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# NAVAL POSTGRADUATE SCHOOL Monterey, California



## THESIS

**COMPARISON OF ENVIRONMENTAL REMEDIATION CONTRACTING  
APPROACHES BETWEEN THE DEPARTMENT OF DEFENSE AND THE  
PRIVATE SECTOR**

by

Richard A. Paquette

December 2001

Thesis Advisor:  
Associate Advisor:

David F. Matthews  
Cary Simon

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**COMPARISON OF ENVIRONMENTAL REMEDIATION CONTRACTING  
APPROACHES OF THE DEPARTMENT OF DEFENSE AND THE PRIVATE  
SECTOR**

Richard A. Paquette  
Lieutenant, United States Navy  
B.S., United States Naval Academy, 1994

Submitted in partial fulfillment of the  
requirements for the degree of

**MASTER OF SCIENCE IN MANAGEMENT**

from the

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December, 2001**

Author:



Richard A. Paquette

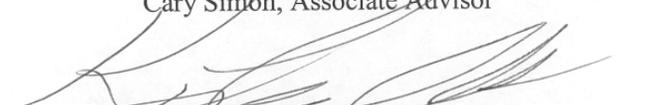
Approved by:



David F. Matthews, Thesis Advisor



Cary Simon, Associate Advisor



Kenneth J. Euske, Dean, Graduate School of Business and Public  
Policy

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## **ABSTRACT**

With the price tag for environmental remediation over the past twenty years exceeding \$1 trillion and the costs expecting to exceed \$500 billion over the next twenty years, there is a tremendous need to study the area of environmental remediation contracting. The concurrent tracts of increasing environmental scrutiny, a down-sizing defense industrial base, and a major effort to reform the Government acquisition system has generated an opportunity to review how the private sector contracts for environmental remediation and apply any applicable best practices to the Department of Defense contracting system. Key findings of this study are (1) there is no readily available process from either the commercial sector or the Department of Defense that will suffice as a template for all environmental remediation efforts, (2) the Department of Defense has no centralized repository of environmental remediation contracting knowledge, (3) Legislative and regulatory hurdles exist which impede assimilation of new initiatives in the remediation of former the Department of Defense facilities, and (4) the utilization of incentive type contracts for environmental remediation is not producing the expected innovation and improvements in contractor performance.

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## I. INTRODUCTION

*Greater use of commercial buying practices is key to improving Government acquisition...We continue to review our statutory framework to ensure it allows our acquisition workforce to pursue innovation and implement new commercial practices as they develop.* Deidre Lee, Administrator for Federal Procurement Policy, March 2000

*The Administration is steadfast in its commitment to transferring closing bases to communities as quickly and as safely as possible. Given the many challenges associated with the closing of an installation and the transfer of the property, innovative approaches to the base closure process, in which cleanup plays a major role, must be taken.* Sherri W. Goodman, Deputy Under Secretary of Defense for Environmental Security, June 1995

*The sharp decline in defense business, and the resultant mergers, acquisitions and bankruptcies of defense companies, is causing a dramatic shrinkage in the defense industrial base.* Secretary of Defense William Perry, 1994

*Federal Facilities, including military bases, must meet environmental standards...As the largest Federal agency, the Department of Defense has a great responsibility to meet this challenge. It must be a command priority at all levels. We must demonstrate commitment with accountability for responding to the Nation's environmental agenda. I want every command to be an environmental standard by which Federal agencies are judged.* Secretary of Defense Dick Cheney in a Memorandum to all Facilities Commanders, 1989

### A. WHY ENVIRONMENTAL REMEDIATION AND WHY NOW?

Acquisition reform, base closures, defense industry contraction, and the environment, these topics have dominated the headlines of newspapers, Government journals, and Congressional hearings since the 1990s. The interest of the Administration, the Congress, and the public was clearly focused on these themes and the introductory quotes help to capture the significance of these issues to the senior leadership throughout the Department of Defense (DOD). That these topics are still in the headlines of major newspapers today, further stresses the importance of these topics for the uniformed and civilian personnel of DOD.

A proper starting place for a discussion of these important topics begins with the rise of environmentalism. The 1960s, 1970s, and 1980s capture the early evolution of this movement. In the space of three decades, industrial processes that had been utilized

for over a hundred years became the target of public concern, lawsuits, and regulation. The list of legislation and the amount of oversight has only increased in the 1990s. This trend can only be expected to continue as even more stress is placed on the Earth by a growing population. With the increasing scrutiny and limitations placed on environmental issues, the cleanup of both current and former industrial sites began in earnest. The costs and time required for this cleanup are truly staggering. Over the past twenty years the United States has invested over \$1 trillion in environmental protection. (Hill, 2000) The United States is not alone in this regard. Worldwide, nations and corporations both large and small have been footing the bill to repair the environmental damage done by industrial activity.

Coupled with the impetus to cleanup the environmental damage at industrial and manufacturing facilities worldwide, another factor has come into play. The end of the Cold War and subsequent decrease in Defense budgets has led to four rounds of base closures. This process, often referred to as the Base Realignment and Closure Acts (BRAC), was carried out in 1988, 1991, 1993 and 1995. The BRAC legislation led to the decision to close over 311 DOD facilities. (GAO, 1996) In fact, the Bush administration has been hinting at even further rounds of base closures. (Dao, 2001) The desire to quickly close down, cleanup, and turnover surplus Federal property is apparent. The sooner the facilities can be turned over to other entities, the quicker savings can be realized from the reduction in DOD infrastructure.

However, before formerly utilized defense sites (FUDS) can be sold, transferred, or redeveloped, they must be environmentally remediated to the level required for subsequent reuse or have all applicable remediation processes in operation. (Shurtleff, 2001) The need to effectively identify, treat, and restore contaminated parcels of property led to a process known as environmental remediation. In order for the identification and cleanup to begin, a contract must be developed that will ensure a successful end result. This has generated the field of environmental remediation contracting.

While there has been a much-publicized story over the closure of hundreds of Federal facilities during the BRAC process, the defense industrial base has undergone a

similar reduction in size due to both reductions in the Defense budget and fierce business competition. (Perry, 1994) “For example, today in the United States there are 5 large defense companies that in 1990 were 33 separate businesses.” (GAO, 2000) These large corporations have closed numerous assembly and manufacturing plants that have many of the same types of contaminants as DOD facilities.

With both DOD and the private sector closing many installations and having to abide by the same regulations in regards to environmental cleanup before transfer or sale, the opportunity exists for a study of the process by which each contracts for the remediation of former industrial sites. (Chesnutt, 2001) This comparison is also in keeping with the significant reforms that have been added to the Federal acquisition system during the 1990s as the Government sought to incorporate the best practices of the commercial sector in purchase of services and supplies.

Thus with such a great deal of money involved and such immense public concern for safe and quick remediation of former bases, there should be a corresponding number of directives, training, and procedures to assist in the genesis of an environmental remediation contract. Sadly, this is not the case. In fact, quite the opposite is true. While there are shelves of books on the process of cleaning up toxins in the environment there is a disconcerting lack of information that covers the unique aspects of writing contracts for this endeavor. Furthermore, the Federal acquisition system, which contains reams of guidance on the procurement of major weapon systems, computer networks, and performance-based service contracts, has no corresponding section in the Federal Acquisition Regulation (FAR) that specifically mentions environmental remediation contracting.

## **B. BACKGROUND**

With the hefty cost and time required to remediate a distressed property, and the need for both DOD and the commercial sector to realize a profit (or savings in DOD’s case), an effective environmental remediation contract is required. Conservative estimates place the cost of remediating DOD’s sites at over \$200 billion and a figure in the trillions is applicable for businesses worldwide. (Hill, 2000) Furthermore, these

dollar values and the estimates on when the cleanups will be completed have been continually revised upward in cost and to the right in schedule. The degree of these increases would make the Navy's A-12 stealth bomber program proud.

While cost over runs and schedule slippage can be found in many major programs, and criticism of them abounds, the remediation of former sites has a unique additional factor added into the mix. The emotional aspect of both the closing of a facility, be it DOD or commercial, and the threat to the environment and the health of the surrounding communities leads to a very large degree of scrutiny and need for a rapid redevelopment of the property for economic reasons and cleanup of the site for health concerns. (Koon, 2001) These factors are not present in any other type of contracting action pursued by Acquisition professionals be they in the DOD or a private firm.

This emotional factor must be remembered throughout this thesis as underlying every action and step undertaken in contracting for the remediation of a distressed property. Unfortunately it is difficult, if not impossible, to quantify this emotion in any type of meaningful way. However, this researcher can provide numerous examples of this by offering to the reader the opportunity to attend any Fort Ord Reuse Authority meeting. By attending these public gatherings the rationale for attaching such importance to environmental remediation contracting is readily apparent.

### **C. AREA OF RESEARCH**

This research evaluates the issues associated with environmental remediation contracting within the DOD and among large corporations. It considers which elements of environmental contracting are considered to be the most important to both DOD and the commercial sector. The current methodologies of both DOD and commercial firms are discussed and analyzed to determine applicable best practices.

This thesis investigates any new contracting techniques and processes that are being generated to help manage this important area of contracting. This section will assist contracting officers in creating and modifying innovative ideas to aid in their quest to successfully contract for the remediation of formerly utilized sites, both commercial and Federal.

## **D. RESEARCH QUESTIONS**

The following research questions are addressed in this study:

### **1. Primary Research Question**

What are the strengths and weaknesses of the various environmental remediation contracting approaches utilized by the DOD and private sector participants?

### **2. Subsidiary Research Questions**

To answer the primary question listed above, it is necessary to address the following subsidiary research questions:

- a. What are the key similarities in the environmental remediation contracting methods utilized by DOD and the private sector?
- b. What are the key differences in the environmental remediation contracting methods utilized by the DOD and the private sector?
- c. What are the main emerging trends in the field of environmental remediation contracting?

## **E. SCOPE, LIMITATIONS AND ASSUMPTIONS OF THIS THESIS**

This study includes the many Federal Agencies that are involved in the process of writing environmental remediation contracts. These agencies are the U.S. Army Corps of Engineers (USACE), the Naval Facilities Engineering Command (NAVFAC), and the Office of the Under Secretary of Defense for Environmental Security. Numerous, large commercial firms were also contacted to ascertain their remediation contracting processes. While some individuals contacted wished to remain anonymous, some of the commercial corporations are: Boeing, Lockheed Martin, Northrop Grumman, General Dynamics, General Electric, and Raytheon. The U.S. Environmental Protection Agency and various equivalents at the State level were also included in this study for their inputs on the regulatory issues confronting environmental remediation. Finally, a host of

Environmental Remediation firms were contacted to help differentiate between the best practices of both the DOD and private industry. Many of the remediation companies had conducted cleanups for both DOD and various commercial firms. The information they provided on the differences in contracting approaches by the DOD and private sector was of great value to the research conducted.

### **1. Scope**

The unique and very complex nature of environmental remediation contracting necessitated reviewing a large number of case studies, lessons learned, and written reports. While this review is important to the conclusions presented by this thesis, it is impossible to accurately capture all of the difficult relationships, trade-offs, and issues encountered when an environmental remediation effort is undertaken. In essence, every action is unique, but there are many similarities and over arching guidance can help prevent duplication of effort and making critical mistakes in the process.

### **2. Limitations**

While this thesis is investigating the environmental remediation industry and the process utilized to cleanup FUDS, there are some important limitations that need to be addressed. First, due to the DOD-unique aspects of unexploded ordinance (UXO) and nuclear/chemical/biological (NBC) wastes, these substances will not be included in the discussion. Furthermore, the researcher has decided to only study the Department of the Navy and the Department of Army's approaches to environmental remediation. While the Air Force has its own unique terminology and methods for cleaning up environmental waste, they were left out due to the limited time and resources available to the researcher.

### **3. Assumptions**

The researcher assumes that the reader of this thesis has some familiarity with the Environmental Remediation Industry and the acquisition and contracting field. Additionally, definitions for words used throughout this thesis are provided in Appendix A.

## **F. METHODOLOGY**

This study involved a comprehensive literature search of books, magazines, newspapers, Government reports, and internet-based materials. Much of the information garnered was obtained from the Dudley Knox Library, Defense Technical Information Center (DTIC), and the World Wide Web.

Twenty-two personnel were interviewed both within DOD and the private sector. These semi-structured interviews were conducted over the phone and in person, when available. The list of questions that were asked during these interviews is included as Appendix B. It is important to note that this list was a general guide and much of the best information in each interview was developed during in-depth discussions of the process involved in environmental remediation contracting.

## **G. BENEFITS OF STUDY**

With such immense amounts of money involved in the cleanup of formerly utilized sites, the high level of press and media interest, and the aforementioned emotional issues involved in ensuring a speedy cleanup, an effective and flexible contracting vehicle is a requirement. Furthermore, the distinct lack of information readily available to contracting officers on this important subject supports the need for this study. In addition, with a clear mandate for inclusion of the best practices of the commercial sector in DOD acquisition approaches, the benefits of this study are apparent.

In short, this research should benefit all who are required to be involved in the contracting for an environmental remediation. This includes such diverse individuals as contracting officers, contracting specialists, technical specialists, elected officials both local and National, and citizens of the communities that surround any remediation efforts.

## **H. ORGANIZATION OF THE THESIS**

Chapter I, “Introduction” outlines the thesis proposal and benefits. It describes the background, purpose, research questions, research methodology, limitations and assumptions, and thesis organization.

Chapter II, “Background,” presents the reader with a brief list of the most important environmental legislation. The second section provides a brief historical overview of the Environmental Movement and the importance of successfully remediating and turning over excess Federal properties.

Chapter III, “Similarities and Differences,” explores the current processes utilized by the DOD and the private sector to environmentally remediate formerly-utilized sites. This chapter concludes by listing some of the newest ideas, pilot programs, and initiatives underway in both DOD and the private sector to complete environmental remediation quicker, faster, and cheaper.

Chapter IV, “Analysis,” utilizes a strengths, weaknesses, opportunities, and threats (SWOT) analysis to determine the best approaches utilized by DOD and the private sector. The results of the SWOT analysis will be integrated with some lessons learned and studies of environmental remediation contracting to develop a list of best practices.

Chapter V, “Conclusions and Recommendations,” furnishes the independent conclusions drawn from the researcher’s analysis. The researcher will provide several recommendations that will assist DOD in its efforts at environmental remediation contracting. This chapter will also provide answers to the primary and subsidiary research questions. The thesis will conclude by providing suggestions for further research in the area of environmental remediation contracting.

## II. BACKGROUND

### A. INTRODUCTION

Two seemingly unrelated strings of events have occurred over the past three decades that have profoundly affected the environmental contracting activities of the Department of Defense (DOD). These processes have resulted in the current need for information, streamlining, and improvements in the way the DOD environmentally remediates and turns over excess property.

In the 1960s and 1970s, many changes occurred within American society. One of the largest was the start of the environmental movement. The publication of Silent Spring by Rachel Carson in 1962 was a watershed event in this area. Her work was full of horrible stories of chemicals destroying nature and the effects of these pollutants on mankind. The resulting change in public opinion led to a flurry of environmental legislation. The passage of the Clean Air Act (1963), the Water Quality Act (1965), and the National Environmental Policy Act (1969) were the nations first substantial controls on what Americans did to the environment. A comprehensive list of major legislation is included as Appendix A. A brief table presented below quickly summarizes some of the more important pieces of environmental law.

<b>YEAR</b>	<b>ENVIRONMENTAL LAWS, REGULATIONS AND ACTS</b>
1963	Clean Air Act
1965	Water Quality Act
1967	Air Quality Act
1969	National Environmental Policy Act (NEPA)
1970	Clean Air Amendments
1973	Endangered Species Act
1976	Resource Conservation and Recovery Act (RCRA)
1977	Clean Water Act (CWA)
1980	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
1986	Superfund Amendments and Reauthorization Act (SARA)
1992	Federal Facilities Compliance Act (FFCA)
1992	Community Environmental Response Facilitation Act (CERFA)

Table 1. List of Major Environmental Legislation (From: Developed by Researcher)

What is most important about this list is that it represents only a very small fraction of the total number of environmental acts that have been approved by Congress. In addition many of these acts have been heavily modified and amended throughout their existence.

More pointed legislation came into effect after 1979 when two serious incidents demonstrated to all Americans the dangers of hazardous substances in our environment. The radiation leak that occurred at Pennsylvania's Three Mile Island nuclear power plant and the discovery of a toxic waste dump under a housing development in Love Canal, New York, led to the passage of a great many more laws and amendments to existing ones.

While the environmental movement was gathering steam, immense changes in the geo-political environment were taking their toll on the Department of Defense (DOD). First, the armed forces of the United States have been in existence for over 200 years. Throughout this time period, the Services have occupied an almost ever-increasing amount of land. However, with the end of the cold war and the reduction in the defense budgets that followed, it was apparent that numerous military installations would have to be closed. Complicating the base closure issues was that throughout the life spans of these facilities, innumerable toxins and hazardous substances had been leaked into the soil, groundwater, and air. (National Research Council, 1999) As bases began to close and the public began clamoring for turnover of Federal properties, the need to thoroughly identify and cleanup the waste sites that were delaying reuse took on even greater importance.

Thus, with a growing environmental movement in the United States and a drive to reduce the size of the military infrastructure, a need for effective and responsive contracting for environmental remediation services is apparent.

## **B. DEFENSE INDUSTRY CONTRACTION**

While the DOD suffered through the declining budgets of the 1990s, the Defense industrial base was similarly affected. At the outset of the decade there were dozens upon dozens of massive defense-related contractors. However, as money for new procurement dried up and existing production lines ended, an inevitable contraction occurred. A statement by the Secretary of Defense William Perry in 1994 captured the feel of this present trend: “with a procurement budget that has declined more than 60% in real terms since FY85...the sharp decline in defense business, and the resultant mergers, acquisitions, and bankruptcies of defense companies, is causing a dramatic shrinkage in the defense industrial base.” (Perry, 1994)

This industry shrinkage led these contractors to the closing of numerous manufacturing, assembly, and test facilities. The closures of so many plants and industrial sites became just one more business process that had to be endured. Senior managers at many of these defense contractors continually sought ways to rapidly divest

themselves of this excess capacity and turn these liabilities into money generating assets. (Senior Manager #1, 2001)

Furthermore, these corporate down-sizing efforts were completed under the same regulatory guidance, same real estate market, and with the same pressures from the public for a rapid cleanup and turnover of facilities to help generate jobs and income for the affected communities. (Simonson, 2001) Therefore, these corporations will have current and relevant knowledge of and lessons learned from the environmental remediation of their formerly utilized sites.

### **C. TAILOR MADE FOR ACQUISITION REFORM**

With both DOD and the major defense contractors closing facilities during the 1990s and into the 21<sup>st</sup> Century, there exists an opportunity to study how each component plans and contracts for the environmental remediation of excess infrastructure. In fact, the latter half of the 1990s was a period of great discussion on acquisition reform and the importance of incorporating the best practices of the commercial sector into Federal procurement policy. Dr. Jacques Gansler, Under Secretary of Defense for Acquisition, Technology, and Logistics stated: “the next phase of acquisition reform will expand on current and past efforts to revolutionize the way we do business as we concentrate on further adapting commercial best practices to Defense needs.” (Brewin, 1998)

Even more recently, Deidre A. Lee, the Administrator for Federal Procurement Policy, speaking to the Committee on Government Reform stated: that her first priority in procurement reform is “greater use of commercial buying practices is the key to improving Government acquisition...We continue to review our statutory framework to ensure it allows our acquisition workforce to pursue innovation and implement new commercial practices as they develop.” (Lee, 2000) The mandate to review and include all applicable commercial “best practices” is clear. The environmental remediation industry is certainly no exception.

#### **D. THE SCOPE**

The true magnitude of the cost, in both time and money, of the environmental remediation effort is staggering. The estimates for the complete cleanup of all closing DOD properties is currently set at \$18 billion and will take more than 70 years to conclude. (GAO, 2001). The addition of the commercial sector brings the number of contaminated sites to greater than 200,000 and cost estimates from \$187-\$750 billion. (National Research Council, 1999) Even more disturbing is that these numbers have continued an inexorable upward trend and even the best auditors have no idea where the actual end point is in terms of time and money. (Staff Member, Deputy USD for Environmental Security, 2001)

Environmental remediation is also affecting governments and corporations worldwide. A mining company in France is expecting to pay \$160 million to cleanup a former mine shaft that has been oozing toxins into the ground water. (Bailey, 2001). In Japan, a mothballed aerospace factory was atop a plume of trichloroethylene that was 16,000 times the allowable limit and will cost \$20 million to cleanup. The total price tag to remediate all of Japan's toxic sites is approximately \$122 billion. (Dawson, 2001) These two examples are only a brief glimpse at [into?] a worldwide epidemic that both the public and the lawmakers are demanding be dealt with.

#### **E. LITERATURE**

With the magnitude of this problem so far-reaching and the costs running into the hundreds of billions, it would seem likely that there would be numerous instructions on how to draft an environmental remediation contract. There would also be volumes of lessons learned, studies on the process, and several books on the best business practices that need to be followed to ensure an on-time and on-budget remediation. Strangely, there exists no such wealth of information. This researcher has spent months searching for even the most obtuse references and found them sorely wanting.

What is even more disturbing is that the Federal Government, which seems to have a regulation or directive on how to do everything from buying office paper to airline

tickets, has little to no direct guidance on how to write an effective environmental remediation contract.

Finally, despite the calls for reviewing and incorporating the “best practices” of the commercial sector into Government procurement policy, there has been only one detailed study to date on this topic. In fact, numerous interviews conducted with contract specialists and officials within the DOD have resulted in a request to receive copies of this thesis upon publication.

## **F. LAW OF THE LAND**

While a more comprehensive list of environmental legislation will be included in Appendix A, the following articles of legislation are introduced due to their incredible importance in understanding the nature of environmental remediation contracting.

First of all, as figure 1 below demonstrates, the number of existing Federal laws and amendments regarding the environment has skyrocketed since the late 1960’s. With even more demands being placed upon the Earth’s resources and the growing strength of the environmental activist lobby, this trend will surely continue for the foreseeable future. While the image of this graph is striking, it does not capture the legislation passed by the states, counties, and cities around the nation that add even more complexity to this issue. In fact, many of these local ordinances are far more stringent than their Federal ancestors [antecedents?] and continue to be updated, changed, and amended as new information is brought forward regarding hazards in the environment. (Ghazi, 2001) In short, the legislative landscape of the environmental remediation industry is ever-changing both in scope, law, and complexity.

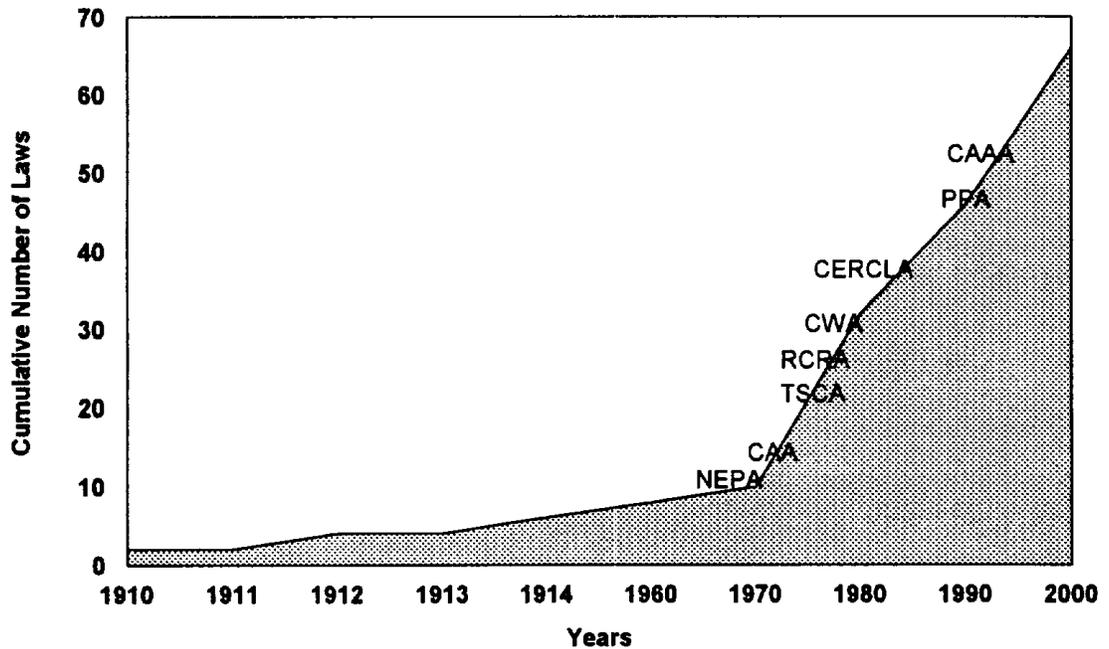


Figure 1. Cumulative Number of Federal Environmental Laws and Amendments. (From: Material Developers Guide for Pollution Prevention 2<sup>nd</sup> Edition, 1994)

### 1. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

This law, while over 20 years old, is still the most widely documented and most applicable law pertaining to environmental remediation. CERCLA is better known as the Superfund Act. The law has two sections that are of great importance in environmental remediation. First, CERCLA covers the cleanup and restoration of all toxic sites that are closed or abandoned. Second, Section 120 states that all action taken to remediate the site must be in accordance with all applicable state and local environmental laws that apply to the site. (Schumitz, 2001) Throughout numerous interviews, this researcher was continually bombarded with comments on CERCLA and its affects, both good and bad, on the environmental remediation industry.

## **2. The Federal Facilities Compliance Act of 1992 (FFCA)**

This law ended what was known as the sovereign immunity of the Federal Government to penalties and civil and administrative fines for violations of Federal, state, and local laws dealing with the handling of hazardous wastes. (Hill, 2000) The Federal Government and DOD were now fully accountable for their environmental sins and all applicable cleanup actions.

## **3. The Community Environmental Response Facilitation Act of 1992 (CERFA)**

This Act addressed the need for rapid identification and remediation of contaminated areas. The Act was passed to assuage fears of communities located near closing bases that they would be irreparably damaged economically by the loss of jobs and revenue from the former facilities. CERFA stated that the DOD could release parcels of land on closing facilities that are not contaminated or that pose no risk to health and human safety.

While these three acts are just a small sample of the hundreds of regulations in existence governing the environment, they stand out for several reasons. CERCLA states that the cleanup must be accomplished according to state and local guidelines. FFCA states that failure to cleanup sites according to those guidelines can result in penalties and fines. Finally, CERFA directs DOD to rapidly turnover as much property as possible to local redevelopers to ease the impacts of the base closure on the affected communities. These sweeping laws summarize the mindset of environmental remediation contracting, for both DOD and the commercial sector, at closing facilities: (1) cleanup the property according to all applicable directives, (2) avoid fines and penalties for failing to do so correctly (bad press), and (3) turnover as much property as quickly as possible to those that wish to acquire it.

## **G. SUMMARY**

This need for effective environmental remediation is great. The large numbers of sites and huge amounts of time and money that will need to be invested into cleaning up

the environment demand an effective and appropriate contractual vehicle to both control costs and get the job done on time.

A recent statement by the Secretary of Defense Donald Rumsfeld calling for more rounds of base closures indicated that even more money will be spent on environmental remediation in the near future. In fact, the Secretary of Defense claimed that over 25 percent of DOD's existing infrastructure is excess. (Dao, 2001) This huge amount of real estate will need to be evaluated and cleaned up. It is imperative to assess and improve DOD's procedures for environmental contracting and ensure that best practices from the commercial sector are applied where appropriate.

This chapter introduced some of the plethora of legislation applicable to the environmental remediation process. While a more definitive list is provided in Appendix A, understanding CERCLA, FFCMA, and CERFA are important in terms of long-term approaches for efficient and effective contracting for remediation services.

Chapter III focuses on the process of environmental remediation, demonstrating that much of the overall course of action is the same for both DOD and the commercial sector. The affects of legislation, regulations, and the concerns of stakeholders are discussed. The chapter begins to differentiate between the DOD and the commercial sector current remediation processes and sets the stage for recommending optimal remediation contracting approaches.

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### **III. THE ENVIRONMENTAL REMEDIATION PROCESS**

*As stewards of nearly 25 million acres of the United States, DOD faces the daunting task of protecting and restoring the land, air, and water entrusted to it. Our military must defend our country but not at the expense of the environment. DOD is making headway in environmental restoration, but much more work must be done. We must strike a balance between what is necessary and what is right. Vice President Al Gore (Guide to Department of Defense Environmental Procurements, June 1995)*

#### **A. INTRODUCTION**

Over the next 30 years, Federal, state and local governments, along with private industry will spend hundreds of billions of dollars to remediate the environment. (Profile of Innovative Technology, 1993). Both the Federal Government and private industry have processes in place to assist in the planning for and the eventual remediation of distressed properties that are to be sold or leased to other entities. This chapter will provide the reader with an overview of both the DOD approach and that utilized by the commercial sector. While some of the information in this chapter was gleaned from written sources, a great deal of the points raised are based on open-ended phone and personal interviews conducted by the researcher.

#### **B. NOTES ON COMPARISON**

No comparison of two processes can ever be 100% compatible. The comparison of the environmental remediation processes of DOD with the commercial sector is no different. There are numerous simplifications, assumptions, and relaxations that must be made in this data to allow for a meaningful comparison of the contracting approaches of each entity.

##### **1. Scale**

The sheer size of many DOD facilities such as Fort Ord, CA, and Naval Station Charleston, SC, simply dwarfs many of the remediation efforts undertaken by the commercial sector. However, while this may affect such factors as overall cost and the actual time required to complete the project, the methods utilized in remediating the property are not significantly different for either the DOD or the commercial firms. In

fact, several remediation firms do not even look at the size of the property involved in the cleanup effort. They instead focus on the toxins present, thoroughness of the remedial assessment, and the difficulty involved with cleaning up the existing contaminated sites. (Fuller, 2001)

## **2. Regional Regulations**

The effect of more stringent local and state regulations on the environment and any cleanups conducted also will have an effect on the comparison. In essence, only cleanups conducted in the same geographic location and under the auspices of the same regulators can be thought of as occurring with the same overarching set of guidance, rules, and directives.

This simplification can lead to some real problems with the comparison. However, most regulators and contracting officers state that the differences between regions has become less of an issue as more States and local communities adopt the higher-level standards that are present in other localities. (Ghazi, 2001)

## **3. Types of Contaminants**

In a perfect comparison, the research would review the remediation of one particular toxin of approximately the same concentration within the same type of physical environment. Unfortunately, many of the larger remediation sites in this comparison contain dozens of toxins in multiple physical environments. Thus, levels and types of contaminations must be simplified and assumed to be roughly similar. However, many of the remediation technologies employed are the same regardless of the concentration or location of the hazards. (Eisen, 2001)

## **C. WHY IS ENVIRONMENTAL REMEDIATION DIFFERENT?**

The steps listed in table 2 help to distinguish the difference between environmental remediation contracting and other types of contractual actions. However, there are numerous other particulars that distinguish remediation contracting from all other types.

First of all, remediation contracting, perhaps more than any other area except research and development, is continually plagued by uncertainties in the scope of work. These uncertainties can be brought about by incomplete record keeping on toxins discharged, large areas that contain various types of soil stratification, and the inability to completely identify the amount of contamination present before the cleanup actually begins. (Eisen, 2001) In fact, nearly every article on environmental remediation contracting that this researcher reviewed cited uncertainties in the scope of work as one the major difficulties in writing an effective remediation contract.

There is also a great deal of ambiguity in the regulations and requirements that are enforced during a cleanup. Everyone involved wants the cleanup to restore the environment and remove the hazards to public health, however what is the proper level? What is the right method to utilize to arrive at the desired outcome? How long should it take and what are the long-term monitoring requirements? Many of these issues vary from State to State and, in some cases, from County to County. (Chesnutt, 2001) The proper level and plan also involves the emotions that were discussed in Chapter II. Are any citizens “happy and satisfied” with acceptable levels of toxins in their soil, atmosphere, and groundwater? (Shurtleff, 2000)

These decisions result in a tradeoff matrix similar to many major systems acquisitions programs where the small amount of residual contamination (or extra performance in a weapons system) can be cleaned up, but only at a huge cost. Figure 2 below illustrates this dilemma.

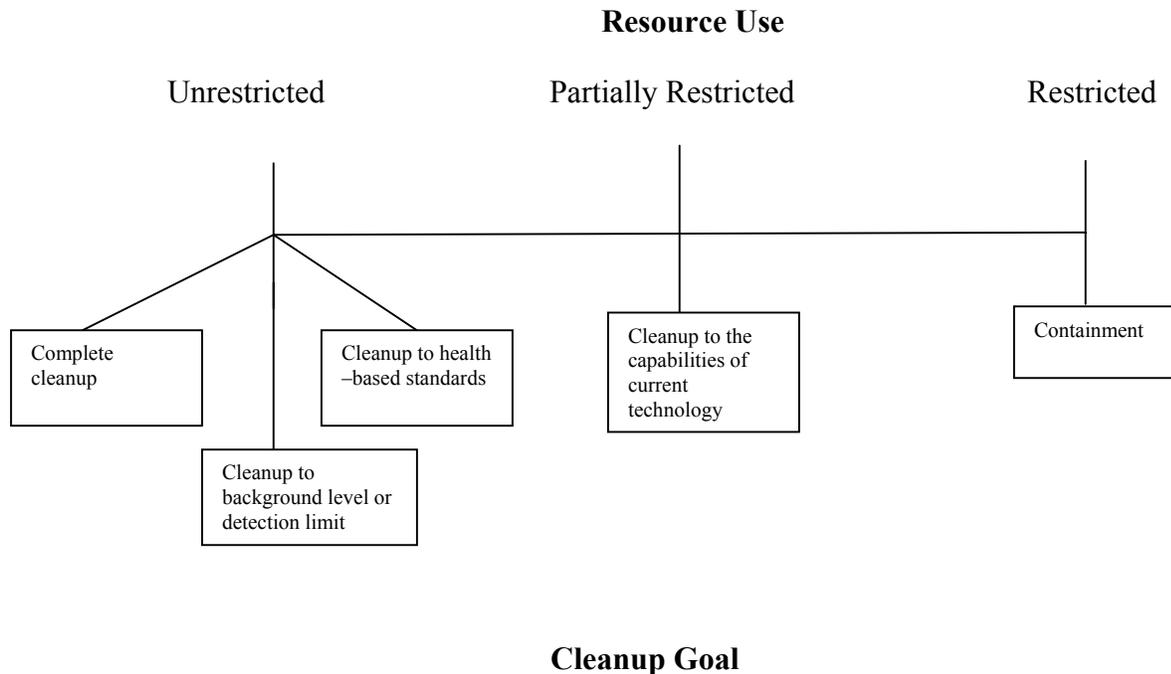


Figure 2. Tradeoff line for environmental remediation.  
 (From: Environmental Cleanup at Navy Facilities, 1999)

With the DOD involving such a great number of individuals in their cleanup process, there is significant pressure to remediate all sites to an unrestricted usage. This proclivity for pristine levels of cleanup is often demanded even when significant scientific evidence is presented that shows that background levels of contamination are in higher concentrations than those left behind by the DOD. (Siller, 2001)

In fact, regulatory issues are such a difficult area for environmental remediation contracting that it was the first item listed in a March 31, 2000, Deputy Under Secretary of Defense (Environmental Security) report titled Best Practices for the Defense Environmental Restoration Program. This report stated:

Overlap in regulatory oversight (e.g. EPA and state regulatory agencies), ambiguities within and between regulatory authorities (e.g., the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA)), and regulator differences of opinion are challenges for most installations and properties.

The pervasive nature of this problem and its listing as the number one issue in managing environmental restoration clearly identifies an area of contracting that many contracting officers are unfamiliar with.

The immense political, press, and local community scrutiny of these contracts are another area that distinguish remediation contracting from all other types of contracting actions. (Herberling, 1992) The high visibility of this effort and the large number of overseers make for a very uncomfortable contracting environment. Contracting Officers must now include far more parties within their thought processes than ever before. The Contracting Officer's action must not only be in accordance with the FAR and other regulatory guidelines, but it must also withstand a great deal of legal and public review. (Perry, 1994)

A final area of differentiation is the importance of insurance and indemnification issues. The risks facing a contractor that takes on a remediation effort are not the usual ones associated with just termination and a disparaging mark on their past performance record. The risks and liabilities go beyond the typical risks in Government contracting because of the difficulty in determining the exact extent and nature of pollution. The RCRA and CERCLA regulations impose criminal penalties for violations of the laws. In addition, many States and local municipalities have incorporated similar legislation with fines, penalties, and criminal charges as well. (Baker, 1992) Any litigation or fines and penalties need to be paid by the contractor. These companies need to purchase liability insurance exceeding any commercial liability insurance policies they may currently carry. (Guide to DOD Environmental Procurements, 1995)

While the above listed items help to distinguish why environmental remediation contracting is a different form of contracting from all other types of contracts, it does not explain all of the rationale. The differences are too numerous to list here and they are coupled with the aforementioned emotional aspects of remediating a distressed property that are impossible to quantify.

The next section will describe the generic format that is followed in completing an environmental remediation. Of note is that this process is utilized by both commercial firms and the Federal Government in cleaning up former sites.

#### **D. BASICS OF ENVIRONMENTAL CONTRACTING**

While both DOD and private industry differ in their approaches to environmental restoration, the steps and processes that are followed are the same for all concerned. In fact, this process is codified in the CERCLA legislation. (Murphy & Herberling, 1994) A short description of the commonly-utilized steps is included to familiarize the reader with some terminology and requirements for each phase. Table 2 provided below will assist in the identification of the various phases of a remediation effort.

## **Phases of EPA's Environmental Cleanup Process**

1. **Preliminary Assessment (PA):** A study to determine if contaminated sites are present. This describes the source and nature of releases, evaluates threats to the public health or to the environment. It also makes recommendations for further action.
2. **Site Inspection (SI):** Investigators analyze samples to determine the nature and levels of contamination. Information is fed into the EPA's Hazardous Ranking System to determine the relative risks to public health and safety. High-risk sites are placed on the National Priorities List.
3. **Remedial Investigation (RI):** This determines the extent of the contamination. Enough data is collected to determine waste characteristics, potential hazards, and treatment options.
4. **Feasibility Study (FS):** Potential remedial alternatives are developed and evaluated. Further investigations are conducted to determine the risk of contamination to the general public. When practical, the RI and FS activities can overlap.
5. **Record of Decision (ROD):** Based on the RI/FS results, the selected remedy and its implementation plan are placed in the record of decision. The public has an opportunity to review and comment on proposed RODs.
6. **Remedial Design (RD):** Detailed plans are formulated for the cleanup. This includes establishing information requirements, the design, and cost estimates.
7. **Remedial Action (RA):** The stage involves all of the actual cleanup activities carried out in accordance with the remedial design. The goal is to have a fully operational remedial treatment system.
8. **Site Closeout (SC):** There is no longer a threat to human life or to the environment. It can be closed out at any point from the remedial investigation through the treatment process.

Table 2. Guide to the Process of Environmental Remediation.  
(From: Herberling & Murphy, 1994)

The above listed steps are outlined in all environmental restoration projects and as the cleanup progresses through each of these phases, the knowledge of the site and its specific requirements increases, thereby reducing risk. (Herberling & Murphy, 1994) This is important to note during the contract administration phase of any environmental remediation. As progress is made towards actual initiation of the remedial action, all

stakeholders should be in agreement and the scope of the project well-defined. In short, there should be a minimum number of additional contaminations discovered, delays due to cleanup difficulties, and other actions that slow down the process.

#### **E. DOD'S METHOD OF WRITING A REMEDIATION CONTRACT**

This section will begin with a discussion of similar processes utilized by all DOD activities in the planning for and execution of remediation contracts.

Once the decision is made to close an installation, planning for the remediation of the site begins in earnest. The remediation process starts with the identification of all relevant stakeholders for the project. (Siller, 2001) These individuals are grouped onto one of two teams. The Local Reuse Authority (LRA) and the Restoration Advisory Board (RAB). These teams are working examples of integrated process teams and have been developed from lessons learned in prior rounds of base closures. (Koon, 2001) The use of these IPTs is an attempt to gather all of the decision-makers and the people of influence with an interest in the closing facility, and have them come to a consensus on the end use for the base (what will take the place of the military post e.g. California State University at Monterey Bay, an airport, or technology park etc.) These teams contain Government officials, lawyers, redevelopers, regulators (Federal, state and local), elected officials, and citizens.

The DOD then must select a lead agency and contracting officer to run the base closure. To date, DOD has selected Contracting Officers from the USACE and NAVFAC to lead large and complex closure efforts. (Youngblood, 2001) They have been selected due to their experience in construction contracts, which these two agencies do very well, and the apparent belief that the skill sets required for construction and remediation are similar in nature. Nothing could be further from the truth. In an article in the April 1992 Contract Management magazine, Michael A. Skawin clearly illustrates why this is a poor decision:

It is important to keep in mind that an environmental remediation contract is not a construction contract...a basic tenet of a construction contract is that the contractor is bringing material onto the customer's site, building something according to a specification that is expected to have a useful

life, and the design and quality of the workmanship will impact that useful life. The basic tenet of remedial services work is that the contractor arrives on the customer's site to perform treatment and/or removal of contamination in accordance with a specification. When the contractor is finished, what is completed has no useful life, and the contractor does not warranty the site as clean only that the work is performed according to the specification. (Skawin, 1992)

With thousands of sites in need of cleanup throughout DOD, and the billions of dollars that will be needed to cleanup these former facilities, the DOD has been building up a massive administrative infrastructure to assist in getting the cleanups moving around the country. (Bowers, 1992) These large infrastructure investments will be considered excess capacity when the BRAC process has finished its course and result in further downsizing of the NAVFAC and USACE as the level of work begins to decrease.

The Department of the Navy and the Department of the Army each have their own unique approach, terminology, and processes to contract for environmental remediation services. Furthermore, each Service has its own executive agent that nominally supervises all remedial actions. The Navy's Naval Facilities Engineering Command (NAVFAC) and the Army's Corp of Engineers (USACE) are the designated experts at contracting for environmental remediation services. (Bowers, 1992) The engineers, contract specialists, and contracting officers at these commands are highly competent and dedicated to finding the "right" solution to each remediation dilemma. (Clean Sites, 1997)

The creation of the Deputy Under Secretary of Defense (Environmental Security) is a key factor in attempting to standardize and streamline procedures for remediation of former sites across DOD. The lack of coordination between the efforts of the Services has been the subject of a GAO report and two major studies undertaken by Washington think tanks: RAND and Clean Sites. (Selstrom, 2001)

The focus of this section on contracting approaches will be on the large-scale remediation efforts that are needed to cleanup facilities with extreme technical and administrative risks. These large scale cleanups are what generate the most political, press, and public interest. The costs and time required to study and cleanup large facilities are immense. The routine issuance of firm fixed-price type contracts for such

items as commercial well-digging and removing underground storage tanks (UST's) has evolved to such a phase where there is little value in studying these efforts. (Phillips, 2001)

All DOD remediation efforts for closing facilities, that have known hazards on them, begin with an identification of stakeholders and creation of the Base Closure Team (BCT) and the Restoration Advisory Board (RAB). (Best Practices for the DERP, 2000) The individuals on these teams include engineers, contracting personnel, base representatives, lawyers, local community leaders, and regulators from all applicable environmental agencies both Federal, state, and local. In addition, a Local Reuse Authority (LRA) is stood up consisting of local officials, citizens, and re-developers. These groups meet early and often in order to make agreements on decision-making authority, ultimate use of the property, remedial actions to be implemented, time lines, and a host of other issues. (Shurtleff, 2000) These initial phases of the cleanup effort have been cited in numerous studies reviewed by this researcher as the most important ones.

### **1. Definition of Success**

All interviewees in the DOD were asked to define what they considered a successful remediation. While the answers differed in exact details, the vast majority of them indicated that a successful remediation would include a cleanup of the site to the agreed upon levels, completion on schedule, and with all stakeholders satisfied. (Various DOD interviews, 2000-2001)

### **2. The Navy Approach**

The Department of the Navy utilizes NAVFAC as their subject matter expert for remediation contracting. If the scope of the cleanup is small, the local base is generally responsible for initiating contracts to remediate the hazardous sites. However, if the cleanup is judged to be complex, the base will sign a Memorandum of Agreement (MOA) with NAVFAC to prepare and oversee the contract utilized to cleanup the property. (Bowers, 1992, p. 18) This unique relationship between active U.S. Navy installations and the NAVFAC, makes them the middleman between the contractor performing the remediation and the base commander.

NAVFAC utilizes two principal contracts for the environmental remediation of large sites. The CLEAN (Comprehensive Long Term Environmental Action, Navy) and the RAC (Remedial Action Contract) are the two most recognized and used vessels [vehicles?]. The CLEAN and the RAC are both cost-plus-award-fee (CPAF) contracts. Despite Congressional desire to utilize firm fixed-price (FFP) contracts for the bulk of purchases by the Federal Government, a cost plus type of contract is the best vehicle for complex remediation efforts. (Sherman, 1999)

The reason most often cited for the utilization of a cost plus type contract is the inability of contractors to adequately determine the scope of work prior to remedial action commencing. There are always surprises be they new toxins or higher than anticipated levels of contamination. These problems tend to add to the scope of a contract and a cost type contract allows for easy inclusion of more work. A FFP contract would need to be continually modified as new hazards are uncovered. (Hills, 1997) In fact, a FFP contract that is heavily modified becomes in essence a cost type contract due to the continual addition of more and more requirements.

The CPAF is an attempt to maintain control of contract management and obtain a high level of performance from the contractor. (Smith, 1996) The CPAF contract has both a base fee and an award fee that are available to incentivize the contractor with profit. The base fee can range from 0-3% and is the minimum profit a contractor can earn. The award fee generally ranges from 0-7% and is an additional amount of fee a contractor can recoup for superior performance. The sum total of the fees (base + award) shall not exceed 10% of the estimated cost of the contract. (FAR) NAVFAC utilizes a 0% base fee to emphasize the need for superior contract performance by the contractor. (Smith, 1996)

The award fee is based upon contractor performance in each of the following four areas: technical, schedule and cost control, program execution/quality management, and subcontractor and consultant management. Each sub-factor is equally weighted at 25%. There are detailed guidelines that are negotiated with the contractor prior to commencement of work that determine what level of performance is required in each sub-factor to earn a certain percentage of fee. (Smith, 1996)

Another significant item of the CLEAN/RAC contracts is that they are intended to be used to remediate one facility at a time. The CLEAN/RAC also requires two separate contractors for all remedial efforts. The first contractor conducts the site investigation, assessment, and develops a remedial plan to cleanup the base. This plan is then competed and a second contractor is selected to perform the remedial work and long-term monitoring, if required. This two-step approach helps to control costs as the remedial investigation contractor has no vested interest in preparing a cleanup plan that will be long and drawn out.

In summary, the Navy's usage of CPAF contracts represents an admission that the nature of environmental remediation services is difficult to fully quantify in advance and the belief that incentives will assist in increasing contractor performance.

### **3. The Army Approach**

The Department of the Army, in the same fashion as the Navy, utilizes the Army Corps of Engineers to manage the environmental restoration of large-scale contaminated sites. (Bowers, 1992, p. 17) The primary contractual vehicle utilized is the Total Environmental Restoration Contract (TERC). The utilization of a TERC is strictly controlled but generally utilized for large-scale cleanups of former Army installations. (Youngblood, 2001)

The TERC is a centrally managed program where the Principal Assistant Responsible for Contracting (PARC) for the Corps of Engineers retains the approval authority for all acquisition plans, Commerce Business Daily (CBD) announcements, and requests for proposals (RFP's). This level of oversight ensures a consistent approach to contracting for remediation. (Smith, 1996)

The TERC utilizes a cradle-to-grave approach to contracting. This means that one contractor is selected to perform both the remedial investigation and the cleanup. The cradle-to-grave approach represents a significant difference from the Navy's approach of two separate contractors performing those steps. (Schumitz, 1995)

As was previously mentioned, the TERC is a cost plus type of contract. The Army's usual contractual vehicle is a cost-plus-fixed-fee (CPFF) or cost-plus-incentive-fee (CPIF) contract. These contracts allow for all allowable costs (costs that are

reasonable, allocable, and negotiated) to be paid and include incentives to help motivate the contractor to perform at a higher level (CPIF) or by utilizing a fixed fee (CPFF) that is payable as long as the contractor exerts his best effort. All five remediation contractors interviewed by the researcher expressed their preference for the CPFF type of contract because of the reduction in time to consider all of the incentive clauses and attending the meetings to discuss performance. (Various contractor interviews, 2001)

Funding issues are usually identified as a sticking point during environmental cleanups. (Siller, 2001) The Army has added a bulk funding approach to their TERC contracts. This allows newly discovered problems to be funded under various open ID/IQ contracts. This prevents a stop work while a new contract is developed that seeks to capture the new requirements. The ability of the Army to avoid such work stoppages has benefited many contractors and has assisted in keeping cleanups on schedule. (Youngblood, 2001)

The Army is also a firm believer in the value of effective and sustained training in all areas of environmental remediation contracting. (Youngblood, 2001) This researcher interviewed two remediation contractors who had conducted business with both the Navy and the Army. Both of the contractors expresses praise and respect for the difficult job the USACE contracting officer was undertaking. Furthermore, they stated that the USACE seems to have a quicker approval process for contract modifications and their personnel are very conversant on all of the latest technological innovations for remediation contracting. (Fuller, 2001)

#### **4. The Air Force Approach**

This researcher did not have available time and resources to include the Air Force model for remediation contracting in this thesis. However, research has shown that their approach is similar to that of the Army and Navy. (Smith, 1996) This is an area ripe for further investigation and study by other researchers.

## **F. THE COMMERCIAL APPROACH TO WRITING A REMEDIATION CONTRACT**

### **1. Definition of Success**

The definition of success among corporations is much different than DOD's. As would be expected, their number one priority in environmental remediation is to receive a profit on the property they intend to cleanup. If there are no expected financial windfalls from the effort, then the need for rapid cleanup is muted. The second most mentioned item in their definition of success was to avoid "headlines" or bad press. As publicly held and traded companies, their senior managers were very concerned about having their firm labeled as the next Hooker Chemical Company, referring to the owners of the toxic waste dump in Love Canal, NY. This media aversion was very pervasive and was noticeably absent from the DOD perspective. (Various contractor interviews, 2001)

### **2. General Process Followed by Corporations**

This researcher contacted many firms and interviewed contracting and engineering personnel to ascertain their specific methods of planning for and executing an environmental remediation. As would be expected many of their methods differed in the specifics, but had many broad macro-level ideas and processes that transcended corporations.

The whole process of deciding when to sell or lease an idle property is relegated to a business decision. (Drezner & Camm, 1999) The simple question asked is will the corporate bottom line be better off without this property on the balance sheet? There is no concern about stakeholders or outright regard for the environment. It is purely an accounting exercise.

Once the decision is made to cleanup and transfer, there were two prevailing processes that were followed. Many of the firms place the property up for bid to the real estate market by separating out the contamination cleanup costs from the resale value. They believe that if the property has sufficient resale value developers and consortiums will be willing to accept the property as is for a fee, and pay to cleanup and rebuild it. (Evanoff, 2001) This approach has two immediate benefits for the firm. First of all, they

realize an immediate cash inflow from the property and secondly, they are removed from the often painful process of cleaning up and deciding what to do with the property.

The other option available to firms is to perform the remediation themselves and then attempt to sell or redevelop the property for future use. This is very similar to the DOD approach. However, the majority of firms do not actually manage the process in the way that NAVFAC or USACE does. Corporations have acknowledged that managing environmental remediation projects is not a core competency and they outsource both the remedial action and the contract administration and management to two different firms. (Leskovian, 2001) This allows the corporation to leverage the knowledge of the environmental management firm while reducing their administration and overhead burden.

Another benefit of outsourcing is a reduction in the infrastructure required to support large-scale remediation efforts. Scores of employees are not tied down on the management of the project and no difficult personnel choices need to be made when the cleanups are complete. (Senior Manager #1, 2001)

The overwhelming response of industry officials is that the use of firm fixed-price (FFP) type contracts is the preferred method of conducting an environmental remediation. The corporations understand the risks associated with this action and insist that all contractors purchase cap insurance to cover any over runs. (Bell, 2001) The use of FFP type contracts also makes the selection of a quality remediation company with a wealth of experience a necessity. (Evanoff, 2001) Another significant advantage of the FFP contract is that it reduces the need for large numbers of supervisory personnel and wasteful oversight and review processes.

Despite the reservations shown by the Government in utilizing FFP contracts for remediation efforts, private sector companies believe that by utilizing cap insurance and environmental liability insurance they can stick with the fixed price, lump-sum type contract. There have been some efforts by DOD to attempt this type of contracting; most notably the remediation contract for the former Charleston Naval Complex was awarded with a fixed price. (Ferro, 2001)

The important point to note here is that commercial firms suffered through many of the same growing pain problems with fixed price remediation contracts in the late 1980s and early 1990s. However, they stuck with them and worked on improving the process. (Leskovian, 2001) The commercial sector feels that fixed price contracts are the contract to use and allow for the use of a cost type contract only on a very limited basis. (Bell, 2001) This is the exact opposite approach of the DOD, who use cost type contracts for major remediation efforts and FFP type contracts by exception.

In fact, several of the corporations interviewed utilize a remediation contractor to manage any cleanups. This decision has been made due to a business review that stated environmental remediation contracting is not a core competency of their organization. This has enabled these firms to dramatically reduce their staffs of environmental engineers, procurement specialists, and other environmental services personnel. (Wiggin, 2001) While, a small number of subject matter experts are kept on hand to interpret reports from the managing contractor, incredible savings are realized by outsourcing the day-to-day oversight and review of remediation efforts. For example, Lockheed Martin has only four company personnel directly involved in cleaning up a large site in Burbank California that has a cost estimate in the tens of millions of dollars. . (Wiggin, 2001)

The commercial sector also takes advantage of the skills of public relations personnel in briefing various stakeholders on cleanup issues. The corporations understand the importance of getting out the right message to all involved. (Evanoff, 2001) The public relations personnel ensure the message is prepared for the audience and all possible questions are prepared for in advance. This allows for a smooth presentation and the impression of a crisp, well-managed program. (Leskovian, 2001) With the importance of the “buy in” of stakeholders to the remediation plan so high, it is apparent why firms leverage the expertise of these communications experts.

Another technique that is available to the private sector is the opportunity to hold onto a property if the expected cash flows are not high enough to justify selling the property. The company puts in place a cursory cleanup program, puts up a fence and steps away from the issue until real estate values make the property more attractive. However, with the move to restore many former industrial sites, known as brownfields, in

many cities gaining momentum, this type of delay in remediating a former facility is becoming a rarity. (Lorenz & Mignery, 2000)

In summary, a successful private sector remediation contract will rapidly cleanup a site and allow for the earliest opportunity to receive revenue from the distressed site. The corporations also have a strong desire for the cleanup to be conducted with as little public scrutiny as possible. (Senior Manager #1, 2001) Therefore, many decisions are made that ensure a high-quality remediation contractor is selected and that all local stakeholders are in complete agreement on all facets of the operation prior to the commencement of the remediation. This prevents untimely and expensive lawsuits, changes in end use for the property, and myriad other hassles that bog down cleanups, extend them over years, and add millions to the cost.

## **G. SUMMARY**

This chapter has presented the processes utilized by the commercial sector and DOD to remediate former industrial sites. While the topic covered was quite broad in scope, some patterns have emerged. First of all, the DOD relies heavily on cost type contracts and public support to remediate facilities. The Services each maintain a separate environmental contracting expert and have worked to utilize integrated process teams to improve the probability for a successful remediation.

Commercial firms utilize two principal approaches to contracting for remediation services. Four of the six companies queried privatize all aspects of their remediation. They determine a fair price for the property, with contamination included, and sell it to the highest bidder. The other two firms use outside contractors to manage the day-to-day operations of the cleanup. All of the firms expect to use a FFP type contract and believe that cap insurance can help protect them from financial liability if the cleanup goes awry.

The next section will provide a strengths, weaknesses, opportunities, and threats assessment of the DOD, specifically the Army and the Navy, and the commercial sectors approach to environmental remediation contracting.

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## **IV. SWOT ANALYSIS**

### **A. GENERAL**

This chapter analyzes the strengths, weaknesses, opportunities and threats (SWOT) of the DOD and commercial contracting methods. The principal reference used to analyze environmental remediation methods of DOD and private industry is Strategic Planning for Public and Nonprofit Organizations, John M. Bryson (1995). Bryson states: “The strengths and weaknesses are usually internal and refer to the present state of the organization, while opportunities and threats are typically external and future oriented.” In addition, many issues can be placed in both the present and future case and a strength that is poorly performed becomes a weakness. Thus, there will be some overlap of issues in the various categories discussed during this SWOT analysis.

The SWOT analysis will initially focus on overall defense, then on the Army and the Navy in particular. The analysis includes unique aspects of the Services in the realm of environmental remediation contracting. The chapter concludes with a SWOT analysis of the private sector. While there are numerous strengths, weaknesses, opportunities, and threats applicable to the DOD and private industry, only major factors will be discussed.

### **B. DOD’S ENVIRONMENTAL REMEDIATION CONTRACT APPROACH**

#### **1. Strengths**

Based on semi-structured interviews with 14 DOD officials, DOD remediation offices appear to be staffed with qualified and motivated employees concerned with satisfying multiple stakeholder requirements. Nine of the 14 contracting participants have been working for over five years on their remediation projects. Most respondents expressed optimism about incorporating new contracting tools into the cleanup process to speed property turnover.

The Office of the Deputy Under Secretary of Defense for Environmental Security is considered a strength of the DOD remediation program. A high-level Government official has responsibility to enact policy and regulation changes to enable the

Department to cleanup and turnover former sites. The location of this office on the staff of the Secretary of Defense ensures that remediation issues have an appropriate voice at the strategic level. The Office oversees all base remediation efforts and assists in the generation of best practices.

The use of integrated process teams (IPTs) to create remediation plans also appears to strengthen DOD's approach to environmental remediation contracting. The IPTs foster a structure where Government officials, regulators, citizens, and elected officials are all involved in crafting and debating various cleanup issues. This inclusive approach helps to minimize bad relations among the parties and sets forth guidelines that participants commit to following. IPTs help generate innovative solutions to the problems presented by the cleanup and encourage involvement from all stakeholders.

## **2. Weaknesses**

The overwhelming weakness in DOD remediation contracting appears to be a proclivity for using cost reimbursement contracts. All six major corporations contacted in this study use fixed-price type contracts for remediation services. DOD attempted this approach earlier in the decade, then changed to cost reimbursement type contracts due to large numbers of modifications and delays in completing cleanups. These problems were also experienced by industry in their early stages of cleanup. Instead of changing their contract vehicle, the corporations redoubled their efforts to gain the advantage in remediation contracting by utilizing more thorough site assessments, insurance tools, and only high-caliber remediation firms.

The concern about using FFP type contracts is a fallback to a period of defense contracting that was considered risk-averse. During the early-to-middle 1990s, DOD attempted to ensure that all of its contracts contained the smallest degree of risk possible, whatever the cost. However, the passage of numerous Acquisition Reform initiatives apparently moved Government contracting officials into a period of risk management. In major weapon systems and numerous other procurements, Government officials appeared to follow the risk management creed. Yet, in the field of environmental remediation contracting, risk aversion is still substantially practiced.

Coupled with the use of cost type contracts is the desire of the Services to utilize incentive arrangements to help manage contractors. The cost-plus-award-fee and cost plus incentive type contracts are claimed by DOD to motivate contractors to perform at a higher level and assist in providing a rapid cleanup of distressed properties. However, some literature and interviews with six remediation contractors question this approach. Incentives and award fee determinations may result in a slower process with more emphasis placed on supervising the contract than on performing the cleanup and turning over the property.

There appears to be a lack of communication among the three Services concerning lessons learned and sharing of trained environmental contracting professionals. Respondents interpreted federal, state, and local environmental guidelines in different ways. The Services also use different terminology and methods to explain cleanup progress. This increases confusion and frustration for local officials and residents, and creates different criteria for contractors involved in DOD cleanup projects.

The lack of professionally trained DOD public relations personnel is a weakness. DOD officials acknowledge the importance of regulator and end user buy-in to the remediation plan and risk mitigation processes used during the cleanup. However, briefings are often conducted by well meaning, but poorly trained, engineers and contract specialists.

Another weakness noted concerning DODs efforts at environmental remediation is the use of Contracting Officers that are experienced in construction-type contracts. DOD uses these individuals (NAVFAC, USACE) to contract for and manage remediation efforts. However, the skill sets needed for construction and remediation contracting are different. This places Contracting Officers in the difficult position of having to learn how to conduct an effective remediation under the spotlight of Congressional, media, and public scrutiny. In addition, the turnover of the Contracting Officers due to transfer and reassignment leads to loss of learning curve knowledge and a need to rebuild the working relationships between the new Contracting Officer and all of the many organizations involved in the cleanup.

### **3. Opportunities**

The current desire to rapidly cleanup and transfer excess property is a substantial opportunity for DOD. The large number of acquisition reforms enacted during the 1990s and the emerging emphasis on using the best business practices of the commercial sector provide an opportunity for DOD to substantially improve its environmental remediation contracting performance.

Another opportunity is the desire of many developers to invest in the remediation and redevelopment of brownfield sites. There has been a movement during the past decade away from building new homes and businesses further from the big cities and thereby contributing to suburban sprawl. Many homebuilders, businesses, and corporations are moving back to the urban areas. There are numerous brownfield sites available for redevelopment in scores of cities throughout the country. In addition, a great many of these urban brownfield sites are former military installations such as Charleston Naval Shipyard, Los Angeles Air Force Base, Norton Air Force Base, Kelly Air Force Base, Fort Benjamin Harrison, and El Toro Marine Corps Air Station and many others. Many of these closing facilities are very lucrative prospects for redevelopment and pose a substantial opportunity for real estate negotiations with the private sector.

### **4. Threats**

A major threat to the remediation efforts undertaken by DOD is the budget process. Budgets for environmental remediation are competing with other Service priorities such as research and development, force modernization, and operations. Dollars are subject to reallocation, and changes in budgetary priorities may result in cuts in cleanup programs throughout the Nation. This budgetary instability is an added risk to both DOD and contractors and often results in added costs in both time and money to remediate a former site. With numerous expensive weapons systems coming on-line in the near future (JSF, LPD-17, Osprey etc.), the budget battle will only become more intense. In addition, the current budget shortfalls and return to deficit spending since the terror attacks on 9/11/01 may result in fewer dollars available to DOD for use in all non-warfare areas.

## **B. NAVY ENVIRONMENTAL CONTRACTING APPROACH**

### **1. Strengths**

The principal strength for the Navy is the increased competition afforded by the use of two-step procurement in the Remedial Action Contract (RAC) and Comprehensive Long-term Environmental Action Navy (CLEAN) contracts. Having one firm design the remediation effort and another execute it, there is no incentive for the firm to inflate time and cost estimates to keep the project generating revenue.

The Navy's commitment to the use of integrated process teams such as the Base Closure Team (BCT), Restoration Advisory Board (RAB) and inclusion of the Local Reuse Authority (LRA) means that multiple stakeholders are represented in the process. This structure helps to discourage public discontent by enabling all concerned parties to have a say in the solutions generated.

### **2. Weaknesses**

The two-step model leads to many time delays. Recent General Accounting Office estimates put the cost of this process at a 30 percent increase in contract price and time to complete. (Smith, 1996) The second contractor does may not trust the results of the remedial investigation contractor, and time and money is lost in rechecking previous data on site characteristics and levels of contamination.

Although some recent literature supports the idea that the inclusion of large numbers of individuals in the decision-making process is an achievable and manageable goal, the ability of a contracting officer to achieve consensus on emotional issues such as levels of acceptable contamination and future uses of property, is difficult with multiple opinions being offered. The more parties that are privy to an array of information, the more likely the Navy is to have lawsuits and costly delays as stakeholders bargain, negotiate, and form coalitions for their points of view.

The utilization of NAVFAC to administer all remediation efforts may constitute a weakness. The workforce at NAVFAC is more comfortable with and better trained to

procure construction contracts. The Navy selected NAVFAC as the resident expert by default. While there are some similarities in the construction and remediation industries, there are also considerable differences. Many NAVFAC personnel have received no formal training in the specifics of remediation contracting. A substantial weakness is the lack of formal instruction in environmental insurance and bonding requirements. The many technologies associated with remediation projects are unknown to these professionals and leave the Government at a disadvantage both when negotiating with contractors and conducting public briefings.

### **3. Opportunities**

The current acquisition leadership in the Navy appears very receptive to novel solutions to remediation problems. The recent firm fixed-price contract for the cleanup of the Charleston Naval Complex, the privatization of the FISC Oakland redevelopment, and the introduction of outcome-based payments have been trendsetters in DOD environmental contracting. While the long-term results of these new initiatives are as yet unknown, they represent a willingness to experiment with different approaches to solving remediation puzzles. The current atmosphere of acquisition reform coupled with the Navy's willingness to accept new ideas in contracting for environmental remediation may lead to some breakthroughs in this vital field in the near future.

Perhaps the greatest opportunity for the Navy is the potential value of many of the former Naval Stations and Naval Air Stations. Many of these facilities are located within or close to major metropolitan centers. For example, Hunters Point Naval Shipyard, FISC Oakland, and Staten Island Naval Station are located in some of the most expensive and desired real estate areas of the nation. The opportunity to redevelop these sites provides unique circumstances for the Navy to strengthen its ties to local communities. While environmental damage is a threat, the Navy can benefit from remediating high-visibility, high-value properties.

## **C. ARMY ENVIRONMENTAL CONTRACTING APPROACH**

### **1. Strengths**

The Army's principal strength is the use of one contractor in a cradle-to-grave approach to remediation. This approach saves time and money by avoiding the duplication of effort that is inherent in the two-step process utilized by the Navy. The single remediation firm conducts its own assessment of the site and is not forced to rely on another company for characterization of the hazards present and the levels of contamination.

The USACE workforce is widely recognized for their skill and professionalism. The USACE is known for having the best knowledge and level of expertise in the planning for and execution of environmental remediation. The Corps of Engineers has been instrumental in the development of many unique contracting solutions to problems presented by remediation efforts.

Another strength is centralized oversight by the Principal for Contracting over all Total Environmental Restoration Contracts (TERC). This high level of oversight ensures that all TERC's are constructed in a similar fashion and results in learning curve benefits to the remediation firms. They understand the nuances of the Army cleanup effort and this enables companies to better understand the requirements, communications, and paperwork that will need to be generated during a cleanup.

Another major strength of the Army remediation system is the use of performance-based specifications for cleanups. While performance-based specifications have been the accepted norm in commercial remediation efforts, the USACE was the first to use them in contracting for Federal cleanups. The principal benefit of performance-based specifications is that they enable the contractor to propose innovative solutions to remediation projects. This may result in savings as the contractor's experience and expertise is utilized to devise solutions to contamination and site cleanup requirements.

The Army has also added a new budgeting approach for remediation cleanups. Each contract is bulk-funded and similar tasks are performed under open task orders. This allows work to start immediately, if more contamination is located, without having

to either resort to modifications in order to add more money to the contract or negotiate a new agreement. This added flexibility has been cited by both the Government and remediation contractor companies as a definite plus to working on a USACE project.

A final strength of the Army's remediation contracting approach is the commitment they have made to training. The USACE has a rigorous training program covering the TERC process. This training helps ensure a uniform application of standards and methodologies across the USACE and allows for all members of the Corps of Engineers to be kept up-to-date on the latest technology and contractual vehicles to speed remediation efforts.

## **2. Weaknesses**

The principal weakness in the Army remediation contracting approach is the utilization of one contractor from start to finish. While this does save time in not having to award two separate contracts, the need for supervisory personnel to oversee contractor operations skyrockets. TERC projects require a great many members of the USACE present on site to monitor the remedial contractor. These personnel are not capable of assisting in spot-checking other programs and essentially become permanently assigned to the cleanup effort.

## **3. Threats**

The major threat to the Army's TERC approach to environmental remediation is the inherent lack of competition in having one contractor plan and cleanup a contaminated site. An unfavorable review by the GAO or an investigative news reporter on cost overruns or poor performance by the TERC contractor may lead to the questioning of this process by Congress. The lack of a system of checks and balances to ensure the Government is paying a fair and reasonable price for the cleanup may threaten perceptions about Government efficiency.

When a large and complex site is chosen for remediation, there is little opportunity for small businesses to be selected as the prime contractors. This bias away from small businesses may lead to lawsuits and lobbying on behalf of these industries to

increase their market share of Army cleanups. A commitment by Contracting Officers to ensure robust, sub-contractor management by the prime may help alleviate this problem.

#### **D. COMMERCIAL ENVIRONMENTAL CONTRACTING APPROACH**

As has been stated previously, many firms conduct their remediation efforts in different ways. The SWOT analysis conducted in this section is an attempt at a “best fit” for a relevant overview of commercial environmental contracting strengths and weaknesses.

##### **1. Strengths**

As can be expected in the private sector, profit motive completely drives the remediation issue. In fact, all six corporations and all six remediation contractors interviewed cited profit as the overriding determinant of success. Many of the methodologies utilized, level of interface with the public, and decisions made during the cleanup, are made to increase the expected return on the closing property. The profit factor adds a sense of urgency that is not apparent in most DOD cleanup processes. Even more noteworthy is that all members of a corporation are focused on this area whether they are senior management, contract managers, environmental engineers, or public relations personnel. The rationale is to make good business decisions that keep the corporation out of the headlines and that increase the return on the decision to cleanup and sell a former site. Many readings in this area call this a “balance sheet mentality.”

A second strength is to utilize public relations personnel to run the cleanup presentations and briefings. Five of the six corporations interviewed ensure that all public meetings, presentations to local governments, and to regulators are conducted by experts in the field of public relations. The management of most corporations is aware that the public relations can help speak to the audience at hand and assist in the “buy in” to the project by the concerned audience.

Another major strength of corporations is the inclusion of real estate professionals in the decisions to close facilities. Professional realtors help influence the sale price for the property, determine how much interest there will be in the facility, and assist in the

development of tradeoffs regarding end use of the site. In fact, if real estate professionals determine that the potential site has limited resale value, the corporation may decide to conduct a cursory cleanup at the property and await a better time to attempt to sell it.

Five of the six firms contacted surmised that performing an environmental remediation, managing a cleanup, and dealing with all the involved stakeholders is not a corporate core competency. These firms maintain a small office of professionals trained in environmental remediation, but rely on a separate contractor to perform the day-to-day functions necessary to conduct a successful cleanup. Private industry believes that the savings in personnel, training, and travel required to manage the remediation at many separate sites more than offsets the cost of having two firms outsourced to conduct a remediation effort. When the facility is cleaned up and sold, there are no corporate employees to worry about reassigning or terminating.

Another strength that private firms have is their ability to completely walk away from an environmental cleanup. They allow developers to bid on the property, including the potential cleanup, and sell off the land right away. They let the redevelopers worry about pleasing local government, concerned citizens, and regulators. This approach adds revenue to the bottom line of the firm and removes them from the headlines. However, the firm does retain long-term liability for the site if the cleanup is poorly conducted. This long-term risk is offset by the risk on the developers if they fail to clean a site to required standards and through the carrying of long-term liability insurance.

## **2. Weaknesses**

The most noticeable weakness of a corporate remediation approach is the practice of marginalizing stakeholders participating in cleanup decisions. Some participants stated that they only worry about the stakeholders with deep pockets, easy access to the media, and significant political capital. This in effect makes the process undemocratic and unfair to poorer communities in some of the metropolitan areas that surround closing facilities.

Another weakness is the long-term liability of the corporation to potential lawsuits and further remedial action if the selected management and remedial action

contractors perform poorly. With many firms outsourcing both the managing and cleaning up of former sites, they are not sufficiently in control of the studies, remedies chosen, and subsequent monitoring. This may leave the firm vulnerable to financial liability if the contractors fail to meet the required levels of cleanup.

Outsourcing management of remediation efforts to other firms may leave corporations vulnerable to a brain-drain of experts in the field of environmental contracting. Firms will release personnel associated with cleanups when the company feels no further closures will be forthcoming. However, if more downsizing results in more closures, these firms may be at a disadvantage in writing successful remediation contracts and in providing the decision-makers with necessary advice.

### **3. Threats**

The internet and increasing numbers of 24-hour satellite/cable news stations makes the probability of activists having access to public attention a growing concern. The ability of corporations to marginalize these small groups of stakeholders is being eroded by the proliferation of outlets to their ire and disgust with corporate behavior.

The unknown affects of the “electronic herd” on corporations who abuse the environment are another long-term threat. Corporations that are seen as polluters and abusers of natural resources may be the target of stock sell-offs by concerned and angered shareholders. This movement of capital away from a firm would be real and compelling evidence to change their corporate mindset and become more environmentally friendly.

Private firms also worry about changes in Government that lead to new and more aggressive policies dealing with the environment. They understand how politically unpopular lowering environmental standards are and are hoping to delay more vigorous legislation and enforcement by regulators and Congress.

## **E. SUMMARY**

The SWOT analysis conducted in this chapter has identified many areas where the DOD and private industry differ in their approaches to environmental remediation. This analysis has highlighted some of the contracting methods utilized by DOD and the private sector to remediate distressed properties. The remediation work done by the DOD can be characterized as risk-averse, burdened by regulatory restrictions, and stakeholder-intensive. The commercial sector conducts remediation by privatizing the entire effort and mitigating risk through insurance vehicles, FFP contracts, and the use of professional environmental management companies to oversee projects.

## V. CONCLUSIONS AND RECOMMENDATIONS

### A. INTRODUCTION

This chapter presents the conclusions of this thesis and offers recommendations and suggestions for further research. The conclusions and recommendations are intended to promote further research on the topic and to stimulate improvements in the important area of environmental remediation contracting.

The objective of the study was to compare and analyze various strengths and weaknesses in environmental remediation processes used by both the private sector and DOD, and to add to the assimilation of best practices in the Government sector. The principal conclusions were derived from interviews conducted with 10 civilian and 10 Government personnel concerning the main aspects of environmental remediation contracting. Interviewed data were analyzed alongside extensive literature review of topic materials. Subsequent conclusions yielded recommendations and suggestions for further investigation.

### B. CONCLUSIONS

#### **1. There is no readily available process from either the commercial sector or DOD that will suffice as a template for all environmental remediation efforts.**

Despite efforts to create a simplified procedure for use in environmental remediation contracting, the immense variety of sites, hazards, differing requirements, and the legislative landscapes hinders development of a standardized approach. There must be flexibility and continuous monitoring of all work conducted during an environmental remediation. Accountable and competent management is needed at all levels of an environmental remediation project to ensure successful completion.

This conclusion does not indicate that lessons learned and general procedural guidance cannot be generated to aid in the development of acquisition strategies for remediating contaminated sites. The use of template work orders for many aspects of remediation contracting, such as those utilized by the USACE in their TERC contracts,

and standardized terminology to describe and explain site conditions, level of completion, and other information would also be beneficial to cleanups.

In addition, training must be conducted for all personnel involved with environmental remediation contracting in order to remain at the cutting-edge of new procedures, contracting approaches and new technology. Substantial training is needed for the Services to leverage knowledge gained in the past 15 years of cleaning up former bases.

**2. The Department of Defense has no centralized repository of environmental remediation contracting knowledge.**

The current practice of allowing each Service to maintain their own specialized branch of experts in environmental remediation has hindered the sharing of information, encouraged duplication of effort, and led to poor relationships with regulators, contractors, and the public. This is wasteful of resources and not in keeping with the best practices of the commercial sector. Every major corporation contacted maintains a small cadre of environmental specialists and contracts out for the day-to-day management of any remediation efforts.

Furthermore, each of the Services has unique terminology, processes, and performance parameters that are confusing to many contractors and community members when attempting to understand what the state of the cleanup is. This lack of a common language has also led to difficulty in effectively communicating with regulators, the GAO and various legislative bodies such as the Congress.

**3. Legislative and regulatory hurdles exist which impede assimilation of new initiatives in the remediation of former DOD facilities.**

There are numerous pilot studies and one-time efforts that have shown progress in both reducing the cost and time required to cleanup distressed facilities, yet legislative and regulatory constraints still exist. More flexible use of budgets, liability insurance, and privatization of cleanup may allow DOD to rapidly remove former sites from military infrastructure, and realize cost savings needed to aid in force modernization.

The GAO and Congress have criticized the DOD for the slow pace and inefficient methods of environmental remediation. However, legislative branch entities have failed to modify existing legislation, such as CERCLA, to enable DOD to incorporate the best practices of the commercial sector and allow for rapid cleanup and transfer of distressed properties.

**4. The utilization of incentive type contracts for environmental remediation is not producing the expected innovation and improvements in contractor performance.**

DOD utilizes an incentive-based approach in the TERC and CLEAN/RAC contracts. However, attempting to utilize incentive-based contracts for environmental remediation has not been very successful. Remediation contractors often do not appreciate the added monitoring and processes that need to be employed to earn additional profits. In addition, using these contracts entails having additional personnel on staff to track the contractor performance and make decisions regarding award fee and incentives. It is difficult to motivate performance when the details of a cleanup are unknown until the project is well underway. Attempting to reward a contractor for more innovative technology is also limited due to scarcity of technological breakthroughs in remediation processes.

Furthermore, research has indicated that, many firms are not satisfied with incentive-type contracts and award fee profit determinations. Firms would much rather bid on a project with a guarantee of 5 percent profit, than have to work through a myriad of subjective decisions in an award or incentive-based contract even though they could realize a profit as high as 10 percent. Firms do not feel that the added time, oversight, and bureaucracy involved adds value to the process. In addition, the majority of corporations involved in remediation efforts use a fixed fee type approach to payment of the contractor.

## C. RECOMMENDATIONS

### **1. The DOD of must consolidate the abilities of the United States Army Corps of Engineers (USACE), the Naval Facilities Engineering Command (NAVFAC), and the Air Force Center for Environmental Excellence (AFCEE) into one joint command managed at the DOD level.**

A Joint Environmental Office could then operate regional offices with expertise in applicable state and local regulations, and build long-term relationships with state and local legislatures, press, communities, and special interest groups. This could eliminate duplication and start-up costs which currently occur when a new installation is selected for closure and a team is assembled to generate a remediation plan and contract. Individuals in regional offices should have long tenures in order to foster personal relationships with local communities, regulators, and remediation contractors.

In addition, the funding for this organization could be kept separate from each Services budget. This would prevent the movement of funds from cleanup to other more high-profile projects such as weapon systems procurement and operational readiness funding. More stable funding would help ensure more expeditious cleanups and minimize delays due to diversion of funding.

### **2. Institute meaningful administrative and/or contractual controls to substantially reduce changes once a Record of Decision (ROD) has been implemented.**

The primary reason for numerous cost over runs and schedule slippages in DOD cleanups is the shifting nature of the cleanup goals. On several occasions, local and state stakeholders have decided to change during the actual cleanup the agreed-upon goals for the future reuse of a site, cleanup standards, or methodology. The resulting delays cost money and time and leads to a sense of paralysis at the local community level as work stops again and again, lawsuits are filed, and nothing appears to be happening.

The commercial sector publishes all agreements in local papers and gets all parties involved to sign binding agreements on all of the possible areas of contention. DOD should follow this practice and quickly identify the individuals who are slowing down the cleanup effort to ensure that delays do not reflect on the DOD. There will be

disagreements and rancor during the planning for a cleanup. When the decisions are made, there must be contractually binding documents that ensure all interested parties support and will abide by all cleanup aspects.

**3. DOD should seek waivers from CERCLA and RCRA to allow for the outsourcing of the management of all environmental remediation cleanups and to allow for the full privatization of some cleanups.**

Environmental remediation is not a core competency of the procurement professionals within the DOD. Furthermore, the bad press and constant oversight by watchdog group's leads to poor public relations between DOD and various elements of American society. Current CERCLA legislation requires DOD to cleanup a site prior to transfer. A recent modification allows for the early transfer of distressed properties. However, DOD must still foot the bill of cleanup and are therefore responsible for the decisions and public scrutiny involved in this process.

The use of outside contractors to purchase the property and perform all of the actions responsible for cleanup will shift the mantle of responsibility from DOD to a private firm. This will enable DOD to remove any existing force structure on the base and in essence realize the full impact of savings from the closing facility. Additionally, the Department would be removed from media headlines when issues arise on former installations regarding cleanup goals, remediation plans, and end use restrictions. Furthermore, by using contractors to assist in the management of environmental cleanups, DOD can reduce the personnel and infrastructure now needed to run current operations. Thus, when the base closures are completed, difficult personnel issues and force size debates at USACE and NAVFAC may be simplified.

**4. DOD should continue to use firm fixed-price contracts to conduct environmental remediation.**

DOD's present utilization of cost type contracts for difficult and ill-defined projects represents a return to risk-adverse contracting. The DOD has moved to risk management techniques in developing major weapon systems and conducting research and development. However, DOD remains risk-adverse in environmental contracting. The Charleston Naval Complex is an example of how using a FFP contract can save money in conducting cleanups. The use of liability and environmental insurance

can help to alleviate much of the potential for cost over runs and insulate the Government and contractor from any liability lawsuits. The utilization of insurance protection will allow contracting officers to manage risk and not just attempt to contract around it.

However, in some scenarios, a cost type contract may be required to cleanup a former base due to extremely poor knowledge of toxins and their concentrations, uncertain end use goals, and the use of new technology to remediate a site. Under such circumstances a cost contract would be acceptable. This would allow cost type contracts to be utilized as the exception and not as the normal method of conducting cleanups.

#### **D. ANSWERS TO THE RESEARCH QUESTIONS**

The following are the answers to the primary and subsidiary research questions. The answers to these questions were derived from the findings and conclusions.

##### **Primary research question: What are the strengths and weaknesses of the various environmental remediation contracting approaches utilized by the DOD and private sector participants?**

The strengths of the DOD contracting approach are the use of cost type contracts that allow for more flexibility in rapidly changing site conditions. DODs requirement for the creation and inclusion of the Local Reuse Authority (LRA) and Restoration Advisory Board (RAB) helps to ensure all interested parties are involved in the decision-making process.

Another major strength is the aggressive use of integrated process teams early in the remediation project to assist in developing the cleanup plan and identifying key issues, hazards, and reporting requirements. This partnering approach has helped to improve the success of DOD environmental remediation projects.

The principal weakness of the DOD approach to remediation contracting is that the cost type contracts do not allow for significant cost control and that a great deal of management and supervision is required to oversee the usage of a cost type contract.

Another significant weakness for DOD is the paralysis that occurs with the inclusion of many community and local Government representatives on the RAB/LRA

boards. These large groups, while politically necessary, pose management difficulties. Diverse interests and hidden agendas leads to indecision, infighting, and delays. Obtaining consensus in such diverse groups of individuals is not easy and requires professional expertise.

The commercial sector strengths are a commitment to viewing the process of remediation as a profit generator. All actions are undertaken to help increase the rate of return and cash flow received from the property.

Another major strength is the use of insurance tools to shift the liability from the corporation to the contractor. These insurance terms help to lessen the risk of cost overruns and mitigate the liability inherent in all cleanups.

A weakness of the commercial sector approach appears to be a lack of stakeholder involvement. This may result in bad publicity and marginalization of some local communities that are not capable of sustaining a concerted legal and media effort to have their voices heard. In addition, a valuable piece of property may never be returned to a community because the business numbers do not justify a full cleanup.

**Subsidiary Question 1: What are the key similarities in the environmental remediation contracting methods utilized by DOD and the private sector?**

The key similarities are the use of teaming arrangements with regulators, local community members and officials to help develop and manage a cleanup plan. Including all parties early in the process may help to build trust, teamwork and a shared sense of purpose.

**Subsidiary Question 2: What are the key differences in the environmental remediation contracting methods utilized by the DOD and the private sector?**

The primary difference is the use by industry of private redevelopment firms to conduct the remediation by purchasing the distressed property. If this approach is not utilized, all five major corporations contacted hire one environmental firm to conduct the cleanup and another to manage the site. This allows the firm to eliminate a large environmental remediation group in-house while still maintaining visibility over cost and schedule issues.

The second major difference is that all decisions made with regards to the bottom line. Corporations ensure all actions of their remediation team are aligned to maximize the return on investment of the property in question. If the numbers don't support cleaning up and selling a piece of property, the corporation will hold on to it in a caretaker role until such time as the property value increases or technology makes the cleanup easier.

A third difference is the commercial sector's commitment to using FFP remediation contracts to cleanup former sites. These contracts allow for cash flow management and limited oversight and administration. DOD has continued to use cost type contracts due to early failures in the late 1980s and early 1990s with FFP contracts. Industry also suffered setbacks during those time periods, but they remained committed to FFP contracts as a means of controlling costs in their cleanups.

A final difference is the use by commercial firms of public relations personnel to assist in the public presentation of the cleanup plan, end use decisions, and the methodologies that will be used. DOD uses well-intentioned engineers and chemists who are not as capable of speaking to pluralistic audiences which can leave participants and observers confused and mistrustful. Commercial sector public relations personnel appear more capable at building ownership of the cleanup among community members and anticipating and responding to tough questions.

**Subsidiary Question 3: What are the main emerging trends in the field of environmental remediation contracting?**

A primary emerging trend is the use of private firms and groups to purchase distressed property from the owner and assume the responsibilities for drafting a plan and cleaning up a site. This removes the property owner from having to worry about either cleanup cost increases and schedule delays or an immediate revenue stream from the land. Furthermore, privatization takes them out of the headlines and avoids embarrassing the corporate name and any potential stockholder penalties for poor cleanup management and slow progress. Secondly, privatizing cleanups allows corporations to outsource management of a project for which they lack expertise.

Another major trend is the use of firm fixed-price contracts to manage remediation projects. The level of technology and insurance vehicles available have made FFP contracts the method of choice for the commercial sector, and DOD is now revisiting this idea as budget difficulties encourage more effective management of limited resources. While there is a great deal of risk inherent in restoration contracts, the environmental remediation technology and experience of contractors has reached a point where FFP contracts appear to be the best solution to cleaning up distressed property.

A final trend is the use of performance-based specifications and performance-based payments for environmental remediation. These tools allow for the characterization of the study and cleanup phases to be broadly defined at the outset of the effort. The payment structure is linked to getting a signature from regulators that no further action is required at a site (in essence cleanup is complete). This forces the remediation contractor to work very closely with regulators to ensure compliance with the cleanup technology utilized and the acceptable end state levels of contamination.

## **E. AREAS FOR FURTHER RESEARCH**

With the environmental remediation still a relatively new discipline, being less than 25 years old, there exists a wealth of potential areas for further research. The potential for future rounds of base closures and the continuing scarcity of funds also make managing environmental remediation contracts even more important. Four recommendations for future research are detailed below.

### **1. Conduct a case study of some of the more successful environmental remediation efforts and present the lessons learned.**

There are numerous success stories such as FISC Oakland, Charleston Naval Station, Fort Sam Houston and many others available for study. The careful study of these projects may yield some significant new findings concerning how contracts can be constructed to capture these successes.

**2. Conduct a study of the savings that could be realized by consolidating the environmental remediation branches of the USACE, NAVFAC, and AFCEE into one joint command.**

While this study may be painful to many agencies attempting to protect their existence, the potential savings and benefits of this joint consolidation could be significant. This joint command would also replace the Service-specific terminology, definitions, and processes with one joint standard. Furthermore, the knowledge gained in all cleanup actions would be easily shared through a knowledge management system and continuous training. Finally, the utilization of such an office would be in keeping with the commercial best practices of managing cleanups at the corporate (or Office of the Secretary of Defense) level.

**3. Conduct a review of large group intervention methodology to establish techniques for DOD contracting officers to use to enhance consensus on base cleanup plans, and end use decisions.**

DOD must include many disparate groups of individuals in the current process for cleaning up and closing a facility. There is some research available in the arena of large group intervention that may prove helpful to Government officials attempting to solve complex or “wicked” problems.

**4. Award-term contracting and performance-based specifications are the newest innovations being fielded by Government contracting officers. Conduct a study to see what advantages these new ideas may yield when used in combination with environmental remediation contracting.**

The poorly-defined nature of environmental contamination and the long period of time associated with cleanups appears to match the goals of these two new initiatives nicely. The inclusion of award-term contracting and performance-based specification could assist in the development of more responsive and efficient remediation contracts.

## APPENDIX A. MAJOR ENVIRONMENTAL LEGISLATION

The information contained in this Appendix was taken from Major Ron Hill's thesis from 2001. A thorough understanding of these laws and regulations is essential to understanding the myriad of issues concerning environmental remediation.

1. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): This statute, better known as the Superfund Act, establishes a fee-maintained fund to cleanup abandoned Hazardous, Toxic, and Radioactive Waste (HTRW) sites which are closed or abandoned. A key aspect of this Act is that section 120 requires compliance with all state and local environmental laws that apply to sites requiring remedial actions, other than those sites already on the National Priorities List (NPL).
2. The National Environmental Policy Act of 1969 (NEPA): The National Environmental Policy Act was actually enacted on January 1, 1970, and mandated a National Policy to encourage a productive balance between people and the environment. This policy was directed toward the operations of all agencies within the Federal Government. The Act required that an Environmental Impact Statement (EIS) be developed by the agency desiring to either construct facilities or conduct changes to basic operations. The process was to be performed as a study of impacts to the environment, assist in the information flow process, and aid in the Federal Government decision-making process. It directed that all policies, regulations, and public laws must be in accordance with NEPA, considering the environmental implications of Government operation. However, NEPA lacked regulatory authority, because each agency only had to consider the environmental consequences of the change. The final operational decision remained with the initiating Government Agency. This law has particular application to the base realignment and closure (BRAC) process associated with many military installations ultimate reuse. This Act requires the preparation and performance of environmental assessments and an environmental impact statement, which considers current and future environmental implications of any given reuse plan, prior to execution of that plan.

3. The Pollution Prevention Act (PPA): The Pollution Prevention Act (PPA) of 1990 stated that the policy of the United States covering pollution should focus on the prevention of admissions into the environment from the source of all pollutants.

This was a new direction in the environmental policy of the United States, which involved the reduction of both point source and non-point source pollution. To achieve this new direction, the EPA established the Office of Pollution Prevention for the promotion of a source reduction campaign and subject related awards programs.

4. The Clean Air Act (CAA): Originated in the 1950s and helped to change the course of future environmental regulations. Prior to the 1950s, State and local governments individually controlled air quality and atmospheric emissions. The Act has been amended six times, the last coming in 1990. The 1990 changes had the greatest impact on the national industrial base and significantly strengthened the environmental protection roles of the Federal Government. The EPA was designated to establish air quality standards. The National Ambient Air Quality Standards (NAAQS) are expressed as concentrations of designated pollutants. It requires the Environmental Protection Agency to set mobile source limits, ambient air quality standards, hazardous air pollutant emission standards, standards of new pollution sources, and significant deterioration requirements, and to focus on areas which do not attain standards.

The Act also assigned the EPA responsibility for implementing the emission standards program and establishing a timetable for national compliance. This included both stationary and mobile sources of air pollution. In addition, the EPA was directed to establish additional national standards and programs for the following: new pollution sources, hazardous pollutants, mobile sources (including those covering motor vehicle fuels), the prevention of significant air quality deterioration in clean areas, and strict controls for areas that have not attained the national standards. To achieve these standards, Congress granted the EPA additional authority to assess administrative fines and penalties.

5. The Clean Water Act (CWA): During the 1950s and 1960s, States individually set ambient water quality standards and developed the plans to implement those standards. In 1972 and 1977, Congress amended the Federal Water Pollution Control Act

(FWPCA), first by combining water quality standards and effluent limitations and second, by expanding it to include toxic and hazardous water pollution. After these amendments, the Act has been commonly called the Clean Water Act (CWA). The current CWA is a system that authorizes States to establish programs to implement the national ambient water quality standards. In addition, it is now illegal for any person or organization to discharge pollutants from a point source into any waters of the United States. The process included the establishment of a permit system controlled by either the EPA or the State (the permitting authority). The permits are obtained under the National Pollution Discharge Elimination Standards Program (NPDES) and only allow specific limited amounts of emissions.

The authorizations included the use of best management practices in controlling the emission of hazardous material into the United States waters. However, the practices are descriptive in nature and do not list any quantifiable reduction amounts. The CWA also includes a reporting system for discharges to report normal, noncompliance and emergency amounts of hazardous waste discharged. The CWA affected the operation of all defense contractors that emit toxic or hazardous material into the United States waters. Through a permit and best practice system, all parties are required to meet or exceed the established national standards. As amended, the CWA includes the authority to impose fines and civil punishment for violations. Focusing on the regulation of the intentional disposal of materials into ocean waters and authorizing related research is the Ocean Dumping Act.

6. The Community Environmental Response Facilitation Act of 1992 (CERFA): CERFA addresses the rapid identification, remediation and restoration of contaminated areas, and the transfer of excess Government property. This Act is in response to the perceived economic hardships experienced by local communities after the closure of a facility and the delay in ultimate property transfer due to the process of environmental remediation efforts. Under CERFA, DOD can release parcels of land that neither present environmental hazards nor are considered a threat to health and human safety. The transfer of parcels can occur while remediation efforts are being performed at other sites on the installation.

7. National Priorities List (NPL): Using the Hazard Ranking System (HRS), the Environmental Protection Agency evaluates contaminated sites for their potential to affect human health and the environment. The HRS is a numerical scoring system which provides a means of applying uniform technical judgment regarding the potential hazards posed by a site relative to other sites. The HRS does not address the feasibility, desirability, timing, or degree of cleanup required. Sites that score 28.5 or greater are considered for placement on the NPL. For DOD, NPL status generally refers to the entire installation, not to any individual site on the installation.

8. The Safe Drinking Water Act (SDWA): The Safe Drinking Water Act (SDWA) was first signed into law in 1974 to ensure safe drinking water to all citizens. Like many other environmental matters, it was amended in 1976, 1977, 1979, 1986, and 1988. This resulted in the establishment of primary drinking water regulations for 83 contaminants. Of particular concern to the general public was lead contamination, which is now banned in all public water systems. The resulting directives required that all states develop programs to protect underground water wellhead areas. Federal facilities that are identified as actual or potential sources of contamination all must comply with all SDWA requirements. This extended into the enforcement area, making Federal facilities responsible for any penalties or fees charged by State government application programs.

9. The Resource Conservation and Recovery Act of 1976 (RCRA): This Act was signed in 1976 and subsequently amended in 1978, 1980, 1984, and 1986. The RCRA picks up where the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) left off and establishes cradle-to-grave management responsibilities for hazardous waste generators. The Act established a national strategy for hazardous waste management of current and future operations. The RCRA was designed to establish a Federal program to regulate hazardous waste management. The amendment resulted in a disposal prohibition of untreated hazardous waste at landfills. The Act also provided minimum standards on all facilities handling hazardous material and a permit system for all treatment, storage and disposal facilities. Responsibilities include record keeping on generation, transportation, storage, and disposal of hazardous materials.

10. The Energy Planning and Community Right-to-Know Act (EPCRA): The Energy Planning and Community Right-to-Know Act was designed to support State and local emergency planning efforts and information concerning potential hazards in communities. To enforce this law, the EPA created the annual Toxics Release Inventory (TRI) for release to the public. Manufacturers are required to report to the State and EPA the amounts of over 300 toxic chemicals that they release into the environment or transfer to waste treatment or disposal facilities. For purposes of emergency planning, a Governor or a State Emergency Response Commission can designate additional facilities, which are subject to the reporting requirements after public notice and the opportunity for comment. This Act was noted by a marked departure from the previous obligated to comply with the requirements because the word “person” was used and Federal facilities were not technically included in the definition of person. However, this Act did extend to current Government-Owned/Contractor-Operated (GOCO) facilities.

11. The Toxic Substances Control Act (TSCA): In 1976, Congress took action to regulate hazardous and toxic material, waste and the prevention of possible health and environmental risks. The Toxic Substances Control Act (TSCA) directed the EPA to require manufacturers and processors to conduct tests for existing chemicals if: (1) their manufacture, distribution, processing, use or disposal may present an unreasonable risk of injury produced in substantial quantities and the potential for environmental release or human exposure is substantial; (2) existing data are insufficient to predict the effects of human exposure is necessary to develop such data.

The TSCA also included: (1) the control of unreasonable known health and environmental risks levels, (2) the prevention of future health and environmental risks, and (3) the establishment of the informational flow process covering all aspects of potential harm to public health and the environment. To achieve these goals, the EPA was given the authority to regulate private industry. The authority allowed the EPA to regulate production, processing, storage, distribution, use and disposal of chemicals that could cause potential harm to human health and the environment. To enforce the regulations, the EPA was given a range of authority. It included the total ban on production, the application of chemical warning labels and a system of fines for

violations. This Act caused changes in all areas of operations for Federal Government agencies and defense contractors.

12. The Federal Facilities Compliance Act of 1992 (FFCA): Prior to this law, there was the feeling that DOD was hiding behind the interpretation of sovereign immunity to avoid fulfilling its hazardous waste cleanup and management responsibilities. The Federal Facilities Compliance Act (FFCA) was signed in 1992. The FFCA clarifies and reinforces what was already stated in CERCLA and its amendments, stating that Federal facilities are subject to the penalties, civil and administrative fines for violations of Federal, state, and local laws dealing with the handling of solid and hazardous wastes. This Act allows the EPA a new and powerful enforcement tool over the DOD; no longer could the DOD rely on sovereign immunity.

13. The Environmental Research and Development Demonstration Act (ERDDA): Authorizes all Environmental Protection Agency research programs.

14. The National Environmental Policy Act of 1969 (NEPA): Requires, in part, the Environmental Protection Agency to review environmental impact statements. The Act requires the preparation and performance of environmental assessments and an environmental impact statement, which considers current and future environmental implications of any given reuse plan, prior to execution of that plan.

15. The Hazardous and Solid Waste Amendments (HSWA) of 1984: Commonly referred to as the amendments (passed in 1976) to the Resource and Recovery Act (RCRA). The increased environmental awareness and health risks from the exposure to hazardous material contributed to Presidential actions that strengthened the EPA's position. The President extended environmental laws and regulations to all Government agencies. A summary of pertinent executive orders follows. They are provided to show the complexities faced by civilian companies, DOD, and defense contractors.

16. Executive Order 11472: Issued in 1969, Executive Order 11472 established the Citizen's Advisory Committee on Environmental Quality and the Environmental Quality Control Council. President Nixon contributed to the future changes in the environmental policies of the United States. The Council and Committee actions led to the drafting of legislation that created NEPA.

17. Executive Order 12088: In 1978, President Carter signed Executive Order 12088, which mandated that all Federal Agencies assume a leadership role in pollution prevention, control and compliance with all existing environmental laws, pollution control standards and regulations. The opening section stated that this applied to all Federal facilities and activities under the control of the agency. However, the definition of activities under the control of the Agency was not provided in the text of the Executive Order.

18. Executive Order 12580: In 1986, President Reagan signed Executive Order 12580, which limited the EPA's jurisdiction in enforcing environmental compliance and cleanup at Federal Government facilities. It addressed the delegation of duties and powers assigned to the President under CEDCLA. The Order required a National Contingency Plan (NCP) to provide teams to respond during national or regional environmental emergencies.

More important to Federal facilities, it exploited an enforcement loophole in Executive Order 12088. The Department of Justice (DOJ) was given authority to approve any EPA enforcement actions against other Federal Agencies. The DOJ determined that one body of the executive branch could not sue another over environmental cleanup or compliance actions. The Order called for the Office of Management and Budget (OMB) to facilitate resolutions between agencies.

19. Executive Order 12856: In 1993, President Clinton signed an Executive Order directing all Federal Agencies to comply with the reporting requirements of the Emergency planning and community Right-to-Know Act. This related to the use, processing, manufacture and release of hazardous and toxic chemicals. The order also directed the Federal Government to incorporate pollution prevention (P2) through source reduction in management and acquisition activities to reduce the total release and offsite transfer for treatment and disposal of toxic chemicals. It further required acquisition policies to be changed, to reduce or eliminate unnecessary hazardous substances and toxic materials. In addition, the Executive Order encourages Federal agencies to develop and test innovative pollution prevention (P2) technologies, including the formation of partnerships with industry and academia to solve pollution problems.

20. Executive Order 12873: Also in 1993, President Clinton signed Executive Order 12873, entitled “Federal Acquisition, Recycling and Waste Prevention.” The order required the head of each Federal Government Agency to incorporate waste prevention and recycling into the agency’s policies and daily operations. It also directed agencies to develop policies to use environmentally preferable products and services and to implement cost-effective procurement preference programs favoring the purchase of such products and services. The order also directed the procurement related requirements to be implemented in the Federal Acquisition Regulation within 180 days of signing.

## **APPENDIX B. INTERVIEW QUESTIONS**

1. What is your definition of a successful environmental remediation action?
2. What are the key factors you look for in determining whether or not the remediation was successful?
3. What are your current contract vehicles for planning and conducting a remediation cleanup?
4. What are the strengths and weaknesses of this approach?
5. Are there any new and experimental methods being utilized to assist in the cleanup of formerly utilized industrial sites?
6. Are there any opportunities and threats associated with these new approaches?
7. Is the technology being utilized for environmental cleanup at a stable level or are there areas where improvements could lead to reductions in both time and cost to complete environmental remediation actions?

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## APPENDIX C. ANOCRONYMS USED

BCT	Base Closure Team
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long Term Environmental Action, Navy
DOD	Department of Defense
EPA	Environmental Protection Agency
FAR	Federal Acquisition Regulation
FFP	Firm Fixed Price
GAO	General Accounting Office
HTRW	Hazardous, Toxic, Radiological Waste
IPT	Integrated Process Team
LRA	Local Reuse Authority
NAVFAC	United States Navy Facilities Engineering Command
OSD	Office of the Secretary of Defense
RAB	Restoration Advisory Board
RAC	Remedial Action Contract
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
TERC	Total Environmental Restoration Contract
USACE	United States Army Corps of Engineers
USAFCEE	United State Air Force Center for Environmental Excellence

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