

March 1996

ENVIRONMENTAL CLEANUP

Progress in Resolving Long-standing Issues at the Rocky Mountain Arsenal



**National Security and
International Affairs Division**

B-266062

March 29, 1996

The Honorable Bill Zeff
Chairman
The Honorable Karen L. Thurman
Ranking Minority Member
Subcommittee on National Security,
International Affairs, and Criminal Justice
Committee on Governmental Reform and Oversight
House of Representatives

You requested that we review the cleanup program at the Rocky Mountain Arsenal, one of the Department of Defense's (DOD) most contaminated installations. This report provides information on (1) the status of cleanup efforts at the Arsenal, (2) completion plans for the cleanup, and (3) the cost-sharing arrangement between the Army and Shell Oil Company.

Background

The Rocky Mountain Arsenal, established in 1942, occupies 17,000 acres northeast of Denver, Colorado, and is contaminated from years of chemical and weapons activities. The Army manufactured chemical weapons, such as napalm bombs and mustard gas, and conventional munitions until the 1960s and destroyed weapons at the Arsenal through the early 1980s. In addition, it leased a portion of the Arsenal to Shell Oil Company from 1952 to 1987 to produce herbicides and pesticides. The Arsenal was placed on the Environmental Protection Agency's (EPA) National Priorities List, the list of the nation's most heavily contaminated sites, in July 1987.

More than 300 species of birds, mammals, amphibians, reptiles, and fish can be found on the installation. Once the EPA certifies the cleanup is complete, the Arsenal is to become a national wildlife refuge managed by the Fish and Wildlife Service. Refuge management activities are already underway. (App. I shows the key physical features of the Arsenal.)

Waste disposal practices used by the Army and Shell in the past have resulted in extensive soil and groundwater contamination. Some of the common contaminants include nerve agents, diisopropyl methyl phosphorate (DIMP), and the pesticides dieldrin and aldrin. Other contaminants include heavy metals, such as arsenic, lead, chromium, and mercury, and volatile organic compounds, such as benzene, toluene, and xylene. The 209 contaminated sites on the Arsenal are divided into on-post

and off-post segments. The on-post sites include all contaminated structures, water, and soil within the boundaries of the Arsenal. The off-post sites include a region north of the Arsenal requiring cleanup because of migrating groundwater contamination.

Cleanup at the Arsenal is subject to the legal requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended (42 U.S.C. 9601); the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901); and state laws. (See app. II for a description of the CERCLA process.)

The Army is in charge of the cleanup under a Federal Facility Agreement, which was signed in 1989. The signatories include the Army; Shell Oil Company; the EPA; and the Departments of Justice, the Interior, and Health and Human Services. The agreement established a framework for cleanup and a process to resolve formal disputes among the parties. However, the state of Colorado was not a party to the Federal Facility Agreement because of litigation with the Army and Shell. A court-appointed mediator facilitated negotiations between the parties over several years.

Results in Brief

Permanent cleanup at Rocky Mountain Arsenal has been delayed for years due to lawsuits and numerous other disputes between the parties involved. In June 1995, the state and five other key parties signed an agreement for a conceptual remedy to address the lawsuits and disputes. Although about \$300 million of the nearly \$1 billion spent to date has been for interim actions to mitigate the most urgent environmental threats, the majority has been spent on studies and other management activities. The \$354 million spent on studies alone represents the costliest study phase in the history of DOD's cleanup program.¹

The June 1995 conceptual agreement resolves the most significant issues and paves the way for a final settlement, or record of decision, in 1996. Based on the agreement, the Army currently estimates the cleanup will cost \$2.1 billion and take until 2012.² Prior to the agreement, the Army had estimated a \$2.8-billion to \$3.6-billion cleanup effort to be complete in about 2010. Although the agreement addresses many of the disputed issues, the final details are yet to be negotiated. Until the cleanup plan is detailed and finalized in the record of decision, the cost and completion

¹The cost for the study phase is based on data supplied by the Army and from DOD's annual report to Congress. DOD has made subsequent adjustments to the data, not verified at the time of this report.

²Cleanup estimates are presented in fiscal year 1995 dollars.

estimates will be subject to change. Historical experience at the Arsenal has shown escalating costs and unmet milestones.

Under a 1989 settlement, the Army and Shell are sharing cleanup costs. The costs to correct damages attributable solely to either the Army or to Shell are to be financed by the responsible party. However, most contamination was commingled, and these cleanup costs will be shared under a formula requiring each party to pay 50 percent of the first \$500 million in cleanup costs, with Shell's share decreasing as total costs increase. Although the agreement does not limit total contributions, Shell estimated its total costs will be about \$500 million; so far, it has contributed \$274 million. By the time the final phase of cleanup begins in May 1996, under an expected record of decision, the Army will be responsible for 80 percent of the costs for commingled contamination. These costs represent most of the remaining cleanup.

Decades of Conflict Approaching Resolution

The recent conceptual agreement for cleaning up Rocky Mountain Arsenal may mark a turning point in years of conflict that has slowed the implementation of permanent cleanup remedies and increased costs. According to Army, EPA, state of Colorado, and Shell officials, long-standing disagreements and extensive studies have diverted key staff and contractors away from the cleanup program and driven costs up. In the 20 years since the installation restoration program began, the Army and Shell have spent about \$1 billion to study and control the environmental damage. The majority of the cost has been for studying the site and resolving disagreements. Totaling \$354 million as of December 1994, the Arsenal's study phase is the costliest in the history of DOD's cleanup program.³ However, about \$316 million was spent on interim remediation projects to cut off contamination pathways. These actions may contribute significantly to permanent solutions. (App. III contains a time line of the Arsenal's installation restoration program.)

Extensive Debate Over Cleanup Remedies

The most recent delay in adopting a cleanup plan for the Arsenal was caused by disagreements over cost-effectiveness and alternative cleanup remedies. EPA's and the state of Colorado's initial cleanup proposals were estimated to cost about \$2.7 billion; Shell Oil Company's was \$1.6 billion;

³Unless stated otherwise, cost data in this report are based on documents provided by the Army and DOD's March 1995 annual report to Congress. An updated version of DOD's annual report was released several months later and the adjusted data had not yet been verified at the time of this report. For example, DOD's revised report reduced the Arsenal's study costs by about \$95 million. DOD has not yet provided the support for that change.

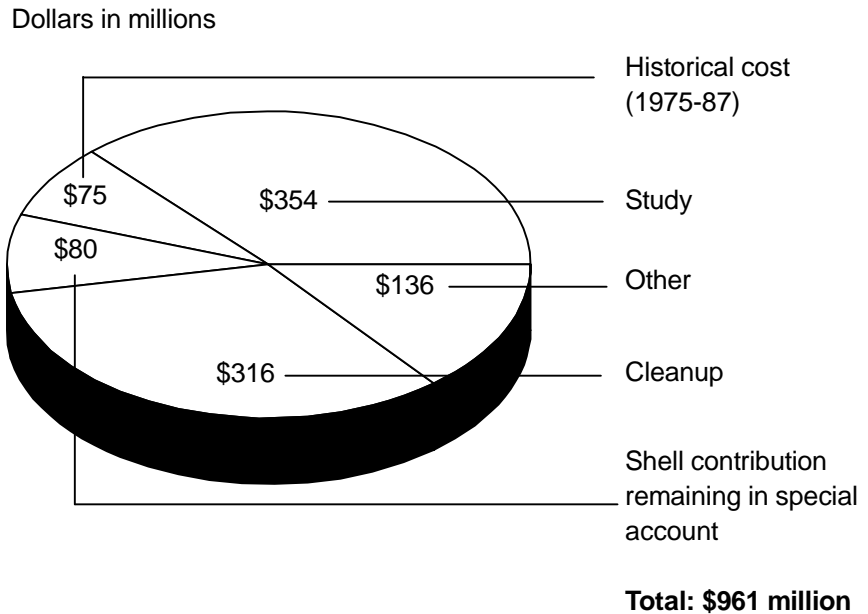
and the Army's was in the middle, at about \$2.1 billion. According to officials from the Army, EPA, and the state of Colorado, the 2-year debate involved how to clean up contaminated soils on the Arsenal and contaminated water off the Arsenal.

- All parties agreed that soils should remain on-site, because moving them off-site would be prohibitively expensive. However, while the Army and Shell suggested that untreated soils be capped in place to prevent the spread of contaminants, EPA and the state suggested that contaminated soils should be treated to neutralize them, before they are capped or placed in a landfill.
- The key off-post issue involved groundwater quality standards for water contaminated with DIMP, a by-product of nerve agent production. In 1993, the state promulgated a drinking water standard of 8 parts per billion. The Army and Shell wanted to continue to pump and treat the water to meet EPA's health advisory of 600 parts per billion, while the state wanted the Army to provide the residents with an alternative water supply.

Costliest Study Phase in DOD History

Largely due to the volume of lawsuits, formal disputes, and other disagreements, the Rocky Mountain Arsenal has experienced the costliest study phase in DOD's history. According to DOD reports, the Arsenal's study costs represent at least 16 percent of the Army's total study costs for about 1,200 installations. The Arsenal's study phase began more than 20 years ago and was completed recently, in October 1995, when the Army requested public comment on its preferred remedy. As of December 1994, Shell and the Army had spent approximately \$354 million on studies, which represents about 37 percent of the total costs incurred by Shell and the Army at the Arsenal. Figure 1 shows shared cleanup costs by category.

Figure 1: Shared Rocky Mountain Arsenal Cleanup Costs by Category
(as of December 1994)



Note: Army officials could not break historical costs into study and cleanup. The "other" category includes some costs for program management, facilities operations, the fish & wildlife program, and advisory boards. The "study" category also includes some program management costs, but officials were unable to determine how much.

Over 400 studies have been conducted at the Arsenal since 1983. Approximately 14,000 samples were taken and 230 reports were produced during the study phase. Although the complexity of the site warranted study, according to Army, EPA, and state officials, the litigation and other disputes encouraged excessive and duplicative studies. For example, had the parties come to an earlier agreement on the installation's future use and on levels of ecological standards, some of the studies might have been avoided.

Relationships among the key parties have been strained by differences throughout the history of the cleanup program, but particularly since 1983 when two major lawsuits were filed.

The Army sued Shell, and the state of Colorado sued the Army and Shell to recover compensation for natural resource damages and cleanup costs. The state sued the Army again in 1986 to enforce regulatory authority over parts of the cleanup. Although the Army and Shell settled their suit in 1988, the first Colorado case has not yet been resolved and the second case went to the U.S. Supreme Court. In January 1994, the Supreme Court refused to hear the case, letting stand the lower court's decision in favor of Colorado's jurisdiction. The key parties' exhaustive efforts to resolve their legal disputes involved 7 years of assistance from a court-appointed mediator. (See app. IV for a detailed chronology of major legal actions involving Rocky Mountain Arsenal.)

In addition to the lawsuits, more than 140 issues have been taken to formal dispute since 1987 under the Federal Facility Agreement, which allows the parties to dispute Army decisions. Disputes have been triggered by a variety of technical issues, often requiring further studies to resolve the controversy. For example, the parties disagreed about what level of dieldrin is considered safe in soil. The Army, EPA, and Shell have all conducted and evaluated studies on this issue, yielding different results and reaching different conclusions. This dispute was invoked in December 1987 and is still not resolved. According to Army, EPA, and state officials, study results are particularly sensitive because precedents set at the Arsenal could potentially have ramifications for Shell Oil Company at its other locations.

Interim Response Actions Addressed Critical Threats

Although final cleanup has not begun, the Army and Shell have made efforts to mitigate the most critical threats at the Arsenal. As of December 1994, they had spent about \$316 million on source control and interim actions designed to provide immediate containment or treatment of some of the more highly contaminated areas. Early assessments, conducted between 1975 and 1985, identified ways to minimize the potential for exposure to and migration of contaminants. Resulting projects included the installation of three groundwater treatment systems at the Arsenal's boundary, the closure of an abandoned well, and the removal of sewer lines known to be a source of soil and groundwater contamination.

Building on earlier source control efforts, the Army began its interim actions in 1986 to control immediate problems while the final cleanup solutions were being determined. The resulting 14 interim actions were designed to be consistent with long-term comprehensive cleanup on and

off the Arsenal. Two of these, the incineration of liquid waste from the Arsenal's major disposal basin and the removal of asbestos, have permanently removed the hazardous materials. Table 1 shows, for each of the 14 actions, the start date, actual or estimated completion date, and the actual or estimated cost as of December 1994.

Table 1: Interim Response Actions and Other Interim Cleanup Actions (as of December 1994)

Dollars in millions			
Interim response actions	Start date	Completion date	Cost
Off-post groundwater treatment system	5/87	2/94	\$19.6
Groundwater boundary systems	5/87	7/93	14.5
Groundwater treatment system north of basin F	5/87	9/90	4.5
Abandoned well closure	5/87	2/90	5.5
Groundwater treatment system in basin A neck area	5/87	7/90	4.1
Basin F liquids, sludges, and soil remediation	10/86	9/95	127.8
Building 1727 sump liquid	5/87	11/89	0.1
Closure of the hydrazine facility	5/87	9/92	13.8
Fugitive dust control	5/87	^a	0.7
Sewer remediation	5/87	9/92	11.6
Asbestos removal	5/89	12/96	16.5
Remediation of other containment sources	9/88	8/94	14.0
Wastewater treatment facility	5/87	2/93	9.1
Chemical process-related activities	4/91	12/96	44.2
Subtotal			\$286.0
Other interim cleanup ^b	0	0	30.0
Total			\$316.0

^aApplication of dust suppressant materials to areas of basin A will continue annually until a final remedy is completed.

^b"Other interim cleanup" represents Army cleanup paid out of the Shell special account.

Source: U.S. Army.

Cleanup Plan Expected, but Uncertainties Remain

If the parties are successful in adopting the on- and off-post cleanup plans as expected in 1996, the final cleanup can begin. The conceptual agreement reached in June 1995 resolved the major disputes and outlined a \$2.1-billion cleanup to be completed in 2012. However, the current cost

and completion targets may be overly optimistic given remaining uncertainties about the final details. In addition, costs have significantly increased over time at the Arsenal.

Cleanup Agreement Outlines Final Cleanup Remedy

According to the conceptual agreement, the parties are expected in 1996 to adopt a final cleanup plan or record of decision for a \$2.1-billion cleanup effort. Although most of the cleanup is expected to be accomplished by 2012, groundwater treatment and monitoring will continue for at least 30 years. The conceptual agreement resolves the two most significant disputes among the parties, regarding contaminated soils on site and contaminated groundwater off site.

The parties agreed that a portion of basin F, the most contaminated of the basins, will be solidified in place through a technique that binds the soil together to minimize the release of contaminants but does not destroy them. Contaminated soil excavated from the basin in 1988 will be removed from the basin area and contained, along with other highly contaminated portions of the Arsenal, in a hazardous waste landfill. The basin will then be capped.

The parties also agreed on demolition and on-site disposal for buildings in the manufacturing areas. Structures with high levels of contamination, such as agent residues, may be treated to reduce the contamination before they are placed in the landfill. Structural debris that is uncontaminated or has low levels of contamination will not be disposed of in the landfill; it will be consolidated in the other major basin, basin A, and capped.

Regarding off-site contaminated groundwater, the parties agreed to continue operating existing groundwater treatment systems at the Arsenal's boundary, where the water will be treated to meet Colorado's groundwater standard of 8 parts per billion of DIMP. The Army and Shell will also supply clean water to residents living near the Arsenal's boundaries.

Cleanup Estimates May Be Optimistic

The parties agreed in concept on a \$2.1-billion cleanup, but until the record of decision is finalized, the cost and time frame estimates remain uncertain. The cleanup estimate reported to Congress just prior to the June settlement called for \$2.3 billion in appropriated funds, in addition to

Shell's \$500-million share, for a total of \$2.8 billion.⁴ According to Army officials, the \$2.8 billion represented a reduction from a \$3.6-billion estimate prepared just 2 months earlier. The Army did not have a detailed analysis at the time of our fieldwork that explained how the conceptual agreement reduced the estimate to \$2.1 billion. The Army expects to complete its analysis for the May 1996 record of decision.

The Army's projected cost estimates and cleanup dates have changed significantly since 1984. The \$2.1 billion estimated for the conceptual agreement is 10 times greater than the best case estimate released a decade ago. The 1984 projections of a record of decision by 1990 and cleanup by 2000 are now estimated for 1996 and 2012, respectively.

The cost and completion schedules recently established could be affected by numerous uncertainties. Budget limitations that reduce the scope or extend the life of the cleanup, cleanup complications, and evolving standards could drive up costs and extend time frames. In July 1994, we reported Army officials' concern that stricter state standards could increase cleanup costs at the Rocky Mountain Arsenal by at least \$1 billion.⁵ Although the conceptual agreement should make this less likely, Army officials noted continuing uncertainties regarding the scope of the state's regulatory authority. In addition, the Army's \$2.1-billion cleanup estimate does not include an estimated \$200 million for inflation, or costs of long-term operations and maintenance for the off-post treatment facility.

Army Will Pay the Majority of Costs Under Cost-Sharing Arrangement

Under the cost-sharing agreement between the Army and Shell, Shell's share of cleanup costs decreases on a sliding scale from 50 percent to 20 percent as total costs increase. The agreement was reached in 1989, when the cost estimates were lower than now. According to officials from the Army, EPA, and the Department of Justice, the formula was based on the best available knowledge of risk and damages at the time.

However, Shell's share of total costs has dropped significantly as cleanup costs exceeded the early estimates; the current estimate is more than 3 times higher than estimated at the time of the settlement. According to Arsenal and Shell officials, the Army will pay about \$1.6 billion, and Shell

⁴Defense Environmental Restoration Program, Annual Report to Congress for Fiscal Year 1994 (Mar. 31, 1995).

⁵Environmental Cleanup: Inconsistent Sharing Arrangements May Increase Defense Costs (GAO/NSIAD-94-231, July 7, 1994).

about \$500 million toward the \$2.1 billion cleanup. When the permanent cleanup begins, Shell's 20 percent share of the costs will be significantly less than its share of remaining contaminants.

Cost-Sharing Formula

Because its operations contributed to the contamination problem, Shell agreed to pay a portion of the cleanup costs. The cost-sharing formula divides cleanup costs equally between the Army and Shell for the first \$500 million of allocable or shared costs, but then reduces Shell's share to 35 percent of the next \$200 million of these costs, and 20 percent of all allocable costs exceeding \$700 million. Each party agreed to absorb its own program management costs. "Army-only" and "Shell-only" costs, for contamination solely attributed to each party, are also excluded from the allocable formula.

When the Army and Shell adopted the cost-sharing formula, cleanup costs were expected to be less than \$700 million, not the currently estimated \$2.1 billion. Even though the permanent cleanup is not yet underway, the parties have already arrived at the second level of the cost-sharing formula; allocable costs reached \$500 million in 1994. According to Army, EPA, and state officials, Shell's 20-percent share of the final costs has an inverse relationship to its share of remaining contaminants that are to be cleaned up. They stated that from a risk management perspective, the contaminants driving the majority of the final cleanup costs will be those related to Shell's production activities.

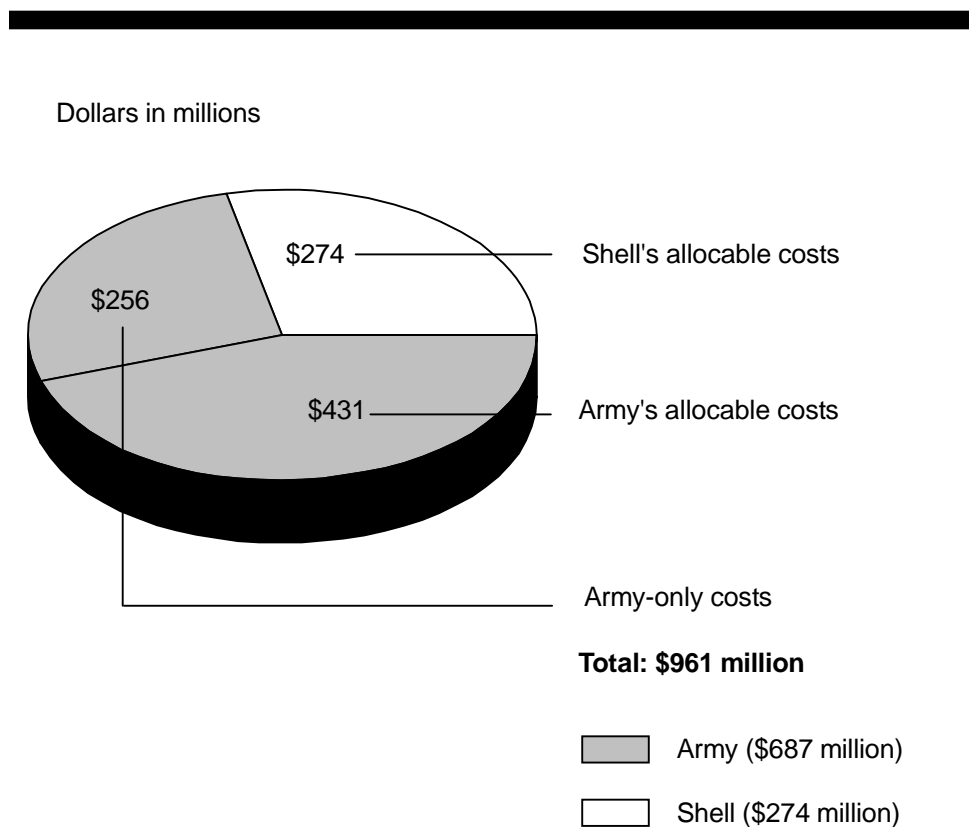
According to Army and EPA officials, the cost-sharing formula was negotiated when much less was known about the extent of Arsenal contaminants and associated risks. In addition, an Army attorney said that the decision to reduce Shell's share as costs increased was an equitable way of recognizing that the Army owned the installation and the disposal systems that Shell used. In retrospect, these officials noted that a declining formula is probably not the best approach to use in allocating shares, particularly early in the study phase before the contaminants have been fully characterized.

Army and Shell Expenditures to Date

The Army and Shell have already spent nearly \$1 billion of the current \$2.1-billion estimate. As of December 1994, the Army had spent about \$687 million of its estimated \$1.6-billion share and Shell had contributed about \$274 million of its expected \$500-million share. The Army's \$687-million share breaks down into about \$431 million in shared or

allocable costs and \$256 million in Army-only costs. Total allocable costs paid by both parties represent about \$589 million of the total. Although Shell contributed about \$274 million toward the allocable costs, the Army has not yet spent \$80 million of this amount. Figure 2 shows Army and Shell expenditures as of December 1994.⁶

Figure 2: Costs Incurred at Rocky Mountain Arsenal (as of December 1994)



Note: Allocable means shared costs. About \$80 million of Shell's \$274 million contribution remains unspent in a special Army account.

⁶After our fieldwork was completed, Shell provided summary data on Shell-only costs showing it spent \$95 million from 1984 through December 31, 1995 related to the Arsenal. However, Shell officials stated they could not break the costs out by year or by category, such as for remediation, although they believe the cleanup amount to be minimal. Therefore, these Shell-only costs are not included as part of our analysis.

The Shell Account

Shell pays its share of cleanup costs directly to a government account. As of December 1994, Shell had contributed about \$274 million of the \$500 million it is expected to pay. About \$116 million of the \$274 million was deposited into the Shell account, and the other \$158 million represented costs Shell incurred directly at the Arsenal. Shell was credited, for example, for conducting one of the Arsenal's costliest projects—the incineration of liquid waste.⁷

Legislation restricts use of Shell's reimbursements to cleanup projects at the Arsenal. As of December 1994, the Army had spent approximately \$36 million from the \$116 million that Shell had deposited into the account, leaving about \$80 million for future obligations. The funds are retained by the U.S. Treasury until they are requested.

According to Army officials, the funds in the Shell account are generally not used to offset budget requirements. Rather, the funds are used to supplement appropriations from the Defense Environmental Restoration Account. The Arsenal's annual work plans outline requirements for appropriated funds, and those requirements are rolled up and consolidated into a DOD budget request. Therefore, according to these officials, the Shell funds are not visible in the budgeting process as requests proceed from the Army to DOD and Congress and do not influence funding decisions. Officials said it is not feasible to use the Shell funds to offset budget requirements in most instances because they do not represent a steady fixed flow and they are not fiscal year specific. The Arsenal's allocation for fiscal year 1995 was about \$70 million, which is less than the balance available in the Shell account.

Agency Comments and Our Evaluation

In discussing a draft of our report, DOD officials agreed with the report's findings and conclusions. Their comments have been incorporated where appropriate.

Scope and Methodology

We performed our work at the Rocky Mountain Arsenal, Commerce City, Colorado; EPA's Region VIII headquarters; and the Colorado Department of Health, Denver. To determine the status of the cleanup work at the Rocky Mountain Arsenal, we attended public hearings and reviewed applicable documents and records maintained by DOD and EPA. We also interviewed

⁷In a related assignment, we are reviewing the nature and appropriateness of the costs incurred by Shell.

officials from the Departments of the Army, the Interior, and Justice; EPA; and the state of Colorado.

To assess plans for future cleanup at the Arsenal, we interviewed officials from the Army, EPA, the Fish and Wildlife Service, and the state of Colorado. We also reviewed the Federal Facility Agreement and the conceptual agreement for Arsenal cleanup. To understand the cost-sharing arrangement between the Army and Shell, we reviewed the settlement agreement, financial manual, and other pertinent documents. We also interviewed officials from the Army, EPA, and the Department of Justice.

We conducted our review from October 1994 to January 1996 in accordance with generally accepted government auditing standards.

Unless you publicly announce its contents earlier, we plan no further distribution of the report until 30 days after its issue date. At that time, we will send copies to appropriate congressional committees; the Secretaries of Defense and the Army; the Administrator, EPA; and the Director of the Office of Management and Budget. We will also make copies available to others upon request.

Please contact me on (202) 512-8412 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix V.



David R. Warren, Director
Defense Management Issues

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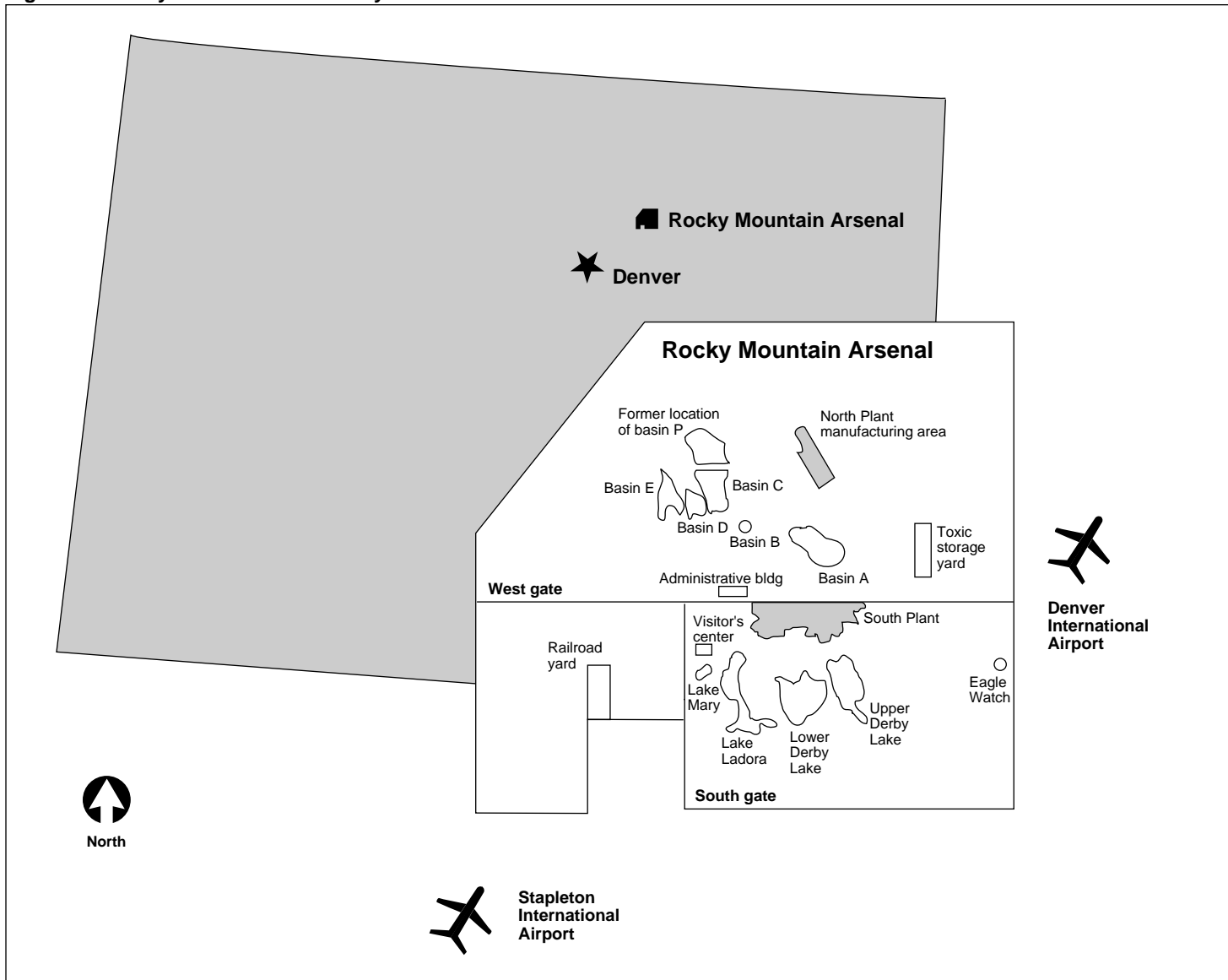
Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DIMP	diisopropyl methyl phosphorate
DOD	Department of Defense
EPA	Environmental Protection Agency

Arsenal Layout

Located 9 miles northeast of downtown Denver, Rocky Mountain Arsenal is adjacent to the communities of Commerce City, Montbello, and rural Adams County. Key physical features of the Arsenal include the north and south chemical manufacturing complexes, numerous pits and trenches, and a series of man-made lakes and basins A through F. Liquid waste from the two manufacturing complexes was discharged into basins A, B, C, D, and E, a series of unlined waste evaporation ponds. In the mid-1950s, the Army discharged all liquid waste to basin F, a newly constructed asphalt-lined waste basin. Solid waste was disposed of in the trenches and pits. The man-made lakes were used to provide process and cooling water to facilities within the south plants area. (See fig. I.1.)

Figure I.1: Rocky Mountain Arsenal Layout



Comprehensive Environmental Response, Compensation, and Liability Act Process

Preliminary Assessment

The initial stage of the cleanup program is an installationwide study to determine if sites are present that pose hazards to public health or the environment. Available information is collected on the source, nature, extent, and magnitude of actual and potential hazardous substance releases at sites on the installation.

Site Inspection

The next step consists of sampling and analysis to determine the existence of actual site contamination. Information gathered is used to evaluate the site and determine the response action needed. Uncontaminated sites do not proceed to later stages of the process.

Remedial Investigation

Remedial investigation may include a variety of site investigative, sampling, and analytical activities to determine the nature, extent, and significance of the contamination. The focus of the evaluation is determining the risk to the general population posed by the contamination.

Feasibility Study

Concurrent with the remedial investigations, feasibility studies are conducted to evaluate remedial action alternatives for the site to determine which would provide the protection required.

Remedial Design

Detailed design plans for the remedial action alternative chosen are prepared.

Remedial Action

The chosen remedial alternative is implemented.

Interim Remedial Action

Remedial actions can be taken at any time during the cleanup process to protect public health or to control contaminant releases to the environment.

Installation Restoration Program Timeline

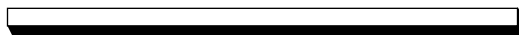
Preliminary assessment/restoration program
1975-1978



Initial source control actions
1979-1985



Remedial investigation
1984-1991



Endangerment assessment
1986-1994



Interim response actions
1986-present



Feasibility study
1988-present



Record of decision
1996



1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996

Legal Actions Affecting the Rocky Mountain Arsenal

1982	Memorandum of Agreement signed by state of Colorado, the Army, Shell Oil Company, and the Environmental Protection Agency.
1983	U.S. Army litigation against Shell Oil Company for natural resource damages and cleanup costs.
1983	State of Colorado filed suit for damages to natural resources and state money spent responding to contamination.
1986	Memorandum of Agreement considered invalid. Colorado filed suit to enforce Army compliance with the Resource Conservation and Recovery Act on basin F.
1988	Army and Shell Oil Company settled 1983 suit by signing consent decree.
1989	State of Colorado won the 1986 suit and issued an administrative order requiring the Army to follow its closure plan at basin F; Army filed suit disputing administrative order.
1991	Court granted Army's motion and affirmed EPA's role as final authority at Rocky Mountain Arsenal; state appealed.
1993	10th Circuit Court of Appeals ruled in favor of Colorado.
1994	Army appealed to U.S. Supreme Court. Certiorari denied.

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