

Environmental Actions in the Former Republic of Yugoslavia

By Major Charles Litzelman

As U.S. forces deployed with the Implementation Force (IFOR) in support of the Dayton Peace Accords, it became apparent that the Army's environmental program would encounter a monumental task. The high degree of urgency and command emphasis on force protection and basic quality-of-life issues would force environmental initiatives, which had been successfully integrated into the culture of the armed services during the past 10 years, to take a back seat. This could adversely affect the soldiers' health and eventually have financial consequences if a strong program wasn't implemented and enforced.

The goal of the environmental program for the area impacted by Operation Joint Endeavor was straightforward and synchronized with guidelines in Army Regulation 200-1, *Environmental Protection and Enhancement*: "To plan, initiate, and carry out all actions and programs to avoid or minimize adverse environmental impacts without impairing the Army's mission."

Background

One of the greatest challenges in ensuring an environmentally sound program was the extensive area of operations. Technically, U.S. operations during Joint Endeavor fell under the 7th Corps, U.S. Army Europe (USAREUR), major command (MACOM). The theater of operations included Hungary (the intermediate staging base [ISB]), Croatia, and Bosnia—with each country having separate and diverse environmental regulations, policies, and problems. The operation included 20,000+ troops (division [+]) and covered more than 28 base camps, forward operating sites, and major staging areas.

For NATO countries, U.S. policy centers on the Overseas Environmental Baseline Guidance with specific standards developed for the final governing standards. Since comprehensive environmental standards were not defined during this deployment, forces in the ISB focused on the stringent standards practiced in Germany. Policy for points further south (Croatia and Bosnia) were more relaxed, since no existing regulations governed non-NATO countries or countries new to the international community. In addition to enforcing environmental standards, the Army must comply with force-protection requirements. Since Croatia and Bosnia were classified as hostile areas, less stringent environmental standards were applied than would have during peacetime. The task of the environmental

program was to ensure compliance with these standards, clean up spills, and if necessary, remediate contaminated sites.

By December 1996, U.S. forces had generated the following waste materials:

- 2,709 drums (55-gallon) of mixed petroleum, oils, and lubricants (POLs)
- 334 drums (55-gallon) of antifreeze
- 96 drums (55-gallon) of nonhalogen solvents
- 738 drums (55-gallon) plus 180 cubic yards of contaminated soil
- 30 kegs (15-gallon) plus 37 containers (5-gallon) of battery acid
- 575 empty metal containers (55-gallon)
- 18,946 empty metal containers (5-gallon)
- 795 empty metal containers (1-gallon)
- 79 drums (55-gallon) plus 1,690 bulk gallons of wastewater and fuels
- 20 asbestos brake pads
- 7,475 lead acid batteries

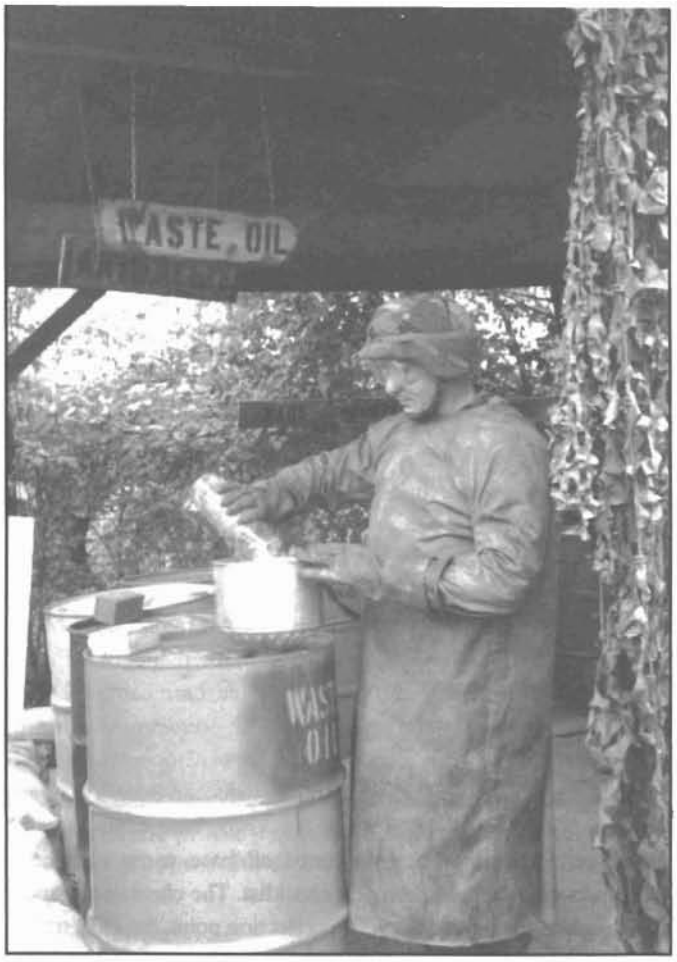
Disposal methods ranged from recycling to trucking wastes to approved disposal sites in Germany or Bosnia. The Tuzla City (Bosnia) power plant burned mixed POL wastes, while some contaminated wastes (antifreeze, lithium batteries, and oil filters) and contaminated soil were disposed of in-country when conditions permitted.

More than 25 spills, ranging from 25 to 9,000 gallons, contaminated the soil. The average spill was 200 gallons. The most common cause was traffic accidents, some involving fuel tankers. The largest spill occurred at the Lukavac fuel bladder farm when a liner was installed improperly. Remediation of that spill consisted of two phases: extraction of fuel that collected three feet below ground in the water table and disposal of the contaminated soil.

Command Structure

To understand the complexity of Operation Joint Endeavor and the environmental problems it generated, it is necessary to understand the key commands. MACOMs included USAREUR, which oversaw the environmental operation, and the Office of the Deputy Chief of Staff for Engineers (ODCSENG), a major contributor of manpower and dollars. These two MACOMs were supported by a forward element located in Taszar, Hungary.

The Allied Rapid Reaction Corps, or C-Support, was a multinational command that oversaw U.N. wastes. The Implementation Force was comprised of all allied forces and included Task Force Eagle and the lst Armored Division. The Base Camp Coordinating Agency (BCCA) was an ad hoc engineer-staffed office formed to assist and support all aspects of the division's base camps. This office was located with the division rear.



A soldier in protective gear deposits waste oil into a 55-gallon container. An overhead cover prevents rain from washing leaks and residue from the container onto the ground.

During the first months of the operation, the staff consisted mostly of USAREUR and ODCSENG environmental personnel. Later, personnel were recruited from the Reserve Components and Corps of Engineer districts. An average of two environmental cadre worked in the ODCSENG forward office and two worked in the Lukavac Coke Plant in Bosnia, affectionately called "Gotham City" by the soldiers. To assist redeployment, the division rear moved operations to Slavonski Brod, Croatia. Brown & Root Services Corporation provided cleanup support and supplies and constructed hazardous waste sheds.

Environmental Program Tenants

The environmental program supporting Task Force Eagle incorporated four areas:

- Environmental surveys
- An assessment program
- A closure team
- A cleanup and remediation program

Environmental Surveys. To ensure a sound base, the environmental program concentrated first on baseline surveys to measure existing pollution. These surveys documented remediation actions required to protect our soldiers and avoid U.S. liability later. These initial surveys included base camps and

facilities used for billets and office space. Documentation described water source conditions, soil, natural resources (including endangered and threatened species), and air quality. Final surveys measured suspected environmental damage resulting from Operation Joint Endeavor by comparing current conditions with those recorded on the baseline surveys.

The Corps of Engineers contracted Brown & Root to complete the baseline and final surveys, which were somewhat constrained because the time of year did not permit an accurate picture of land and facilities. In many cases, previously contaminated areas were discovered only after the spring thaw.

Assessment Program. Because all environmental programs rely heavily on prevention, site inspection was critical. All unit hazardous waste collection sites in Hungary, Croatia, and Bosnia were inspected. The Base Camp Assessment Team (BCAT), an arm of the BCCA, assessed and monitored base camps during both sustainment and closure phases. The sustainment mission included visits to all base camps and forward operating points south of the Sava River (the border of Croatia and Bosnia) at least once each month. At the close of the visits, base camp mayors (appointed officers who coordinated all base camp activities) received a completed assessment checklist. The checklists graded areas such as the hazardous waste collection point, the POL transfer point, hazardous waste management, spill prevention, and the base camp's overall environmental program.

The standards for the hazardous waste collection points required that units provide overhead cover and secondary containment for liquid wastes, label all containers, and indicate the availability of material safety data sheets and hazardous waste inventory sheets. As with all successful programs, command emphasis was very important. Since the Army recycles waste oil, it was necessary to segregate wastes at unit level before turn-in. For the most part, soldiers were environmentally conscientious, but some neglected to read hazardous waste drum labels. Invariably, some used oil filters ended up in the oily rag or used oil container, requiring additional resources to re-sort the wastes. Spill reaction teams were monitored during assessments to determine the time they needed to clean up spills rapidly.

Since major spills of hazardous substances can generate complex technical, legal, and public relations problems for U.S. forces, fast response procedures to report, respond to, and control accidental discharges of POL products and other hazardous substances were stressed to the units. POL spills (JP8 [jet petroleum] fuel) normally posed the chief environmental risk for U.S. forces. Most soil, ground-water, and surface-water contamination from POL and BTEX (primarily consisting of benzene) occurred at fuel transfer facilities when gas tanks were overfilled or nozzles were dropped while filling the tanks.

Base camps were required to have appropriate spill response materials on hand and to clean up spills within their capability. Spills larger than 25 gallons required contractor help from Brown & Root. The BCCA maintained a database of spills exceeding 25 gallons. That information assisted units as they departed base camps, real estate personnel as they closed leases, and claims personnel as they addressed damage claims to property used by U.S. forces.

As an assessment tool, base camps were assigned color-coded status slides depicting their readiness assessments. These assessments were featured at the 1st Armored Division's daily battle update brief.

Closure Team. To facilitate clearing base camps in a timely manner with minimal environmental impact on the mission, the BCAT team provided sustainment assistance and closure information. Base camps prepared an environmental condition report and a list of possible contaminated sites and identified the engineer requirements needed to repair and restore maneuver damage. This information was later used by real estate and claims personnel during claims processes. A final checklist signed by a representative from the environmental office and tenant leaders cleared the unit of further responsibility.

Cleanup and Remediation. Cleanup and remediation of contaminated sites were performed to the extent possible under the operation's constraints. The primary concerns were to reduce immediate threats to human health and the environment, determine legal responsibilities, and maintain the good name of the U.S. Army. Based on the preliminary assessments and site characterization, the ODCSENG forward element determined if remediation was required. Decisions to remediate were based on several variables:

- If the site posed an imminent, substantial health threat to U.S. military forces.
- If remediation reduced the liability of the United States.
- If remediation was required by international agreement.

Environmental contractors hired by the Corps or the Defense Reutilization and Marketing Office (DRMO) determined appropriate remediation techniques and the action process schedule. Natural attenuation with no anthropologic control was the desired course of action. If remediation was attempted, two treatment goals were considered:

- 5,000 milligrams of TRPH/kilogram of soil, as measured by the Environmental Protection Agency Method 418.1
- 5,000 milligrams of POL/kilogram of soil, as measured by Petroleum, Oil, and Lubricants - Mineral Hydrocarbons (DIN 38 409, H18)

A question that often arose during base camp cleanup was whether to clean up hazardous wastes left by previous tenants, such as the United Nations. This problem surfaced at several places, including Camp Pleso, Croatia, and Camp Rumbaugh, Bosnia.

Lessons Learned

The following environmental lessons learned during Operation Joint Endeavor may assist units deploying to similar missions:



Secondary containment for liquid wastes protects the environment if the primary container leaks. The sandbags and plastic shown here ensure that no waste fuel will leach into the ground if the drum leaks.

Environmental Surveys

Problem: Incomplete surveys. Because of the urgency to deploy, many base camps had incomplete environmental baseline surveys. Since deployments occurred during winter, most base camps were under several inches of snow and ice. The harsh conditions made surveys difficult to complete, so some included inaccurate data.

Recommendation: To facilitate rapid deployment, begin baseline environmental surveys immediately (preferably by a designated contractor) and treat them as "working documents." The base camp mayor should document sites as accurately as possible. Video and still photographs are the best tools for corroboration. Historical data is also important and should be available for most government buildings and factories.

Prevention Program

Problem: Lack of spill materials. Units brought spill materials to the theater, but only as an afterthought. Spill materials were usually the last items to be shipped. Generally speaking, they are not the most important items when going to war. Units eventually rushed to order these materials, only to find that delivery required weeks or months. The BCAT team finally ordered absorbent materials for the entire division. To supplement the shortage, the Corps of Engineers used its Rapid Response Contract to purchase additional absorbent materials, which were distributed to all base camps. Also, some supplies that were originally misplaced were found in various base camp warehouses throughout the theater.

Recommendation: Units need to transport a basic load of environmental cleanup and storage supplies during deployment. Once deployed, they should order and track additional supplies. The Corps should coordinate pre-existing contractor support for contingency purposes.

Problem: Washrack discharge. Too often, because of expediency and lack of real estate, washracks were built near creeks. As a result, discharge ran directly or indirectly into streams. But this wasn't the extent of the pollution; the main damage was from vehicle runoff sludge, which included heavy metals (cadmium).

Recommendation: Base camps may lack sufficient land and must make-do with the space provided. If no suitable alternative site is available, environmental controls (such as absorbent pillows and booms) should be placed at the washrack. Unit personnel should periodically deposit sediment in containers stored at the site to prevent heavy metals from polluting nearby streams. Base camps should test the sediment to ensure that heavy metals have not contaminated areas downstream.

Base Camp Closure

Problem: Clearing base camps. Successful base camp closure was very important to the overall mission of Joint Endeavor. Recurring problems cropped up during the first wave of closures. Often, base camp leaders were unaware of solutions for maneuver damage, such as dismantling hesco bastions (prefabricated metal/cardboard shells filled with soil), disposing of gravel, and clearing firing ranges and burn pits.

Recommendation: Key personnel, including representatives from real estate and the environmental contractor, should visit a base camp at least six weeks prior to closure. They should identify specific remediation responsibilities during this visit. Assessment personnel must conduct follow-up inspections during the last two closure visits to ensure that the remediation actions have been accomplished.

Cleanup and Remediation

Problem: Transportation of hazardous wastes. Because of the sensitivity of hazardous wastes, some countries imposed strict limits on the transportation of these wastes through their area. Normally, the Army's environmental policy calls for the DRMO to transport all hazardous wastes from a central collection point to remediation sites. A problem occurred when Croatian officials refused permits to DRMO's subcontractor to transport wastes from Croatia to Germany, effectively bottling up the disposal system. At one point, Implementation Force vehicles transported the hazardous wastes, although this action was not entirely within the letter of the agreement. The problem was eventually elevated to the highest level of the command structure, but no satisfactory solution was reached.

Recommendation: During deployment operations, Army staff must coordinate with host country officials as early as possible. Although constrained diplomatically, the United States must firmly set operating limits with the respective country. If this fails, the staff must aggressively search for in-country disposal sites that meet our standards. To preclude this problem, the staff may prepare agreements with cooperative countries authorizing the collection of hazardous wastes and the transportation of wastes out of the country.

Problem: Leakage from containers. Arriving MILVANs (military-owned demountable containers) and CONEXes (container expresses) often leaked at the ISB. Some hazardous waste materials were improperly transported from Bosnia through Hungary for turn-in to Germany. For example, one shipment of hazardous materials contained undrained batteries. Operation Plan (OPLAN) 4243 specifically describes shipping standards for hazardous wastes.

Recommendation: Transporting hazardous materials without taking proper precautions (such as draining battery acid) and transporting hazardous wastes are prohibited. Transport personnel must be briefed on the hazardous materials included in any shipment, including health risks of exposure and the physical hazards of the material. The chain of command must continually train soldiers to properly load and secure CONEXes.

Problem: U.N. hazardous wastes. The disposition of hazardous wastes left by former U.N. agencies and countries at sites occupied by U.S. forces created potentially embarrassing problems. Several base camps contained large quantities of used POL products left by previous tenants. Fortunately, most of the hazardous wastes were left in segregated areas in motor pools and out of harm's way. The U.S. policy regarding wastes generated by other than our forces is simple: We will not clean up other than U.S. wastes unless there is an immediate threat to our soldiers' health.

Recommendation: Continue to enforce the policy that the United States will not add to, transport, or touch hazardous wastes generated by other countries unless they present an immediate health risk to our soldiers. Unit leaders must immediately coordinate with base camp mayors and the camp's multinational component to safely remove all wastes.

Personnel

Problem: Recruitment of personnel. Although environmental personnel performed superbly during the year-long operation, there were some difficult periods when staffing fell short. Additionally, the frequent changes in civilian personnel caused continuity problems. Originally, personnel were recruited from only one source—the ODCSENG office in Wiesbaden. This restriction made it difficult to fill positions.

Recommendation: To ensure an adequate number of personnel, the U.S. Army should not limit recruitment to a single source. Engineer districts and other governmental agencies are excellent sources of qualified employees. To ensure continuity, civilians should be assigned on a temporary status for a period of not less than 90 days. This will allow 60 days on station, including travel and one week of training in Hohenfels. (This training is mandatory for all personnel deployed to the ISB/Bosnia.)

Conclusion

The Army's superb effort during Operation Joint Endeavor resulted in the fewest nonbattle injuries of any deployment in U.S. history. Some of this credit can be attributed to a successful environmental program. A result of this program is improved quality-of-life for soldiers. This includes reduced health risks as well as additional comforts during extended deployments—bought with money saved on site remediation.

To ensure continued environmental success in the field, units must keep accurate records on their baseline through final environmental surveys. Units must initiate a sound prevention program with a working assessment process and immediately clean up all spills. If site remediation is required, units must use the best techniques possible within their mission constraints.

Command interest is key to a successful environmental program in the field. Commanders must continually emphasize the importance of accomplishing the Army's mission without adversely impacting the environment. With this emphasis, the Army will be a national leader in environmental stewardship for present and future generations.

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