundwater and to inject treated water back into the ground onsite. The treatability system included collector drains to collect contaminated groundwater, a treatment system, and leach drains to allow treated water to percolate back into the subsurface. Quarterly reports by the Air Force to the regulatory agencies revealed numerous operational and maintenance problems.

In the spring of 1996, elevated TCE concentrations in Diamond Creek caused concern. Either the SS7 treatability study system was not effectively collecting the TCE plume, or the system had changed the groundwater flow pattern, negating its effectiveness. In April 1996, the Air Force — in agreement with EPA and WDEQ — shut down the SS7 treatability study system. A shut-down monitoring program was conducted for SS7 and Diamond Creek from April 1996 to May 1997.



The IRA for Spill Site 7 began in December 1998. SS7 is considered to have the greatest impact on the environment of all base IRP sites. Cleanup at Landfill 6 will begin this spring as soon as weather permits.

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Compost System at F.E. Warren Begins a Third Year of Successful Operation

The AG-BAG composting system at the base is beginning its third year of operation and continues to provide a valuable service to base personnel and the environment. The base cleanup team originally selected the AG-BAG system because it reduces the time required to produce compost while reducing odor, controlling leachates, and keeping rodents, flies, and other pests out of the compost pile. In addition to producing superior material for use on gardens and lawns, the base has drastically reduced the amount of organic wastes that occupy our landfills.

F.E. Warren AFB personnel are committed to recycling as much waste generated on the base as possible. Pictured above, a bulldozer adds debris to the base compost pile. The composting program has operated for three years.

Base personnel actively ensure that we recycle as much of our organic waste as possible. Materials collected for the compost facility include trees, grass trimmings, leaves, and waste boards. The 90th Civil Engineer Squadron arranges periodic pickup of these materials all across the base. Additionally, individuals may transport their own waste to the facility.

Solid materials (such as trees, limbs, and boards) are chipped prior to being mixed with grass, leaves, and some manure. It is important to obtain a proper mixture of nitrogen and carbon to facilitate bacterial growth and breakdown of the material. The mixture is then placed in a bag called a Preferred Organic Digester (POD). PODs are five feet in diameter and can be extended to a total of 200 feet. PODs lie horizontally on the ground and contain about 450 tons of material when completely filled. The bags are equipped with a blower to provide oxygen and are periodically checked for proper moisture content and temperature. In 10 – 12 weeks the POD is emptied and the compost is allowed to cure for about two weeks.

After curing, the material is screened to remove large chips of wood that did not adequately compost and the material is ready for use. Large chips are then cycled through the system again. The resulting compost is made available for use by the on-base Civil Engineer Squadron or other organization projects, the base populace, and retirees in the area.

In 1998, four PODs of compost were completed for a total of 1,200 tons of finished product. This compost constitutes a substantial reduction in the amount of material F. E. Warren sends to a landfill as solid waste. Additionally, other products, such as firewood and landscaping chips, are made available through the composting facility as an added service. Although we are pleased with the results of the composting system, we will continue to look for other areas where we can recycle to reduce the amount of waste sent to our landfills.

After the debris is turned into compost, it is ready for reuse.

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Also in 1996, a feasibility study was conducted to evaluate three alternatives for cleaning up the shallow groundwater aquifer. The study compared three plans: a no-action alternative, a groundwater pump-and-treat alternative using some of the on-site treatability study equipment, and an alternative utilizing a new innovative iron-filings wall technology. The iron-filings wall was selected as the most appropriate alternative and was implemented as an IRA to protect Diamond Creek.

Representatives from the Air Force, EPA, and WDEQ met to discuss the scope of the IRA and agreed that it would address volatile organic compounds (VOCs) that were determined to pose an unacceptable risk. The purpose of the IRA was to address only the top 15 feet of the groundwater aquifer at SS7. In addition, the IRA would protect portions of Diamond Creek immediately downgradient of SS7 and reduce the scope of final remedial action activities for groundwater. An Interim Record of Decision (IROD) signed in September 1998 formalized the decision to implement this IRA technology using the iron-filings wall.

The iron-filings wall is a passive permeable treatment wall composed of iron-filings. According to the IROD, the wall will be installed in the top 15 feet of groundwater to intercept water flow. As contaminated water flows into the iron filings, contaminants will degrade to nontoxic by-products through a process referred to as "reductive dehalogenation." This solution will:

- Intercept groundwater flow and treat it with the iron-filings wall.
- Degrade contaminants into nontoxic by-products.
- Degrade contaminants to treatment goals.
- Minimize impacts to the site after construction.
- Be consistent with future remedial action planned for the site.

The iron-filings wall has low operation and maintenance requirements, no effluent or treatment residuals, is cost-effective, and has minimal impact on the site

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Installation Restoration Program Site Status:

Construction Completed on Landfills 2c and 5a

Construction of the IRA at Landfill 2c (LF2c) and Landfill 5a (LF5a) was completed in December 1998. On December 3, 1998, the Wyoming Department of Environmental Quality (WDEQ), EPA, contractors, and base restoration personnel completed a successful final inspection of both sites. The IRA for LF2c was removal of the waste, and the IRA for LF5a was a landfill cap (see *ERM Restoration Update*, Autumn 1998, for more detail on these IRAs). The Comprehensive Remedial Investigation for both sites will analyze the impact each site has had on surface water, groundwater, and soils to determine any further remediation.

Waste was removed from LF2c, pictured left, and a landfill cap was placed on LF5a, pictured right, in December.

Cleanup for Landfill 6 to Begin

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final report issued in February 1995. During the investigation, 87 temporary test wells and 23 permanent monitoring wells were installed in the shallow groundwater zone around LF6. The Air Force found that the following four contaminants exceeded EPA's accepted MCLs: TCE, Vinyl Chloride, Sulfates, and Nitrates.

TCE Plume

The TCE plume in the groundwater at LF6 originates in the northeastern corner of the landfill and is moving downgradient toward, and possibly into, Crow and Diamond Creeks. A risk assessment performed during the investigation indicated possible risk to human health and the environment. The Air Force recommended that an interim cleanup be performed at LF6 to lessen risk before the final cleanup plan is completed.

Interim Cleanup

The Air Force selected a multilayer geo-synthetic clay liner cover as the interim remedy. The cover's design incorporates an impermeable synthetic clay liner covered by 12 inches of screened soil, 24 inches of cover soil and six inches of top soil. This remedy will prevent surface water from penetrating the landfill, thus reducing further leaching of contaminants into surrounding soils or groundwater. In addition, a passive gas-venting system will be installed to relieve potential landfill gas buildup below the synthetic liner. Methane gas monitoring wells will also be installed around the perimeter of the landfill.

Construction of the landfill cap for LF6 is expected to begin as soon as weather permits this spring. The contract was awarded in December 1998.

Soil Investigations

Further investigations of soil and water are being conducted to determine the final clean-up plan for the site and surrounding zone. These investigations began in December 1998 and will continue throughout 1999. A Final Record of Decision for groundwater and surface water, which outlines the remaining cleanup actions associated with LF6, is expected to be completed in early 2001.

SS7 continued from previous page

after construction. It will be constructed in a "dog leg configuration" downgradient of the site and will extend about 546 feet. The wall will extend 15 feet into the water table, perpendicular to the direction of water flow, and will be 1 to 4 feet thick, depending on the rate of water flow.

IRA for SS7

IRA activities in December began with surveying the site, preparing work plans, and arranging for the manufacture and shipping of the iron filings. These preparations will allow for timely construction to begin as soon as weather permits in the spring of 1999. The wall should be completely installed by July 1999. Compliance monitoring will begin about six months later under a separate contract to ensure the wall is working as expected.

The final remedy for groundwater and soil contamination at SS7 and the surrounding zone will be determined later after completion of a comprehensive Remedial Investigation of all media. We will keep you posted in this publication as we progress.

Partnering: Fixing the Problem, Not Placing the Blame

Partnering is a Department of Defense (DoD) team-building concept that focuses on cooperative efforts by individuals involved in the restoration process. At F.E. Warren, the team has consisted of the Air Force (including Air Force Space Command and the Air Force Center for Environmental Excellence), EPA, WDEQ, environmental restoration private contractors, and the community.

The goals of this partnership include increased and more effective communication, trustbuilding, consensus decision-making, and improved quality. The motto of the partners is "Smarter, faster, cheaper."

Partnering Begins

Following some troubled times in the cleanup effort at F.E. Warren, the partnering approach began in February 1998 with the goal of developing a new environmental cleanup schedule that would work for all parties involved. The partnering effort served to overcome the tendency for organizations to hold each other at arm's length and allowed the team to share interests and achieve mutually beneficial goals. While it only seems logical for organizations to work together without defending turf, this has not always been the norm. Partnering allows all stakeholders to find the best way of cleaning up the environment rather than worrying about meeting individual organization agendas.

FFA Modification Results

In the case of F.E. Warren, the result is Modification 11 to the Federal Facilities Agreement and a restoration program that is charging ahead with great expectations. Partnering meetings continue on a scheduled basis to review where we have been and what our next steps will be. These reviews build confidence in each partner's efforts while giving us the opportunity to head off problems before they materialize. The successes so far are encouraging to everyone concerned and further enhance an established and successful working relationship.

Wanted: Restoration Advisory Board Members

The F.E. Warren Air Force Base Restoration Advisory Board (RAB) is comprised of community members from all walks of life. Its purpose is to advise the Air Force, WDEQ, and EPA Remedial Project Managers about issues of concern to the community regarding the environmental cleanup of F.E. Warren AFB. If you are interested in the progress of this program, then membership on this board is for you. In addition, the general public is cordially invited to attend all RAB meetings.

Meetings are held every fourth Tuesday of the month, except in November when it meets on the third Tuesday. The RAB does not meet in July and December. All RAB meetings are held from 7 p.m. to 9 p.m. in the Regency Room at the Little America Hotel and Resort, 2800 W. Lincolnway, Cheyenne, WY.

For more information about RAB meetings or membership, contact:

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Installation Restoration Program Phases of Hazardous Site Cleanup

IRP cleanups involve several phases from beginning to end of a project. Following are the five steps of any IRP site cleanup:

1. Preliminary Assessment (PA) — Identification

This is basically a search of the installation's history to see if and where wastes were disposed or hazardous substances may have been used. Locations where contamination may have occurred are mapped.

2. Site Inspection (SI) — Identification

Locations identified in the Preliminary Assessment search are sampled in the appropriate media (air, soil, water), to determine if contamination is present. If not, the site requires no further action.

3. Remedial Investigation / Feasibility Study (RI/FS) — Investigation

In this phase, contaminated sites are investigated to determine extent, risks to human health and the environment, and the feasibility and appropriateness of various established remedies or cleanup actions. Collected data must support suggested remedies, such as removal, venting, capping, and so on.

4. Remedial Design/Remedial Action (RD/RA) — Cleanup

The chosen solution, or cleanup remedy, is designed and tested. Detailed plans and construction drawings are prepared and the remedy is constructed/installed. The site is then monitored to verfiy that the desired effect is achieved.

5. Site Closeout (SC)

When EPA, the state Department of Environmental Quality, and the DoD agency that owns the site agree that there are no further actions required to protect human health or the environment, the site may be closed out.

Access Information on the Internet

Information about clean-up activities at F. E. Warren Air Force Base, as well as other environmental information, is available from a variety of sources on the Internet. Visit any of the sites below to learn about what's going on at F.E. Warren and in your community:

Environmental Protection Agency
http://www.epa.gov

Wyoming Department of Environmental Quality
http://www.deq.state.wy.us

Help Update Our Mailing List

If you need to report any changes in your mailing address, would like to be added to or deleted from the list, or would like to add a friend to the list, please call the Environmental office at (307) 773-4355, or complete this coupon and mail it to the return address on the last page. Thank you.

Check if you would like:

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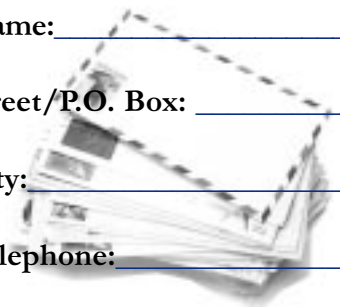
- ☐ To have your address changed



Name:_____

Street/P.O. Box: _____

City:_____ **State:**_____ **Zip Code:**_____

Telephone:_____

For Additional Information ...

Information about the F.E. Warren hazardous waste cleanup is available for review in the Administrative Record File — the official collection of documents, data, reports and other information that supports EPA's decision on cleanup at a site. You may review the Administrative Record File at the locations listed below:

90th SW/RM
Environmental Restoration Management
6203 15th Calvary Avenue, Building 367
F.E. Warren AFB, WY 82005

Laramie County Library
2800 Central Avenue
Cheyenne, WY 82001

For additional information about the F.E. Warren hazardous waste cleanup, please contact one of the following Remedial Project Managers:

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Inside: Information on the F.E. Warren AFB Environmental Restoration

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