April 1998

Envision

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Arnold Engineering Development Center Installation Restoration Update

Contractors drill solvent recovery wells

AEDC contractors completed the drilling of seven solvent recovery wells at Site 8 in January as part of the installation restoration program. The wells are part of the solvent recovery process and site controls used to treat underground water.

"Site 8 was used from the 1950s to 1972 as a leaching pit to neutralize acids and solvents used during metal cleaning processes," said Dennis Flatt, restoration program manager. The former 16-foot diameter soil-lined pit filled with limestone rocks is located just north of the Model Shop.

At one time, the site had a vapor degreaser building located on it. This building was demolished in August 1994. A soil source area excavation and low-temperature thermal treatment of 8,000 tons of contaminated soils from the leaching pit were completed in June 1995. The treated soil was returned and backfilled into the excavation in August 1955.

He said, "the primary contaminant at the site is Tetrachloroethene or PCE, which is a volatile organic chemical that was used in large quantities prior to 1990. Initial solvent recovery rates of 2-4 percent solvent per gallon of water extracted have been observed."

"To prepare for construction of the groundwater treatment unit, we drilled four extraction wells at the site," said Stephen Arnold, AEDC environmental geologist. "During the course of this drilling is when we found an area of highly-concentrated solvent under the site within the groundwater."

In 1996, the groundwater extraction and treatment system to control contaminant migration to potential off-site areas was com-

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***WELL DRILLING** – Three drilling specialist from Boart Longyear, under contract from CH2M Hill Inc., get ready to drill the last of seven solvent recovery wells at Installation Restoration Program Site 8, located behind the Model Shop. The site was used up to 1972 as a leaching pit to neutralize acids and solvents used during metal cleaning.*

A publication for Coffee and Franklin county residents

Environmental Public Affairs

Arnold AFB, Tennessee

RAB to meet April 21

The Arnold AFB Restoration Advisory Board (RAB) will meet Tuesday, April 21 at the Steeplechase Inn, 1410 North Jackson Street in Tullahoma.

The public is invited to attend this meeting that starts at 4:30 p.m.

For more information concerning the RAB and public participation opportunities, contact the Arnold, AFB environmental public affairs office at 454-4353.

Dye substitute cuts hazardous waste

Through the innovative efforts of AEDC employees from Space Systems Testing and the Model Shop, a new dye for critical infrared applications has been approved that reduces hazardous waste.

For over 20 years, black anodized aluminum surfaces were used in infrared testing for controling radiation and providing the proper space simulation test environment. This capability was provided by the heat treatment facility at the Model Shop using Aluminum Deep Black which provides the correct surface treatment for space simulation applications.

"Unfortunately, the chemical dye used in this process contains chromium, which has to be handled as a hazardous waste once the dye is depleted," said Bill Jennings, manufacturing engineer for the Model Shop. "We needed to come up with another dye for critical infrared applications that would not create a hazardous waste."

The Sverdrup environmental team recommended that the Model Shop evaluate a substitute for the Deep Black called Sanodal Fast Black in an effort to reduce hazardous waste. Two properties of the anodized aluminum process are critical to AEDC's application for space simulation—high infrared reflection from visible to long wave infrared wavelengths and low outgassed contaminants in a high vacuum environment.

"We conducted tests to evaluate both properties for samples made by the new dye against baseline samples made with the Deep Black process," said Bob Wood, a research engineer in the Engineering Laboratory Building. "The results show the Fast Black produces surface reflectance properties equal to or exceeding the old Deep Black. In addition, the outgassing from the samples is the same as the Deep Black producing mostly water vapor which is not harmful to critical optical surfaces," he added.

Based on the tests, AEDC space systems approved the Sanodal Fast Black process on August 27. "Although the new dye will be more explensive, the increased operating cost should be off-set by a reduction in hazardous waste disposal costs," said Jennings.

CAPPING A WELL — Outfitted in personal protective equipment to protect them from chemical spills, two members of the Boart Longyear drilling team cap one of the solvent recovery wells located behind the model shop.

Contractors complete drilling...

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pleted. "Operation of the system requires extensive study to determine the appropriate removal rates to maximize solvent recovery and prevent unwanted groundwater movement," said Arnold. The study time could require between two to five years.

Arnold went on to say, "controlling groundwater contamination is not a simple task. Well locations, pump depths and extraction rates have to be carefully managed to maintain site control. Uncontrolled pumping could have negative effects forcing contamination to spread into deeper portions of the aquifer."

"Site 8 will require a phased approach for remediation which will focus on (1) solvent recovery, (2) groundwater capture with treatment, and (3) long-term site monitoring. The remediation process will take many years to achieve cleanup goals," added Flatt.

The contractors are now working to install piping to each well so that groundwater extracted can be treated at the groundwater treatment unit and then pumped into the retention reservoir. Solvents collected during drilling are stored in containers and processed as a hazardous waste.

"The site has been a part of our installation restoration program for 14 years," said Clark Brandon, deputy chief of the environmental management division.

AEDC plans events for Earth Day

How many pounds of garbage does the average American produce each day—1 pound, 5 pounds, or 10 pounds. According to a recent congressional study, every American produces roughly 10 pounds of garbage a day. This is enough to fill five million large trucks.

To get rid of all this garbage, and heal the planet, Earth Day was started. Until the first Earth Day, April 22, 1970, the ecology movement was limited and confined to small nature organizations. But Earth Day caught the imagination of America, and caused people to take a hard look at recycling, landfills, and garbage.

For AEDC and other Air Force organizations, pollution prevention and environmental cleanup also became part of everyday operations and a "must do" program. The Air Force is committed to cleaning and protecting the environment through restoration, compliance, pollution prevention and planning.

On this 28th anniversary of Earth Day, AEDC will schedule several days of activities to mark Earth Day. On Saturday, April 18, in base housing, there will e an environmental scavenger hunt, games, prizes and other activities for children of base employees. On Tuesday, April 21, the new recycling operation center will be dedicated at 8 a.m. Local elementary school students will visit the base from 9:30 to 11:30 a.m. and environmental booths will be open from 11 a.m. to 12:30 p.m. in both cafeterias. From 1-3 p.m., Earth Day patrols will visit AEDC buildings and give away tee-shirts for people doing a good job of recycling.

On Wednesday, April 22, a tree planting ceremony and presentation of Earth Day environmental stewardship awards will take place at 8 a.m. Local elementary school children will visit the base and engage in environmental activities from 9:30-11:30 a.m. The environmental booths will again be open in both cafeterias and an alternative energy vehicle exhibit will be on display from 10 a.m. – 2 p.m. The annual environmental career day for high school seniors will be held in the main cafeteria from 1:30-2:30 p.m.

The second annual Earth Day five kilometer and two mile walk will take place at 4:15 p.m. Throughout both days, presentations will be made in the main auditorium and a recycling trailer will be available to walk through at the main cafeteria parking lot.

In Nashville, Tuned in Broadcasting (TIB) composed of three radio stations, is throwing a large FREE concert and festival at Riverfront Park on Saturday, April 25. There will be live music from national bands, food and refreshment vendors on-site and environmental and community groups on hand to discuss their organization's roll in making Nashville and Tennessee even better. TIB will donate 50 percent of the profits from this event to The Tennessee Environmental Council.

RECYCLING AWARDS – Charles King, chief of the environmental management division, presents the first recycling program quarterly stewardship awards to Kim Reed (center), photo lab, and Sarah Potuk, read property records. Reed and the photo lab started recycling 35mm film cartridges and empty ink jet cartridges and Potuk began recycling CD Roms for the base. Because of their efforts, these items are no longer being disposed of in the landfill.

ECAMP INSPECTORS IN ACTION – Three ECAMP inspectors, Roger Painter, Ed Morgan and O. T. Coleman, look at fuel intakes for the Elk River Dam emergency power generator. The three were members of one of the 15 ECAMP team that inspected all base facilities from Dec. 1-15.

ECAMP logs no 'significant' findings

No significant environmental findings were tallied during AEDC's 1997 internal Environmental Compliance Assessment and Management Program review that ended Friday, Dec. 12.

This internal ECAMP prepared AEDC for an external review in July 1998 by Air Force environmental experts from bases across the country.

Of the 151 findings logged, none were determined to require immediate correction to prevent a threat to health, safety or the environment. Some 15 teams of approximately 60 environmental employees and facility representatives from around the base made sure AEDC is complying with federal, state and Air Force directives.

The teams looked at air emissions, cultural and natural resources, hazardous materials, hazardous waste, pesticides, solid waste, storage tanks, toxic substances, wastewater discharges, water quality and POL (petroleum oil and lubricants).

Of the 151 environmental findings, 58 percent were hazardous material problems. The majority of them were related to improper storage, labeling or handling of hazardous materials.

Environmental Trivia

1. What percentage of landfills is made up of paper and paperboard: a) 10 percent, b) 25 percent, or c) 40 percent.
2. How many plastic bottles are discarded every hour in the U.S: a) 250,000, b) 1 million, c) 2.5 million.
3. How many disposable diapers are discarded into landfills in the U.S. every year: a) 3 billion, b) 8 billion, c) 16 billion.

Answers

1. Landfills are composed of 40 percent of paper and paperboard.
2. Every hour, we dispose of 2.5 million plastic bottles.
3. Over 16 billion diapers are disposed of every year in landfills in the U.S.

RAB MEETING — Charles King, chief of the environmental management division, discusses Installation Restoration Program (IRP) projects with members of the AEDC Restoration Advisory Board (RAB) at their January meeting in Winchester. The RAB meets at 4:30 p.m., Tuesday, April 21 at the Steeplechase Inn, Tullahoma, and is open to the public.

Entomology team traps insects on AEDC

Hunting is underway at AEDC, not only for deer and other game species, but also for the illusive terrestrial invertebrate. In layman's terms, AEDC and a team of entomologists from the University of Tennessee are seeking and trapping insects.

"The category of insects we are surveying include spiders, centipedes, millipedes and beatles," said David Bynum, AEDC conservation biologist. "Our goal is to develop a baseline inventory of insects especially those listed by the State of Tennessee and the federal government as endangered, threatened, or of special concern."

He said that by completing this baseline inventory, we can go on to support the broad management goals of protecting, restoring and maintaining populations of native insects and adhering to the principles of ecosystem management. "This project will satisfy an Air Force requirement for the baseline study," Bynum said.

Under contract to a base contractor, CH2M Hill, two research scientists from the university, Dr. Paris Lambdin and Dr. Jerome Grant, are working with the AEDC environmental management division on the field surveys that started in September. Several other individuals from various universities, the Smithsonian Institution, and the Department of Agriculture, play limited roles in the project.

According to Bynum, traps are being set at eight locations on AEDC. These include two sites near the landing field and Goose Pond wetland area, and single sites at Sinking Pond, along Bradley Creek, in the old Camp Forest area and in a hardwood oak-dominated region of the base.

MALAISE TRAP – Two University of Tennessee graduate students, Greg Wiggins (right) and Jerome Grant, bait a malaise trap before raising it off the ground. The malaise trap catches samples of flying insects.

A two-day reconnaissance in July identified the survey sites. Factors determining the sites were diversity and uniqueness of insects, forest canopy coverage, location, and access availability. Sampling is conducted weekly, every two weeks, or monthly depending on the season and species of interest.

Several types of traps are being used including illuminated traps, sticky traps, leaf-litter samples and malaise traps.

"Each trap is designed to collect certain types of insects," said Bynum. For example, the malaise trap placed in the canopy collects sample populations of flying insects not obtained through the other ground-related traps."

He said, AEDC should have the final report on the project sometime in early 1999. This report includes maps, lists of species, and information on habitat characteristics, population conditions, and geographic locations.

"With this report and the completion of all our baseline inventories of flora and fauna, we can plan ecosystem management strategies at AEDC for many years to come," he concluded.

Vehicle maintenance leads in polution prevention ideas

Programs to use re-refined oil, recapped tires, and the use of non-toxic freeze protection are reasons why Vehicle Maintenance is a leader in AEDC recycling and pollution prevention efforts.

"Our program is successful because our people are environmentally conscience and want to do everything in their power to reduce pollution," said Harry Limbaugh; vehicle maintenance team leader. "The program won't work without their participation."

Re-refined oil is prchased from a Nashville company and is used for oil changes instead of using new oil. In the past 12 month period, over 3,200 gallons of re-refined oil has been used by Vehicle Maintenance.

"We save over $1.50 per gallon on oil purchases by buying the re-refined oil instead of new oil," said Limbaugh. "More importantly, using re-fined oil means we are reducing the amount of new oil being purchased."

At the same time the conversion to re-refined oil was being made, a new bulk oil dispensing system became operational. The new system eliminates the need for handling 55 gallon drums and reduces the risk of leakage and costly drum disposal.

Cost savings have also been realized by using recapped tires when possible, According to Limbaugh, a recapped tire will cost approximately 65 percent of what a new tire would cost. This also reduces the amount of rubber going to local landfills.

Some initiatives are not cost based, but make environmental sense. "We don't realize a cost savings by switching to propylene glycol as an anti-freeze in our vehicles and generators, but we are helping to save the environment," said Limbaugh. Propylene glycol is non toxic and is not dangerous to animals like regular anti-freeze is, he added.

Several months ago, Vehicle Maintenance started recycling inner tubes through a local recycling firm instead of disposing of them in the landfill. Lead acid batteries are recycled at AEDC. The Vehicle Maintenance shop is the central collection point for all lead acid batteries, including some as small as a package of cigarettes. Batteries of all sizes and origin are placed in a special storage container. "The vendor who delivers our automobile batteries, takes away the old batteries to be recycled, and in return pays a small amount for each," said Limbaugh.

Limbaugh pointed out that these recycling programs were not the first pollution prevention measures taken by Vehicle Maintenance and that they will not be the last. "We are always open to new and better ways to recycle, save money and help the environment," he said.

DABBING INSTEAD OF SPRAYING SAVES $$$ — Mike Biankowski, an inside machinist at the Model Shop, and Robert Sotherland, senior associate engineer, demonstrate a new method for applying Blue Dykem to parts before machining. By dabbing the Blue Dykem to the parts instead of spray painting, the Model Shop reduces hazardous material usage and over a six-month period, saved 33 gallons of acetone used to remove the residual Blue Dykem.

Status report on IRP sites

The status of all installation restoration programs as of June 30. Eighteen sites have been closed and no further action is planned.

Site 1, Landfill 2 and leaching pit 2: Construction of a $1.56 million modified clay cap with a geosynthetic clay liner was completed in November 1997. Turf was put down on the landfill during May. Groundwater treatment facility treats approximately 1,700,000 gallons of water per month. Site will require long term monitoring.

Site 2, Retention reservoir and J-4 draining area: No further action on the retention reservoir and recommended no further action for the J-4 drain area.

Site 3, Landfill 4: Construction of a $2.1 million cap started in March 1997 will be completed in August. Groundwater treatment facility treats about 17,000 gallons of water per day.

Site 4, Surface drainage, Bradley Creek: This site is recommended for no further action having completed the RCRA facility assessment and confirmatory sampling.

Site 5, Surface drainage, Rowland Creek: No further action based upon the RCRA facility assessment.

Site 6, Camp Forrest water treatment plant: Corrective measure study underway including sampling along Spring Creek. Interim corrective measure in the form of a groundwater treatment facility that treats about 400,000 gallons of water per month. Additional effort will include long-term monitoring.

Site 7, Main test area: Corrective measure study underway. Interim corrective measure in the form of a groundwater treatment facility in operation.

Site 8, Leaching pit no. 1: Corrective measure study underway. Groundwater treatment facility and solvent/water separator brought on-line in May. Interim corrective measure in the form of a groundwater treatment facility in operation. Previous interim measures include low temperature thermal desorption soil treatments.

Site 9, Surface drainage-Brumalow Creek: Additional effort will include long-term monitoring. This site is recommended for no further action.

Site 10, Fire Protection Training Area 2, Landfill 1, Burn area 2: No further action on all three areas with long term monitoring.

Site 11, Chemical treatment pond: No further action. This former site is not part of the retention reservoir flow through treatment process.

. **Site 12, Retention leach/burn area:** An interim corrective measure to biologically treat soils and RCRA facility investigation is complete. The site is proposed for no further action with continued long-term monitoring.

Site 13, Fire Protection Training Area: Proposed for no further action.

Site 14, Surface drainage-Crumpton Creek: Proposed for additional sampling and long-term monitoring.

Site 15, High energy fuel burn/burial area: No further action based upon completed confirmatory sampling results.

Site 16, Beryllium leaching area: No further action based upon completed confirmatory sampling results.

Site 17, Burn area no. 2: No further action based upon completed confirmatory sampling resutls.

Site 18, Building 1421 area: This site is proposed for no further action based upon confirmatory sampling results.

Site 19, Camp Forrest area: Thirty six monitor wells installed at nine former Camp Forrest gasoline stations/motor pools. A work plan for Camp Forrest is being developed.

Site 20, Steam plant ash pits: No further action based upon source removal and confirmatory sampling results.

Site 21, Three hazardous waste storage buildings and one non-hazardous waste storage building: No further action on all four buildings. These were previously permitted storage units that underwent RCRA closure.

Site 22, Entire RCRA corrective action program: Some areas required more study and some areas are no further action. A corrective measurement action focused on groundwater is underway

Site 23, Salvage yard: No further action.