



US Army Corps
of Engineers®
Huntsville Center

Environment *Ordnance & Explosives*

July - September 2000

Vol. 7, No. 3

Center awards six contractors \$200m ordnance contract

Huntsville, Ala.—The U.S. Army Engineering and Support Center, Huntsville, Ala., awarded a five-year contract with a not-to-exceed value of \$200 million to American Technology Inc. (Oakridge Tenn.), EOD Technology Inc. (Lenoir City, Tenn.), Foster Wheeler Environmental Corp. (Huntsville, Ala.), Parsons Engineering (Pasadena, Calif.), USA Environmental (Tampa, Fla.), and Zapata Engineering PA (Charlotte, N.C.) for Ordnance and Explosives (OE) response and services on Aug. 29.

The contractors will be awarded different task orders not to exceed a total of \$60 million under this indefinite delivery/indefinite quantity contract for work throughout the United States and overseas. The contract covers OE response and services at various Formerly Used Defense Sites (FUDS); active Department of Defense (DoD) installations; DoD sites identified under the Base Realignment and Closure (BRAC) Act; property adjoining DoD installations; other federally controlled/owned sites which have been impacted by OE operations; and work for foreign governments if appropriate.

“Contractors in the OE field demonstrated a great deal of interest in this contract,” said Carol Youkey, director of the Huntsville Center’s OE Center of Expertise. The Request For Proposals (RFP) generated interest from 50 firms. Sixteen proposals competed for the contracts. The RFP was structured unlike previous versions for work at multiple sites in that it included an entire range of services, from preliminary fieldwork, studies and analyses, through removal actions. This broad range of services requires the contractor to implement a total management strategy, based on an engineering approach and to integrate all of the activities at a site. Previously, the various activities at a site were covered by individual independent contracts.

While the acquisition strategy required that three of the contracts be reserved for qualified 8(a)s and small businesses, four of the actual awards made were to contractors that fell under these categories. ATI and Zapata are 8(a) firms, while EODT and USA Environmental are small businesses. “These awards demonstrate Huntsville Center’s continuing commitment to the selection of small business contractors for our major programs,” said Judy Griggs, Huntsville Center assistant director for small business. “This acquisition strategy was designed to encourage teaming and cooperation among large and small contractors.”

These new contracts are expected to be the U.S. Army Corps of Engineers Huntsville Center’s primary source of acquisition over the next few years. “We believe the contracts and the contractors bring strength and versatility to our organization, and will help us to reduce health and safety risks at OE sites in the U.S. and abroad,” summarized Youkey.

CONTRACTORS

American Technology Inc. (ATI)
EOD Technolgy, Inc. (EODT)
Foster Wheeler Environmental Corp.
Parsons Engineering
USA Environmental Inc.
Zapata Engineering PA

INSIDE

2

Q&A with HQ

4

Army realigns FUDS program

5

Business team update

6

New England District assists MMR

7

Classification of secondary explosives in environmental media

8

Rocky Mountain “high explosives”

9

Ordnance safety assists archeological dig at BHAD

10

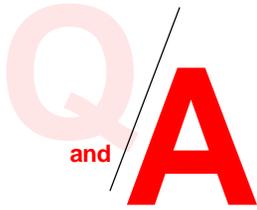
Blast Chamber and VCS: Testing proven products as new technology

12

Farewell to Rob Wilcox and upcoming events

Questions and answers with Corps Headquarters

Business processes key to future ordnance program



Editor's Note: OE Environment asked Pat Rivers, Director of the Corps' Environmental Program to address these questions and issues pertaining to the current status of the Formerly Used Defense Sites' Ordnance and Explosives program. Below are the questions asked and the responses received by this publication.

OE Environment: What is the anticipated workload and funding for the Corps' Environmental Program over the next few years, and how will this affect the OE program?

Pat Rivers: Our best estimate, as of mid-August, of future Military Programs environmental work is shown below (numbers rounded to the nearest \$10 million). Significant changes in individual program allocations are certainly possible, but the total is likely to be within 10 percent or 15 percent of \$1 billion per year.

In recent years, DERP-FUDS has allocated \$35 - \$40 million per year for ordnance cleanup. Those figures are not likely to increase significantly until the high relative risk FUDS have been cleaned up.

Army BRAC typically spends about 25 percent of its funds on ordnance cleanup with work underway at Umatilla Depot, Fort Ord, Fort McClellan, Fort Ritchie, Pueblo Depot, Camp Bonnevill, Savanna Depot, Sierra Depot, Jefferson Proving Ground, Fort Wingate, and Seneca Depot. Army BRAC funding beyond FY03 is uncertain at this time.

PROGRAM (\$ x 1,000,000)					
	FY01	FY02	FY03	FY04	FY05
DERP-FUDS	230	190	190	200	200
DERP-IRP	160	160	160	160	160
BRAC (Army)	200	100	100		
BRAC (Air Force)	20	20	10	10	10
EQ	180	180	180	180	180
Superfund	250	250	250	250	250
FUSRAP	150	150	150	150	150
Totals	1190	1050	1040	950	950

OE Environment: What do you see as the Corps' role in assisting the Army in Training Range Sustainability?

Pat Rivers: We can support all of the Army's range planning, design, construction, inventory, maintenance, and closure needs. The Project Management Business Process is our service delivery vehicle. We are developing a Life-Cycle Range Support business plan that will help divisions and districts, and their clients, build project teams to provide needed services. In particular, this plan will help district-level project managers communicate with and employ range experts throughout the Corps and the Army.

In the past, most of our support was in range design, construction, and closure (ordnance removal). Now, we also help many installations fulfill their range maintenance responsibilities, and in February 2001, we will assist ODEP with the inventory of closed ranges on active installations.

We also provide real estate and environmental services that the range community might find helpful. These services include: National Environmental Policy Act documentation; land acquisition; endangered species identification and management; historical/cultural resources identification and management; wetlands identification and regulation; recycling metal scrap from ranges (including certification that it is free of explosives); target removal and disposal or recycling; HTRW cleanup of range areas; encroachment modeling; noise modeling; and, assisting with regulator and public interface. Also, we can support Army Training Range Sustainability by serving as an integrator for training range drivers such as strategic plans and strategies, training standards and doctrine, force initiatives, force structure, force development, and force modernization.

(See Headquarters, page 3)



**US Army Corps
of Engineers®**
Huntsville Center

*Environment
Ordnance & Explosives*

Distributed quarterly by the Ordnance and Explosives Center of Expertise and Design Center, Ordnance & Explosives Environment is an unofficial newsletter published under the authority of AR 25-30. The purpose of this newsletter is to provide information about DOD ordnance response actions, issues, policy and technology. Inquiries can be addressed to U.S. Army Engineering and Support Center, Huntsville, Attn: CEHNC-OE-CX, P.O. Box 1600, Huntsville, AL 35807-4301. Phone: DSN 760-1692, commercial (256) 895-1692 or fax (256) 895-1689.
Commander
Col. Harry L. Spear
Director, OE Team
David Douthat
Editor
Kim C. Gillespie
kimberley.c.gillespie@usace.army.mil

Ordnance & Explosives

Headquarters

(Continued from page 2)

OE Environment: Do you have any advice regarding support to our BRAC customers to which the Corps should be particularly attuned?

Pat Rivers: *We use the Project Management Business Process for BRAC environmental restoration as we do in other programs. Ordnance experts from Huntsville Center are valued members of project teams led by geographic district project managers. Sites that require concurrent HTRW and OE cleanup continue to challenge project managers. One solution to contract coordination difficulties that we are reviewing, and it looks promising, is to give COR authority for all contracts, regardless of origin, to the local district project manager.*

I must also mention that we appreciate the close support we are getting from the Huntsville Center in working BRAC programmatic issues with HQDA DAIM-BO.

OE Environment: How will USACE conduct prioritization of FUDS projects to accommodate the DERP Environmental Restoration Program Consultation contemplated in the draft EPA FUDS Policy?

Pat Rivers: *The Department of Defense is our direct client for the FUDS program. The nature and extent of the EPA's involvement in FUDS project prioritization and other activities are issues of concern primarily to the EPA and the DoD. The two agencies are discussing the matter, and the Corps will accommodate the outcome, whatever it is. We hope EPA and DoD will come up with a solution that avoids duplication of effort that diverts scarce resources from program missions.*

OE Environment: Does the Corps anticipate greater involvement from EPA in the Corps' Environmental Program?

Pat Rivers: *We have a good working relationship with the EPA, and we are pursuing opportunities to make it even better. The EPA is an important stakeholder in our environmental programs. In the Superfund program, the EPA is our client. In other programs, the EPA regulatory role is a natural complement to our role as a project execution agent. The EPA and the Corps are teammates and we plan to continue and expand that relationship in the future.*

OE Environment: Will there be an increasing alignment of the Environmental Programs, i.e., HTRW and OE, to help better streamline the Corps' Environmental Program and processes?

Pat Rivers: *Closer alignment, in the sense of increasing reliance on partnering and teamwork across organizational lines, is inevitable. The diversification of the Corps' workload in recent years makes it important that we take advantage of talent wherever it resides in this organization, and beyond. Recent advances in information and communication technologies enable such "virtual teaming." We expect to increase our reliance on these technologies to support decentralized operations in the future.*

OE Environment: Do you feel the Corps' input regarding field demonstrations of OE technologies has been helpful to our partners, and do you foresee any significant changes in the way we are using our technologies?

Pat Rivers: *Field demonstration of OE technologies has been very helpful to our partners. Many technologies look promising but are untested. Large scale application of untested technology carries unacceptable risk to our partners. Controlled testing, particularly where it is leveraged with vendor resources, potentially reduces the cost and risk to the government customer. Demonstrations also provide hard evidence of performance, applicability and cost that help decision-makers choose among competing technologies. Vendors should support demonstrations because they stand to gain valuable insights on performance that they can use to perfect their processes and products.*

"In the past, most of our support was in range design, construction, and closure (ordnance removal). Now, we also help many installations fulfill their range maintenance responsibilities, and in February 2001, we will assist ODEP with the inventory of closed ranges on active installations."

--Pat Rivers

(See Headquarters, page 4)

Formerly Used Defense Sites Program realigns to improve property cleanup

The Formerly Used Defense Sites (FUDS) program is realigning its cleanup policy to improve coordination and communication with property owners, regulatory agencies and surrounding communities in the planning and completing of property cleanups.

The FUDS program strives to reduce the risk to human health, public safety and the environment from contamination resulting from past sites formerly owned, leased or used by the Department of Defense. Through policy realignment, regulator stakeholders, property owners and the communities will play a more active role in communicating concerns and identifying potential risks.

“The time is right for change. We’re taking a number of positive steps to improve the overall effectiveness of the program,” said Ray Fatz, deputy assistant secretary of the Army for environment, safety and occupational health.

FUDS program changes will expand the oversight role of the Army Secretariat and provide more opportunities for input from stakeholders by regularly sharing

cleanup information, conducting meetings to discuss plans, priorities and schedules, and soliciting input on proposed study and cleanup plans or cleanup technology alternatives. Restoration Advisory Boards comprised of regulatory and public stakeholders at FUDS sites to share information and seek input on cleanup activities will continue to be used.

Other initiatives include developing a complete business plan that identifies requirements and funding to complete the program, and issuing revised FUDS program policy and guidance.

The FUDS program, which is conducted by the U.S. Army Corps of Engineers, has more than 9,800 properties in its inventory. The properties range from privately owned farms to National Parks, residential areas, schools, airports and industrial sites. The program includes property once used by Army, Navy, Air Force, and other defense agencies.

For more information, contact the U.S. Army Public Affairs Office at (703) 697-4314 or (703) 697-7591. This document is also available on Army Link, a World Wide Web site on the Internet at <http://www.dtic.mil/armylink/>.

Headquarters

(Continued from page 3)

Technology is changing the way we work. I expect to see increased use of digital mapping and shared databases in the coming years. By taking a carefully planned, life-cycle approach to data compilation, and by linking databases, the various disciplines that work together on complex projects will have a much easier time coordinating their efforts. Such measures will also enhance our credibility with regulators and the public. Airborne technologies for site OE characterization also look increasingly promising. Advances in this area are critical for cost-effective cleanup of large areas and rugged terrain, and will enhance the safety of personnel.

Combined with digital mapping and data compilation, site characterization from the air will save time on the ground, but will increase the need for advance planning and coordination.

OE Environment: Do you anticipate that Corps Lab R&D capabilities can be integrated into some of the range technology issues, and if so, in what ways?

Pat Rivers: Absolutely! The Engineer Research and Development Center (ERDC) has an active technology development and transfer program that directly addresses many issues critical to Corps support of the Army and DoD range program. Technology is vital to construction, inventory, maintenance, and closure support of sustainable lands and ranges. Technology development efforts are solving critical environmental problems related to training, mobilizing, deploying, and employing a force at any location and time.

It is important to note that the ERDC effectively augments our research base with an active program to identify and adapt commercially available technologies that meet our immediate needs. The ERDC is working closely with the installations and trainers to ensure availability of the latest technologies to the customers. The ERDC work in technology validation and implementation makes the Army a smarter buyer in the technology market place.

OE Environment: Do you think the Corps can become a leader for DoD in successful stakeholder involvement?

Pat Rivers: We are leaders in successful stakeholder involvement. We have a lot of experience in this area. Our work is, by nature, inclusive. As engineers and managers, we bring together people with problems and people with solutions. As engineers in the public sector, we routinely solicit public input, and there are many examples of successful stakeholder involvement in the Civil Works program, Base Realignment and Closure Environmental Restoration Program, and others.

The biggest challenge we face in this area is properly balancing the sometimes-conflicting interests of our many stakeholders. To the extent that we can do that, we can, should, and will be leaders in successful stakeholder involvement.

Business team update

Range scrap

By Glenn Earhart, OE Business Team

Recent Department of Defense directives and an accident several years ago caused a renewed focus in how the Department of Defense manages range residue or material potentially presenting an explosive hazard. Typically, range residue resulting from training exercises or cleanup for the closed, transferred or transferring DoD sites is certified as safe from an explosive hazard. Then final disposition is made through Defense Reutilization Material Organization (DRMO) or by the Corps of Engineers. The local Explosives Ordnance Disposal (EOD) Detachment or the civilian unexploded ordnance specialists mitigate the hazard and certify the items safe from explosives hazards prior to recycling.

However, during the process of transferring range residue to the scrap yard or the foundry, the recycled ordnance material is frequently being sold several times to different recyclers and potentially co-mingled with material that has not been certified safe from explo-

sives hazard and sold to scrap dealers. The optimum solution is either smelting the ordnance material or breaking it up so that it does not resemble ordnance.

The Corps is coordinating with local steel mills and foundries to locate a company that will take its certified scrap and smelt into other usable metal products. There are several challenges. One concern is a liability issue. Many companies have an exclusion from processing military ordnance items in their insurance policies. Many foundries have specific metallurgy requirements that preclude specific types of metals. Since ordnance items are constructed from different types of metals, the appropriate ordnance items must be provided to the appropriate foundry process. Finally, the Corps of Engineers must ensure that the appropriate chain of custody procedures is in place, that military ordnance is not co-mingled or the foundry does not accept other military ordnance from other sources.

Currently, the Corps is in the final stages of negotiating with several foundries that will accept and smelt military ordnance. Conditions include that the foundries will accept the items free of charge with the U.S. Government paying for transportation. Any funds received from recycling of the smelted scrap will be kept by the foundry (with the current low prices of steel, negotiation for reimbursement is not cost efficient). If steel prices do rise and the materials being recycled have significant value for reimbursement, separate negotiations with the foundry will be conducted at that time.

Other range residue related issues are also being worked. These include: formalizing a scrap process, working on developing processes for intermediate processing of scrap that is too large for furnaces or can be processed cheaper than smelting, and coordinating with DRMO and installations to ensure an adequate supply of material for the foundries.

Range and Training Lands Facility Services contracts awarded

Huntsville Center awarded five-year contracts for services in support of the Ranges and Training Lands Facility Services to Baldi Brothers Constructors (Beaumont, Va.) and Eagle Support Services Corp. (Huntsville, Ala.). These fixed price, indefinite delivery/indefinite quality contracts have a not to exceed value of \$12.5 million.

Support services under these contracts include construction, maintenance, or repair of buildings, downrange features, associated equipment and training lands; providing and installing range equipment; and ordnance surveys and clearances.

The contracts cover locations in the continental United States and worldwide to include Hawaii, Alaska, Guam, Puerto Rico and the Virgin Islands.



250kg bomb casing recovered

One of the 250kg bomb casings recovered during the planned excavation and recovery of chemical warfare materiel at the former Memphis Depot, Memphis, Tenn., is shown above. Information contained in the archives search report indicated 29 bomb casings were destroyed and buried at the depot's Dunn Field. As of Sept. 28, three 250kg casings and 19 500kg casings have been recovered.

New England District assists MMR

Courtesy of New England District

The New England District and the Huntsville Center are assisting the U.S. Army National Guard by using a sophisticated detonation

chamber to safely dispose of ordnance such as shells and other munitions. The ordnance is stockpiled within the Impact Area at Camp Edwards, located in the Massachusetts Military Reservation, Cape Cod, Mass. The disposal began in June and is expected to cost approximately \$500,000. To date, 406 pieces of various ordnance have been destroyed.

The work is being performed in compliance with U.S. Environmental Protection Agency directives under the Safe Drinking Water Act (PL 93-523, as amended).

The 2,000 plus acre Impact Area has historically been used as a range for the firing of field artillery (105/155) and mortars. The site was last used for field artillery in 1985 and for mortars in 1997.

Presently, ordnance is being collected from the surface of, and stockpiled within, the Impact Area.

The Corps of Engineers, through its contractor, Sudhakar Company, Inc., of Huntsville, Ala., will assess the condition of the unexploded ordnance, determine if it is safe to move, and if so, transport it to a specially-designed chamber for detonation, and properly dispose of any residual metal debris.

A six-foot-high chain link fence topped by three strands of barbed wire encloses the chamber, situated at the approximately 2,800-square-foot site at a crossroads within the Impact Area known as Five Corners. In a separate, adjacent fenced area, a "Day Box" is located for temporarily storing the explosive materials needed during chamber operations each day. In addition, a 750-foot exclusion or buffer zone around the chamber site is observed at all times while the chamber is in use.

Unexploded ordnance is placed in portable wooden ammunition boxes, which have a sand layer in the bottom to cushion the shells. The boxes are then secured in place, on the sandbag-lined bed of a pickup truck, to prevent movement

during transport to the detonation chamber.

Upon arrival at the chamber site, the chamber operators, supervised by experienced unexploded ordnance personnel, wrap each shell in an explosive blanket before it is placed within the chamber. Once this has been completed and the chamber sealed, the explosion will occur. During the actual explosion, the sound generated is similar to the slamming of a heavy door.

The chamber operates during daylight hours, ten hours per day, Monday through Thursday to dispose of the stockpiled ordnance. No work is undertaken at night or on the weekends. The chamber will remain onsite a total of three months should additional ordnance be found during the excavation/exploratory stage.

The unit to be used at Massachusetts Military Reservation has the ability to withstand detonation of an explosion equal to 13 pounds of TNT. The chamber has the capacity to detonate two 81mm mortar rounds at one time. During its operation at MMR, the design capability of the chamber will not be exceeded.

The T-10 Donovan Blast Chamber was developed by DeMil International to destroy hazardous conventional munitions while controlling and containing the detonation and its by-products. The chamber contains toxic metals, organics or energetics within, thus eliminating stormwater, soil and groundwater contamination. Resultant metal scrap is safe for disposal at community landfills. The chamber controls overpressure, heat, shrapnel and noise so that personnel may work safely in the vicinity and safely reenter it within one minute of a detonation.

The T-10 unit is comprised of three principal components, which include the actual detonation chamber, an expansion tank into which detonation gases and overpressures are vented for cooling and pressure reduction, and the air pollution control unit that filters detonation gases to 0.5 microns before discharge into the atmosphere. In addition, the trailer-mounted unit is totally self-sufficient, providing its own generator and compressor.

The National Guard Bureau has contracted with Tetra Tech, Inc., of Pasadena, Calif., to manage the excavation of test or sample sites within the Impact Area.



John Dovovan (right), the inventor of the Donovan Blast Chamber, shows the chamber to Brig. Gen. George W. Keefe, Adjutant General of the Massachusetts Military Department (left), on-site at MMR.

(See MMR, page 11)

Classification of secondary explosives in environmental media

Department of Transportation Regulations

By Ed Bave, Omaha District
HTRW Center of Expertise

The first article in this series addressed the relationship of the HTRW and OE programs with a focus on how environmental media contaminated with secondary explosives (EMCSEs) are managed in an integrated fashion. The second article dealt with the classification of EMCSEs as an Environmental Protection Agency (EPA) hazardous waste. This final article in the series addresses the Department of Transportation (DOT) Hazardous Materials Regulations (HMRs) and how they relate to EMCSEs remediation.

Article two in this three-part series discussed how under the hazardous waste regulations, EMCSE can be classified by chemical constituent using the toxicity characteristic leaching procedure (TCLP) and/or by the physical characteristics of ignitability or reactivity. A common TCLP waste code for secondary explosives is D030 (2,4 Dinitrotoluene) while the waste codes for ignitability and reactivity are D001 and D003 respectively. The hazardous waste generator is responsible for the correct classification of their waste.

For the purpose of shipping EPA hazardous waste off-site, EPA clearly refers to the DOT regulations that govern those activities and with very few exceptions, all EPA hazardous wastes meet the definition of a DOT hazardous material. It is critical to note here that DOT, DOD and USACE require

personnel responsible for the shipment of DOT hazardous materials to be trained in accordance with the criteria identified in 49 CFR 172.700. The content of the DOT training requirements is defined in three general categories which include safety issues, regulatory awareness, and function (i.e., job) specific training.

Nine hazard classes

DOT has defined nine (9) numerical hazard classes that establish the universe of DOT hazardous materials. With the exception of Class 9, all DOT hazard classes represent a category of material with a similar physical state (i.e., compressed gas) or physical property (i.e., flammable liquid). Class 9 DOT hazardous materials represent a group of miscellaneous materials that warrant regulation, but do not meet the definition of DOT hazard classes 1 – 8. When selecting a DOT shipping name, a hierarchy of hazard class precedence (49 CFR 173.2a) has been predetermined by DOT along with specific procedures on how a shipping name is deduced (49 CFR 172.101c).

Depending on the type of secondary explosive and the amount present, the most likely DOT hazard classes are Class 1 (explosive) or Class 4, (flammable solid) or Class 9 (miscellaneous hazardous material, i.e. hazardous waste). When dealing with EMCSEs, the DOT hazard class definition will most likely be directly related to the EPA waste code(s) assigned. For a secondary explosive at > 10% we default, by DOD policy, (see previous article) to a D003 explosive

reactivity subcategory, which by definition meets one of the three 40 CFR 261.23(a)(6)-(8) criteria. So, for a remediation waste contaminated with TNT at > 10% and with < 30% water, we find in the DOT hazardous materials table (49 CFR 172.101) the entry for TNT as an explosive. The shipping description in this case is as follows: "Waste Trinitrotoluene, 1.1D, UN0209, II" by applying the required DOT "waste" modifier. If the same material has greater than 30% water by weight naturally or the material was purposely wetted, then according to DOT criteria, the material is considered a flammable solid and must be described in the following manner: "Waste Trinitrotoluene, wetted, 4.1, UN1356, I." Note that the waste modifier is appropriate if the material meets the definition of a D001 ignitable waste (see 40 CFR 261.21(a)(2)). It should be noted here that RDX and HMX are recognized by DOT as proper shipping names for a 1.1D explosive, however, unlike TNT, there is no equivalent flammable solid (4.1) entry for RDX, HMX, or mixtures of both. A generator/shipper must evaluate whether a Flammable solid, n.o.s. proper shipping name is warranted.

Other criteria

Now, continuing with the previous scenario, if a site remediation waste contains < 10% secondary explosives and does not meet the definition of a DOT explosive or flammable solid, then the EMCSEs must be evaluated

for other DOT hazard class criteria. As an example, if a representative sample of remediation waste is tested by TCLP and results indicate the presence of 2,4 Dinitrotoluene at > 0.13 mg/l, (D030), then we meet the definition of a DOT Class 9 since DOT includes hazardous waste (see 49 CFR 173.140) under this class of hazardous materials. To describe this material for shipment off-site we must use a "not otherwise specified" (n.o.s.) description since there is no other option available from the authorized list of DOT proper shipping names. In this case we would describe the material as: "Hazardous waste solid, n.o.s., 9, NA3077, III (contains 2,4 Dinitrotoluene)."

Training

As can be seen from the examples presented above, it should now be apparent that individuals tasked with preparing shipping papers (i.e., hazardous waste manifest) for EMCSEs must be trained in accordance with EPA hazardous waste regulations, DOT hazardous materials regulations (including safety) and, when needed, have function specific training relative

(See HTRW, page 11)

Rocky Mountain 'high explosives'

By *Gregg Kocher*,
St. Louis District

Like a sharp wind, the shock wave could be felt through the cracks in the rocks. A monolith the size of three Volkswagens vibrated as the resounding boom echoed through the Colorado mountains. A pall of black smoke rose above the 12,000-foot peak as the team members emerged from their hunkered-down position. An unexploded 155mm artillery shell that had lain undisturbed on the mountain for 36 years was safely detonated.

Three members of the St. Louis District's Ordnance and Technical Services Branch, Engineering Division — Project Manager Tom Murrell, Historian Jim Luebbert and Safety Specialist Gregg Kocher — spent two weeks combing National Forest property formerly known as Camp Hale, where ski troopers

of the elite 10th Mountain Division trained in World War II. This team was searching for evidence of ordnance and explosives that may still pose a threat to public health and safety. The mission was to characterize former military firing ranges and to identify potentially contaminated areas. The end product will be an exhaustive Archives Search Report, utilizing historical maps, docu-

ments, interviews and aerial photography to gather the necessary information.

This project, which is under the auspices of the Omaha District and the Huntsville Center, and is being conducted in conjunction with the State of Colorado Department of Public Health and Environment and the U.S. Forest Service, was a daunting task. In its heyday, the former Camp Hale occupied 200 square miles, with the cantonment area sitting at an elevation of 9,200 feet.

Jim Luebbert conducted extensive research not only at the National Archives, but at local depositories and uncovered not only the locations of a variety of training and maneuver areas, but that a 155mm howitzer shell had been fired for avalanche control during the building of the Homestead Reservoir in 1964. This round failed to function and was not recovered until the St. Louis District team climbed the mountain and located it.

"Beyond a needle in a haystack," was U.S. Forest Service park ranger Bill Kight's reaction when he was informed of the find. Two members of the Army's Explosive Ordnance Disposal unit from Fort Carson responded to destroy the shell. This unit was kept busy, as it responded on two other occasions when the St. Louis team located high explosive anti-tank rifle grenades at another location on the former Camp Hale.

Finding live munitions in an area near camping and hiking trails, especially right before the Labor Day weekend, gained the attention of local TV news stations. Two

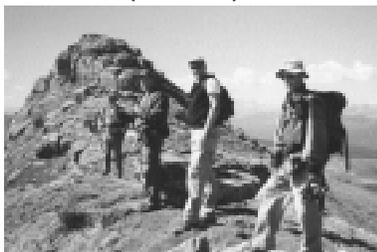
news crews departed the dedication of a new amphitheater in Vail by former President Ford, in pursuit of the story. A remotely-operated camcorder positioned within 50 meters of the demolition shot captured the explosion and immediately transmitted it to the TV studio for inclusion in the five o'clock news that evening. It was this kind of proactive publicity that both the State of Colorado and the U.S. Forest Service needed to get the word out that there were still hazards associated with the former Camp Hale. In addition, signs were posted to close off the area where the rifle grenades were found.

In conducting the research, Jim Luebbert found that there was more to the Camp Hale story than just World War II mountaineering training. In the late 1950's and early 1960's, the CIA trained Tibetan guerrillas to fight the Chinese. Documents describing the kinds of munitions that were cleared from Camp Hale in 1964 indicated that the Tibetans fired 106mm recoilless rifles and the St. Louis team found evidence from this type of ammunition. From the 1945 through 1964, Camp Hale was a sub-installation of Fort Carson and continued as a troop training ground.

The rigorous physical demands, combined with the need for coordination at many levels, gave the team great satisfaction in knowing that its efforts made the former Camp Hale a safer place for outdoor recreation.



Above, the blast from a 155mm shell. At left, an unexploded 60mm mortar shell. Below, the group at 12,400' (left to right): Tom Murrell, Jerry Hodgson (Omaha), Jeff Swanson (State of Colorado), and Gregg Kocher (St. Louis)



Ordnance safety assists archeological dig at Black Hills

By *Liam Anselm Bickford, Omaha District*

Discovery of 80 million year-old fossils brought increased attention to the fact that special provisions are in place to protect archeological finds, and the U.S. Army Corps of Engineers plays an important role.

Contractor Raymond Zaharevitz of Human Factors Applications, helping with the Corps of Engineers' cleanup at the former Black Hills Army Depot near Edgemont, S.D., was looking for shell fragments when he and a co-worker discovered some bones lying on the ground. More bones lay underneath the surface.

Paleontologist Dr. James Martin from the South Dakota School of Mines and Technology examined the remains and determined the bones were from a mosasaur. Calling the discovery "a very important find," Dr. Martin explained that a mosasaur was a rare and vicious looking predator with an abundance of teeth. They were aggressive marine reptiles or 'sea lizards,' roaming the sea about 70 to 80 million years ago using turtle-like pads for propulsion.

Graduate student Frank Varriale described the significance of these findings, "Each is part of a puzzle to the history of life. They add to our knowledge of the evolution of organisms. You need to find more and more pieces of the puzzle." He further explained, "Because it would be impossible to base an accurate conceptualization of an organism on only one specimen."

The U.S. Forest Service which owns the former depot's Burning Ground 2, where the mosasaurs were found, was naturally anxious to preserve the ancient reptiles. But metal remnants on the surface of Burning Ground 2 posed a hazard to excavators.

The history of the burning ground as a disposal site for military munitions dictated the vital need for the presence of an Ordnance and Explosives (OE) support team to ensure safety and provide technical advice for all personnel involved in the operation. OE specialist personnel from the Omaha District and Rock Island District Corps of Engineers provided this support throughout the excavation process.

"The Corps' presence was significant to the execution and success of this project," says Dr. Martin. "The Corps of Engineers became an essential part of the team. Some Corps members even contributed directly by finding some vertebrate remains themselves. We have a long history of working with the Corps," says Dr. Martin. "And the teaming has been highly successful."

The fossil recovery team consisted of Dr. Gordon Bell and Dr. James Martin from the South Dakota School of Mines, together with graduate and undergraduate students. Volunteers from other parts of the United States also participated. Dr. Bell supervised the combined efforts of the U.S. Forest Service Fall River Ranger District, the School of Mines, and the Corps of Engineers in unearthing six mosasaur specimens.



Soil must be carefully scrutinized for fossils. The area is also a formerly used defense site so an OE support team was on hand to ensure safety and provide technical advice for all personnel in the operation.

At each mosasaur location, a representative of the S.D. School of Mines advised OE safety personnel on the area required for OE avoidance in order to preserve these ancient marine mammals, and clear the way for additional environmental work at the site.

During this recovery project, initial efforts of OE avoidance involved providing safe access for site workers to travel from the entrance to Burning Ground 2 to the mosasaur locations, as well as the OE avoidance work of clearing a suitable work area

immediately surrounding each mosasaur location. Throughout the project, continuing efforts of OE avoidance were required to safely remove the mosasaurs from progressive layers of soil.

Rock Island District personnel and Omaha District Corps of Engineers completed an investigation consisting of surface and subsurface soil sampling at soil boring locations, surface water and sediment sampling, and installation and sampling of monitoring wells. OE investigators were looking for contamination from explosives, chemical warfare materiel, and hazardous and toxic waste left over from when munitions and other

items were burned in trenches in these areas.

During OE avoidance procedures three small ordnance items were located which posed a potential threat to the site. The first of two live 40-mm shells was found on July 13 near the fossil dig. A Corps ammunition inspector said that although the 40-millimeter 4-inch long shell had no fuse and no means of initiating, it was still considered live ammunition because the round contained a tenth of a pound of TNT high explosives. The third ordnance item, a 3.5-inch high explosive (HE) shoulder-fired rocket, was discovered 23 July and added to the destruction plans. The ordnance items were detonated at Ellsworth AFB on July 29.

Most ordnance items discovered during the mosasaur recovery project were surface debris. In the case of the second 40 mm round, it was discovered in loose silt-like deposits two inches below the surface during surface clearance for the fossil recovery. Only one location, not near the fossil sites, showed evidence of buried materials where erosion exposed a few crushed drums at a depth of two feet.

The surface debris included ordnance items, such as fuses and 3X materials, large pieces of shrapnel and bombs, various metal pipes, drums, packing and crating materials. In all, nearly 157,000 pounds of scrap have been removed from the site and disposed of since August 20, 1999.

(See Black Hills, page 11)

Donovan Blast Chamber, Vapor Containment Structure

Testing proven products in new combinations may mean new technology

By **Kim Gillespie, Huntsville Center**

The Huntsville Center, as part of its ongoing mission to ensure Ordnance and Explosives project site safety, tasked Zapata Engineering and the Southwest Research Institute to test the DeMil International's transportable Donovan Blast Chamber for the concept of safe and efficient destruction of a toxic simulant. "Huntsville Center does not do R&D (Research & Development), but we do look for better and safer ways of doing business. The Donovan Blast Chamber has already been approved by the Department of Defense Safety Board and is currently being used for destruction of conventional munitions at the Massachusetts Military Reservation. Because of its capacity for destruction of munitions without emissions, we are looking at other ways it can be applied to protect the public and the environment," said Chuck Twing, team leader for Huntsville Center's Chemical Warfare Materiel team.

Tests were conducted in June to determine if a toxic simulant could be effectively destroyed within a blast chamber contained in a vapor containment structure with no detectable levels of smoke simulant escaping the vapor containment structure's air filtration system to the external environment. The draft report containing the analyses of the test results was issued to Huntsville Center in September, and initial conclusions are positive. "Huntsville Center should have the final report available for those interested by the end of this calendar year. These tests were very limited in scope and context and we will probably recommend a second phase of expanded tests be conducted."

Four tests were conducted, with Tests 1 and 2 being used for informational purposes, and Tests 3 and 4 serving for qualitative evaluations. Tests 1 and 2 were conducted with only the Donovan Blast Chamber in an open-air environment. Air sampling was conducted by inserting DAAMS tubes into the ductwork at approximately three, six and nine feet from the chamber's overpressure outlet. Tests 3 and 4 were conducted with the Donovan Blast Chamber in an enclosed environment—the vapor containment structure. The blast chamber's overpressure outlet exhausted

directly into the vapor containment structure, and the vapor containment structure was connected to a filtration system provided by the Edgewood Chemical and Biological Command. Two DAMMS tubes were mounted approximately one foot above the discharge stack on the air filtration system for Tests 3 and 4. In addition, two DAAMS tubes were placed inside the vapor containment structure to measure ambient air quality.

"The vapor containment structure is already an approved and proven technology, but we wanted to see how the detection levels differed. That is why we labeled the first two tests as "information data," while we considered the second two tests as "pass or fail," explained Twing.

The simulant used for testing was methyl salicylate (oil of wintergreen), an industrial chemical commonly used as a simulant for hazardous material. "The Soldier, Biological and Chemical Defense Command (SBCDCOM) has the expertise in this area, and they recommend using this simulant for testing," said Twing.

The technical team conducting the tests consisted of Huntsville Center, Zapata Engineering, Southwest Research Institute and Sudhakar Co. Zapata provided all engineering and support services for the test. Southwest Research and Sudhakar were subcontracted to Zapata and conducted the actual testing. Southwest provided air monitoring and analysis of air and surface waste residue generated during blast containment structure testing events, and measured pressure changes inside of the vapor containment structure during Test 4. Sudhakar assisted Southwest Research in the detonation of test blasts. The tests were conducted at Southwest Research Institute's facility in San Antonio, Texas. All personnel involved in the testing were properly trained and qualified. The inventor of

(See Donovan, page 11)



Installation of the DAAMS tubes inside the ductwork for Tests 1 and 2.

Donovan

(Continued from page 10)

the Donovan Blast Chamber was also on-site to assist with the chamber.

High oxidizing Datasheet was used as the donor charge. "We wanted the blast to consume as much of the simulant as possible, so a 4:1 explosive-to-simulant ratio was determined to be best for these initial tests, but we didn't want to exceed the 3- to 5-pound explosives limit of the Donovan Chamber, so lesser amounts of the simulant were used than would likely be encountered with a real hazardous material," explained Twing. The other variation used for the test was wet testing and dry testing. "The purpose of the wet test was to assess the effect of water on simulant destruction," said Twing. Wet tests were conducted by suspending water-filled plastic bags from the inside roof of the blast containment chamber.

Tests 1, 3 and 4 were conducted using 0.25 pound of simulant and 1.0 pound of charge. Test 2 was conducted using 0.094 pound of simulant and 0.375 pound of charge. Tests 1 and 3 also were wet tests and included 1.0 pound

of water. Tests 2 and 4 were dry tests.

Results of the tests indicate that no detectable levels of simulant were measured outside of the vapor containment structure. Additionally, Test 4 included a pressure sensor attached to the wall, but no significant change in pressure was detected. "We will probably recommend a second phase of testing be performed with a greater variation on the charge. We would also like to see more variations on the wet and dry tests, with a possible neutralizing agent being used with or in place of the water," said Twing.

"Both the blast chamber and the vapor containment structure were commercially developed products, and have proven to be safe and reliable. We believe it is a worthwhile investment to explore the various ways these products can be used. Combined with our experience of actually implementing technologies out in the field and our track record for safety, we think we have a pretty good feel for what will work," concluded Twing.



Installation of the DAAMS tubes above the air filtration system discharge stack used for Tests 3 and 4.



The configuration of the Donovan Blast Chamber inside of the vapor containment structure for Tests 3 and 4.

MMR

(Continued from page 6)

These sites, the largest of which is approximately four acres, are within the highest-use target zones of the 2,000-acre Impact Area.

As part of the effort, Tetra Tech will excavate to a depth of approximately ten feet, in increments ranging from six inches to one foot, using small mechanical equipment (backhoe) and hand tools.

During the activity, the site will most closely resemble an archaeological dig. At the conclusion of the excavation phase, Tetra Tech will prepare a report of its findings.

HTRW

(Continued from page 7)

to DOT Class 1 (explosives). Without appropriate training, individuals are in violation of Federal, DOD, and USACE regulations. PROSPECT training is one mechanism to address EPA hazardous waste and DOT hazardous materials requirements.

The OE Center of Expertise is the subject matter expert regarding DOT Hazard Class 1, division, and compatibility group classification issues. The HTRW and OE Centers of Expertise have individuals skilled in these DOT and EPA regulations and they are available to support district efforts in meeting the challenges of regulatory compliance during EMCSEs remediation efforts.

Black Hills

(Continued from page 9)

The U. S. Army Corps of Engineers has been studying contamination and cleaning up the Igloo area since 1992, occasionally discovering other live munitions. Remnants of potentially dangerous ordnance are often destroyed by controlled blasts in remote areas of formerly used defense sites. The HTRW effort is on going and is scheduled for completion in 2001. The area around Burning Ground 2 remains restricted by the Forest Service.

"The importance of open communication and community involvement has proven to be vital to this project," says project manager Deb Kobler. The Corps continues to keep the public informed of matters relating to the former Black Hills Army Depot through communications with the RAB.

Kobler added, "The U.S. Army Corps of Engineers' commitment to conducting safe and valid environmental investigations is the most important element of the on-going efforts at the former BHAD. This commitment remains unchanged and will continue to be the top priority."

A fond farewell...

Rob Wilcox, one of the original members and the first team leader for Huntsville Center's (then Huntsville Division) FUDS work, retired on Sept. 29. "Rob has been the backbone of our FUDS and OE program," said David Douthat, Huntsville Center OE Director.

Wilcox came to Huntsville Center in 1982 and when the Defense Environmental Restoration Program (DERP) was established by Congress in 1986, he was assigned as the team leader for a group of three project managers that were given the DERP FUDS work. "When we first started, myself and the other project manager had about 17 projects a piece. As the team leader, Rob was responsible for making sure the program followed environmental regulations. But what he really ended up doing was developing policies because this was a whole new ballgame and none of the rules really applied. He became the 'regulation guru' for the program," said Bob Nore, a Design Center project manager and one of the original team members.

Wilcox' label as the "regulation guru" has followed him to his present work in the Huntsville Center OE Center of Expertise (CX). Wilcox was the leader in developing the use of institutional controls as an OE response action. Institutional controls are now one of the four standard response actions addressed in the Engineering Evaluation/Cost Analysis for every OE project.

Most recently, Wilcox came full circle and was a member of the first "Recurring Review" team. The team performed the first five-year review of the very first OE project completed by the Corps in Tierrasanta, Calif. The review was performed to ensure that the project work remained protective of the community and the environment. "Once again, Rob has set the ground-work for how future work will be performed," said Douthat. "The Corps has adopted the five-year Long Term Monitoring requirement for HTRW sites and is requiring a five-year 'Recurring Review' for all OE projects. Rob's work on long term risk management, and its application at the Tierrasanta site, were extremely successful. The California state regulators were so pleased, they invited Rob to share his work at their last conference," added Douthat.

"Rob is a visionary," said Nore.

The Corps of Engineers OE team wishes Rob all the best in his retirement. He'll be missed.



Rob Wilcox, one of the original team members for ordnance work at Huntsville Center, retires after 30 years of government service.

SPECIAL NOTICE: OE Stand-Down

Huntsville Center will not host its annual OE Stand-Down in December 2000, but OE Center of Expertise staff expects that it will return in December 2001. The primary reason for not hosting the event this year is that the potential timing did not fit well within the December calendar. To minimize interference with the holidays, the Stand-Down would have to be scheduled for mid-December. In turn, this would mean closing down field work at all OE projects after only the first week of the month. Planners of the Stand-Down agreed this schedule was not in the best interests of most of those who would likely attend. In general, the response to the OE Stand-Down has been very positive and future sessions appear to be very much in demand.

Army BRAC IPR

Oct. 17-18, 2000
Huntsville, Ala
POC: Toni Hamley
DSN: 760-1761
Commercial: (256) 895-1761
Fax: (256) 722-8709
E-mail: Toni.S.Hamley@HND01.usace.army.mil

