

MILITARY LAW REVIEW



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The *Military Law Review* has been published quarterly at The Judge Advocate General's School, United States Army, Charlottesville, Virginia, since 1958. The *Review* provides a forum for those interested in military law to share the products of their experience and research and is designed for use by military attorneys in connection with their official duties. Writings offered for publication should be of direct concern and import in this area of scholarship, and preference will be given to those writings having lasting value as reference material for the military lawyer. The *Review* encourages frank discussion of relevant legislative, administrative, and judicial developments.

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THE CHEMICAL DEMILITARIZATION PROGRAM—WILL IT DESTROY THE NATION'S STOCKPILE OF CHEMICAL WEAPONS BY DECEMBER 31, 2004?

LIEUTENANT COLONEL WARREN G. FOOTE*

*One service more we dare to ask—
Pray for us, heroes, pray,
That when Fate lays on us our task
We do not shame the Day!*¹

Rudyard Kipling

*Our goal is to eliminate from this Earth one of the most
horrible and terrifying weapons known to mankind—
chemical weapons.*²

*President Ronald Reagan
April 16, 1984*

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¹ RUDYARD KIPLING, *THE VETERANS* (Penguin Books 1982) (excerpt of the poem written for the gathering of survivors of the Indian Mutiny, Albert Hall, 1907).

² Remarks on the Vice President's Trip to Geneva, Switzerland, 20 WEEKLY COMP. PRES. DOC. 554 (Sept. 30, 1985) (presenting a new American treaty proposal to ban chemical weapons).

I. Introduction

The United States Army is poised to destroy the Nation's stockpile of lethal chemical weapons. The Army received this mission after the United States Congress directed the Department of Defense (DOD) in 1985 to destroy the stockpile by September 30, 1994.¹ Although this deadline has been extended several times,² significant progress has been made. The Army, as the DOD's executive agent for the chemical stockpile,³ has begun destroying chemical weapons overseas, and is ready to begin demilitarization operations within the Continental United States (CONUS).⁴

The Army's mission is to destroy the stockpile of lethal chemical weapons and material by Congress's mandated deadline of December 31, 2004, while providing maximum protection for the environment, the general public, and personnel involved in the destruction of the stockpile.⁵

Chemical demilitarization is the subject of considerable congressional and public attention. This article will examine how the chemical demilitarization program has developed from its inception, with emphasis on federal and state legislative enactments which directly affect the program. The discussion also will examine the new treaty requirements which are expected to take effect in the near future.⁶ Closely related to the new treaty requirements is a major new demilitarization mission—the clean up of nonstockpile chemical materiel. This includes chemical weapons production facilities, binary chemical weapons, and suspected burial sites containing chemical warfare materiel.

Two environmental statutes, the Resource Conservation and Re-

¹ Pub. L. No. 99-145, 99 Stat. 747 (codified as amended at 50 U.S.C.A. § 1521 (1993)).

² See 50 U.S.C.A. § 1521. Historical and Statutory Notes (1992). This deadline was first extended to July 31, 1999, and later, to December 31, 2004. See National Defense Authorization Act for Fiscal Year 1993, Pub. L. No. 102-484, 106 Stat. 2315 (1992) (codified at 50 U.S.C.A. § 1521(b)(5) (1993)).

³ See S. REP. NO. 102-408, 102d Cong. (1992); 50 U.S.C.A. § 1521(e) (1993).

⁴ The Johnston Atoll Chemical Agent Disposal System (JACADS) was constructed in the 1980s as a demonstration plant for incineration and thermal treatment technology for chemical agents and munitions stockpiled on Johnston Atoll. The JACADS began operations using chemical agents in 1990 with operational verification testing to determine whether the incineration and thermal treatment technology would work as predicted. The testing concluded in March 1993. Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program, Recommendations for the Disposal of Chemical Agents and Munitions, 24 (National Research Council 1994) [hereinafter Disposal Recommendations]; see *infra* notes 88-124 and accompanying text.

⁵ See 50 U.S.C.A. § 1521(a)(1), (b) (1993).

⁶ The Chemical Weapons Convention (CWC) is awaiting final action in the United States Senate. President Clinton submitted the CWC to the Senate for its advice and consent to ratification on November 23, 1993. He has urged its prompt ratification. 141 CONG. REC. S2821-03 (1995).

covery Act (RCRA)⁹ and the Clean Air Act (CAA),¹⁰ are examined for their impact on the demilitarization program. These statutes are implemented by a large body of federal and state regulations and include considerable oversight by regulating officials over Army demilitarization operations. For instance, the RCRA requires a permit before facility construction and operations may begin.¹¹ Under certain circumstances, the permit under the CAA to operate a demilitarization facility may be required, depending on the amount of emissions that the facility is expected to generate.

All of these enactments, congressional committee reports, and treaties affect the demilitarization program, and the Army's ability to meet the December 31, 2004, deadline. The program presents the dilemma of whether it is in the nation's best interest to proceed with a proven technology¹² which can be used to meet the deadline, or to seek out and develop an alternative technology¹³ which may ultimately prove to be "safer."

A. A Historical Perspective

Chemical warfare agents are terrifying weapons. Reports of their use provoke universal feelings of revulsion among those concerned with human suffering. As a weapon against military targets, chemical weapons have proven to be largely ineffective.¹⁴ As a result, chemical weap-

⁹ 42 U.S.C.A. §§ 6901-6992k (1993).

¹⁰ *Id.* §§ 7401-7671q.

¹¹ See Lawrence Rouse, *The Disposition of the Current Stockpile of Chemical Munitions and Agents*, 121 MIL. L. REV. 17, 81 (1988).

¹² The method selected by the Army and endorsed by the National Research Council to destroy the stockpile of chemical weapons is called the baseline disassembly and incineration technology. This technology mechanically separates chemical agent from both projectiles and containers and uses incineration and thermal treatment for chemical agent destruction. United States Army's Alternative Demilitarization Technology Report for Congress, Executive Summary, Department of the Army Program Manager for Chemical Demilitarization (1994) [hereinafter *Alternative Demilitarization Technology Report*]. See *infra* note 90.

¹³ The National Research Council has considered a large number of candidate alternative technologies that would use different processes to destroy chemical agent, hopefully at less risk to human health and the environment. Most of these technologies require extensive research and development to determine whether they would work. Disposal Recommendations, *supra* note 6, at 98-119. See *infra* sect. XII.

¹⁴ The British official history of World War I concluded that "Gas achieved but local success, nothing decisive; it made war uncomfortable, to no purpose." The official history also noted that chemical weapons only proved to be effective in a few instances when:

large quantities of agent were delivered on a wide front against enemy forces without adequate masks at hand, poorly trained in gas defense, low in morale, and poorly led and disciplined, toxic chemical opened the way for what might have been a decisive operation by producing casualties but, more significantly, by inducing panic.

See Dorothy Clark, *Effectiveness of Chemical Weapons in WWI*, 134 (Nov. 1958) (staff paper distributed by the Defense Technical Information Center, Cameron Station, Alexandria, Virginia 22314-6145, telephone: (703) 274-7633).

ons have come to be regarded as a weapon of terror against poorly trained and ill-equipped soldiers and civilians.¹⁵

The most widespread use of chemical warfare agents occurred during the First World War. Although Germany achieved early tactical success when it first used poison gas, it failed to achieve the desired breakthrough.¹⁶ While chemical warfare agents produced a large number of casualties during the Great War, it did not produce decisive results for either side.¹⁷ After World War I, fascist Italy in Ethiopia, and Imperial Japan in China used lethal chemical weapons.¹⁸ Nazi Germany used nerve agents in the notorious concentration camp system.¹⁹ Subsequent use of lethal chemical agents have been reported to have occurred in Yeman, Iraq, Cambodia, Laos, and Afghanistan.²⁰

The United States first developed its own stockpile of chemical weapons in response to the threat posed by Germany during World War I.²¹ The threat changed over the years, finally culminating in the massive development of chemical weapons as an offensive weapon by the former Soviet Union and the Warsaw Pact.²² In response, the United

¹⁵ *Id.* See also EDWARD SPIERS, CHEMICAL WARFARE 31-32 (1986).

¹⁶ Germany first used poison gas in World War I on April 22, 1915, during the Second Battle of Ypres. Two French divisions collapsed after being subjected to a German surprise attack using chlorine gas, which created a gap in the defensive lines. The Germans, however, failed to commit adequate forces to exploit the momentary breach, which was quickly filled by British and Canadian forces. The advantage enjoyed by the Germans in possessing this weapon of terror quickly dissipated as the Allies developed tactics, protective equipment, and training to counter the terror effects of the weapon. They also developed chemical weapons of their own. See Combat Studies Instit., United States Army Command and General Staff College, Charles Heller, *Chemical Warfare in World War I: The American Experience, 1917-1918*, 10 LEAVENWORTH PAPERS, Sept. 1984, at 8-10.

¹⁷ Poison gas caused an estimated 224,089 casualties among the American Expeditionary Force in France in World War I. *Id.* at 91. Many soldiers suffered long-term health effects from the residual presence of chemical agents on the battlefield. One of the soldiers that suffered from exposure to poison gas in France, but recovered after convalescing in Arizona, was Corporal Joseph C. Foote, my grandfather. The nation that appears to have been the least prepared for chemical warfare during World War I was Russia, which suffered approximately 475,000 nonfatal casualties and 58,000 fatalities from chemical agent exposure. See SPIERS, *supra* note 15, at 53, 62, 104.

¹⁸ See SPIERS, *supra* note 15, at 53, 62, 104.

¹⁹ The fear of Allied retaliatory use of poison gas is often attributed as the reason it was not used by the Germans on the battlefield during World War II, despite Germany's huge stocks of lethal nerve agent. See President Reagan, Radio Address to the Nation, 22 WEEKLY COMP. PRES. DOC. 1111 (Aug. 16, 1986). See also SPIERS, *supra* note 15, at 63-68.

²⁰ SPIERS, *supra* note 15, at 104-05, 118.

²¹ See Heller, *supra* note 16, at 91-93.

²² The Russians have acknowledged a 40,000-ton stockpile of chemical weapons, but are believed by United States analysts to have a stockpile well in excess of that figure. See U.S. NEWS & WORLD REP., Sept. 13, 1993, at 56. The total unitary stockpile of the United States is estimated to be 25,000 tons. "Unitary" chemical weapons "contain agents that, by virtue of their molecular composition and structure, are highly toxic and lethal in themselves." Committee on Alternative Chemical Demilitarization Technologies, Alternative Technologies for the Destruction of Chemical Agents and Munitions at 22-23 (National Research Council 1993) [hereinafter NRC Alternative Technologies Report].

States developed its own arsenal of chemical weapons and chemical defense tactics and equipment.²³ The last lethal chemical agents to be manufactured by the United States were binary²⁴ chemical agents.²⁵ In 1991, President Bush departed from the decades-long United States policy which allowed for the retaliatory use of chemical weapons²⁶ by:

foreswearing the use of chemical weapons for any reason, including retaliation, against any state, effective when the convention [the Multilateral Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction] enters into force. . . .²⁷

This represented a shift in United States policy. The chemical stockpile will no longer be used as a weapon of deterrence. Consequently, the need to maintain the chemical stockpile has passed.

²³ The bulk of this stockpile is now at least 25 years old, with some munitions as old as 45 years. The last unitary lethal chemical agents manufactured by the United States was in 1968. See Rouse, *supra* note 11, at 18. See also President Reagan, Remarks at the Annual Leadership Conference of the American Legion, 24 WEEKLY COMP. PRES. DOC. 279 (Feb. 29, 1988).

²⁴ Binary chemical munitions were designed to avoid the dangers of storing lethal chemical agent in either projectiles or containers. Binary munitions were loaded with two relatively safe chemicals in separate compartments within a single projectile. Upon being fired (such as an artillery projectile) or released, the compartments open, allowing the two chemicals to mix and form a lethal agent. The components of binary munitions are stockpiled apart, in separate states. See generally *Disposal Recommendations*, *supra* note 6.

²⁵ See 50 U.S.C.A. §§ 1519, 1520, 1521(h) (1993). Section 1519(a) prohibited the obligation of funds for the production of binary chemical weapons, unless the President certified to Congress that for each 155-millimeter binary artillery shell or aircraft-delivered binary aerial bomb produced, a serviceable unitary artillery shell from the existing arsenal would be rendered permanently useless for military purpose. Section 1519(b)(2) further required the President to certify that the production of binary chemical munitions was essential to national security before production could begin. President Reagan provided the required certifications to Congress on October 16, 1987.

²⁶ During World War II, President Roosevelt strongly opposed gas warfare, declaring that the United States would never engage in first use of chemical weapons. See SPIERS, *supra* note 13, at 84. This basic policy was carried on after the war, and was reflected in the Army's field manual on war fighting doctrine, which restated the policy of the United States which prohibited the first use of lethal or incapacitating chemical munitions, but reserved the right to retaliate if enemies used chemical weapons first. Under this policy, only the National Command Authority (the President) could grant authority to use chemical munitions. DEP'T OF ARMY, FIELD MANUAL 100-5, OPERATIONS, 47 (May 1986). Current Army doctrine stresses the ability to operate in a chemical environment, "Although U.S. policy does not condone or authorize first use of chemical weapons, preparedness to operate in this environment negates many possible advantages for an enemy to employ these weapons—in itself a deterrent to their use." DEP'T OF ARMY, FIELD MANUAL 100-5, OPERATIONS, 6-11 (June 1993).

²⁷ President Bush, Statement on Chemical Weapons, 27 WEEKLY COMP. PRES. DOC. 599 (May 13, 1991). See also Article I of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (United Nations 1993).

B. The Army's Experience in Demilitarizing Chemical Weapons

The Army has extensive experience in destroying chemical agents.²⁸ Since 1969, the Army has destroyed over 7000 tons of chemical warfare agents by incineration or chemical neutralization.²⁹ Much of this work was carried out at Rocky Mountain Arsenal, Colorado.³⁰ Problems associated with destroying chemical agents by chemical neutralization led the Army to decide against using it as a major chemical demilitarization process.³¹

In the early 1980s, about thirty-eight tons of GB (Sarin) and eight tons of VX (both are lethal nerve agents) were destroyed by incineration at the Army's Chemical Agent Munitions Disposal System (CAMDS), which is the Army's pilot demilitarization plant, located at Tooele Army Depot (TEAD), Utah.³² The CAMDS began demilitarization operations in 1979 as a prove-out facility to develop and test various chemical and thermal disposal technologies. It was not designed for large-scale disposal operations.³³ Nevertheless, in the course of various tests, the CAMDS has destroyed a significant amount of chemical agent.³⁴ A wide variety of tests have been conducted at the CAMDS, to include evaluating technology for caustic neutralization and incineration of chemical agents, machine (robot) testing of projectile disassembly equipment, trial burns under the RCRA, testing of Mustard thaw containers, and cryofracture technology.³⁵ The Army has used the tests conducted at the CAMDS to demonstrate that chemical agent could be successfully destroyed by incineration.³⁶

²⁸ "Between World War I and 1969, obsolete or unserviceable chemical warfare agents and munitions were disposed of by open pit burning, land burial, and ocean dumping. These disposal operations were standard industrial practices and were conducted without fatality or adverse public reaction." Alternative Demilitarization Technology Report, *supra* note 12, at 1-3.

²⁹ NRC Alternative Technologies Report, *supra* note 22, at 54. This activity represents Army research and development efforts to gain experience in chemical demilitarization operations. *Id.* at 1-3.

³⁰ Chemical destruction activity conducted primarily at Rocky Mountain Arsenal included incinerating approximately 3100 tons of H (mustard) and destroying nearly 4200 tons of GB (Sarin) by reaction with alkali (chemical neutralization). *Id.* at 54-62.

³¹ *Id.* at 54. The NRC states that the Army rejected chemical neutralization due to the complexity of the process, the quantity and nature of the waste produced, the high capital and operating costs, and the detection of trace amounts of GB after the neutralization process was completed. The validity of the latter problem, however, is in dispute, due to the analytical method used by the Army.

³² *Id.* at 62.

³³ National Research Council, *Disposal of Chemical Munitions and Agents: A Report*, 21 (1984) [hereinafter NRC 1984 Report]; see also Rouse, *supra* note 11, at 37.

³⁴ For instance, in January 1992, 1200 pounds of mustard agent were incinerated during testing. See USACMDA, *Annual Status Report on the Disposal of the Lethal Chemical Stockpile*, 14 (Dec. 1992) [hereinafter 1992 Annual Status Report].

³⁵ *Id.* at 14-15; NRC 1984 Report, *supra* note 33; Rouse, *supra* note 11, at 37-42.

³⁶ The CAMDS is scheduled to be closed in 1995. Congress consequently directed that the Army study future research missions for the facility. See Comm. on Appropriations,

Although the Army has destroyed large quantities of chemical agent in the past twenty-five years, the primary mission was to safeguard the stockpile to deter potential adversaries from using lethal agents against the United States and its allies.³⁷ As a result, all unitary lethal chemical agents have been maintained in carefully guarded storage locations. The policy of deterrence has been a notable success. After World War I, chemical weapons were never used against American personnel. Nevertheless, as the nation's stockpile of unitary lethal chemical warfare agents aged, it began to degrade. A 1984 report from the National Academy of Sciences determined that the Army should continue to store the majority of its chemical munitions and agents, proceed with disposing of the M-55 rockets—which are viewed as a long-term storage hazard—and to analyze alternative methods for disposing of the chemical stockpile.³⁸ By 1985, the bulk of this stockpile was determined to be obsolete or of no military utility.³⁹ It was time to destroy the stockpile.

In 1985, Congress directed the Secretary of Defense by statute to destroy the nation's stockpile of unitary lethal chemical agents and munitions that existed on the date of enactment of the Act.⁴⁰ The original deadline set by Congress to destroy the stockpile was September 30, 1994.⁴¹ Subsequent legislation extended the deadline to December 31, 2004.⁴² This statute is the basis for the Army's chemical demilitarization program.

C. Composition and Location of the Chemical Stockpile

The chemical stockpile consists of two basic types of unitary lethal chemical agent, nerve agents (GA (Tabun)), GB (Sarin and VX), and blister agents (H, HD, HT (Mustard), and L (Lewisite)).⁴³ Nerve agents

S. REP. NO. 102-408, 102d Cong. 2d Sess. (1992). The Army is presently conducting a study to determine how to utilize the CAMDS. The study considered several alternative future uses of the facility, to include pilot studies of conventional munitions destruction; pilot studies to support alternative technologies for chemical munitions destruction; and support of the nonstockpile chemical destruction program. 1992 Annual Status Report, *supra* note 34, at v.

³⁷ United States Army Chemical Materiel Destruction Agency, Environmental Report for the Johnston Atoll Chemical Agent Disposal System, Operational Verification Tests 1 & 2, Johnston Island 1990-1992, 1 (Sept. 3, 1993) [hereinafter JACADS Environmental Report].

³⁸ *Id.* at 1 (citing NATIONAL RESEARCH COUNCIL, COMMITTEE ON DEMILITARIZING CHEMICAL MUNITIONS AND AGENTS, DISPOSAL OF CHEMICAL MUNITIONS AND AGENTS (National Academy Press 1984)).

³⁹ Rouse, *supra* note 11, at 18.

⁴⁰ Department of Defense Authorization Act of 1986, Pub. L. No. 99-146 (codified as amended at 42 U.S.C.A. § 1521 (1992)).

⁴¹ 50 U.S.C.A. § 1521(b)(1)(3)(A) (1992).

⁴² National Defense Authorization Act for Fiscal Year 1993, Pub. L. No. 102-484, 106 Stat. 2315 (1992) (codified at 50 U.S.C.A. § 1521(b)(5) (1993)).

⁴³ See NRC Alternative Technologies Report, *supra* note 22, at 1 n.1. The stockpile originally designated for destruction consisted exclusively of unitary chemical weapons. "Unitary chemical weapons contain agents that, by virtue of their molecular composition

are the most lethal of the chemical agents. These agents inhibit the body's nervous system from operating normally, to include the nerves that control the diaphragm. In cases of lethal exposure, death is caused by asphyxiation.⁴⁴ Mustard agents burn the eyes and lungs and blister the skin.⁴⁵

The stockpile is stored in a variety of munitions and bulk containers, to include one-ton bulk containers, spray tanks, artillery projectiles, mines, mortar rounds, and rockets. Many of the munitions also contain propellant and explosive components.⁴⁶ With the exception of the one-ton bulk containers, all munitions are stored in covered igloos.⁴⁷ The stockpile is stored at eight locations in CONUS, and at Johnston Island in the central Pacific Ocean.⁴⁸ The CONUS stockpile storage facilities fall under the Army Materiel Command (AMC).⁴⁹ The stockpile locations are listed below, by major subordinate command, to reflect the respective percentage and composition of the unitary stockpile that is stored at each site⁵⁰:

and structure, are highly toxic or lethal. By comparison, binary chemical agents consist of two nonlethal chemicals that, upon mixing, form a lethal chemical agent." Binary agents were introduced during the Reagan Administration, largely as a bargaining chip, to encourage Soviet participation in eliminating chemical weapons. Criticized at the time as an unnecessarily provocative policy, the United States and the former Soviet Union are now engaged in cooperative efforts to destroy their respective stockpiles of unitary and binary chemical weapons. See also Chemical Stockpile Disposal Program Final Programmatic Environmental Impact Statement, Program Executive Officer—Program Manager for Chemical Demilitarization 1-5 (1988) [hereinafter FPEIS].

⁴⁴ NRC Alternative Technologies Report, *supra* note 22, at 41-42. See Assessment of the United States Chemical Weapons Stockpile Integrity and Risk Analysis, 1-4 (July 1993): "Nerve agents are chemical agents which, when absorbed into the body by inhalation, by ingestion, or through the skin, interfere with the nervous system by inhibiting an enzyme (cholinesterase) throughout the body, permitting accumulation of a stimulator (acetylcholine). Blister agents are chemical agents that are readily absorbed by both exterior and interior parts of the body, causing inflammation, blisters, general destruction of tissues, and death." See also Rouse, *supra* note 11, at 17-19; NRC 1984 Report, *supra* note 33.

⁴⁵ NRC Alternative Technologies Report, *supra* note 22, at 42; Rouse, *supra* note 11, at 20.

⁴⁶ NRC Alternative Technologies Report, *supra* note 22, at 37-53; Rouse, *supra* note 11, at 18-19.

⁴⁷ See NRC 1984 Report, *supra* 33, at 20. Each igloo is locked and has its own agent detection equipment (to detect leaking agent) and a security system. One of the devices used to detect leaking agent is the automatic continuous air monitoring system (ACAMS), which is an automatic gas chromatograph. Additionally, all igloos are located in a special restricted area that requires a special security clearance to enter. Security measures around this restricted area include: double fencing; security guards; lighting; and electronic surveillance.

⁴⁸ NRC Alternative Technologies Report, *supra* note 22, at 26-27.

⁴⁹ To carry out its many diverse missions, the AMC has created several major subordinate commands, to include the United States Army Test and Evaluation Command; the United States Army Depot Systems Command; the United States Army Armament, Munitions, and Chemical Command; and the United States Army Chemical and Biological Defense Command. Each stockpile facility belongs to a major subordinate command of the AMC.

⁵⁰ See FPEIS, *supra* note 43, at 2-1 to 2-20; Mark Brown, Public Trust and Technology: Chemical Weapons Destruction in the United States (Committee for National Security 1992).

U.S. Army Test & Evaluation Command (TECOM)

(1) Aberdeen Proving Ground (APG), Maryland (5%) (HD-ton containers only)

U.S. Army Armament, Munitions & Chemical Command (AMCCOM)

(2) Pine Bluff Arsenal (PBA), Arkansas (12%) (HD, HT, GB, and VX)

(3) Newport Army Ammunition Plant (NAAP), Indiana (3.9%) (VX-ton containers only)

U.S. Army Depot System Command (DESCOM)

(4) Pueblo Depot Activity (PUDA), Colorado (10%) (HD, HT-projectiles and cartridges only)

(5) Umatilla Depot Activity (UMDA), Oregon (11.6%) (HD, GB, and VX)

(6) Tooele Army Depot (TEAD), Utah (42.3%) (H, HT, HD, GB, and VX)

(7) Blue Grass Army Depot (BGAD), Kentucky (1.6%) (H, GB, and VX)

(8) Anniston Army Depot (ANAD), Alabama (7.1%) (HD, HT, GB, and VX)

Defense Nuclear Agency (not affiliated with AMC)

(9) Johnston Atoll Chemical Agent Disposal System (JACADS) (5.2%) (HD, GB, and VX)⁵¹

To gain an overall perspective of the chemical demilitarization program, it is necessary to review its development over the past seven years. Special emphasis will be placed on legislation, congressional directives, and treaties that directly affect the program. Finally, the congressionally directed alternative technologies study will be examined.

II. Federal Legislative Enactments and Reports Affecting the Demilitarization Program

Congress created the chemical demilitarization program to destroy the stockpile of unitary chemical weapons. Subsequently, the program

⁵¹ See NRC Alternative Technologies Report, *supra* note 22, at 50. Two of the listed commands, the DESCOM and AMCCOM merged in 1994 to become the Industrial Operations Command.

has been expanded to include nonstockpile materiel. To understand the organization and direction of the program, it is necessary to review the legislation and congressional committee reports that have shaped it.⁵²

A. The Department of Defense Authorization Act of 1986⁵³

This DOD Authorization Act of 1986 was the genesis of the chemical stockpile disposal program. It mandated the destruction of the United States stockpile of lethal unitary chemical weapons as it existed on November 8, 1985.⁵⁴ It also provided a separate DOD account to fund all activities, and required the Secretary of Defense to establish a management organization in the Department of the Army to carry out the mission. The Act required the Secretary to designate a general officer as director of this management organization.⁵⁵ The Act also prohibited any future use of the demilitarization facilities once the destruction of the lethal chemical stockpile is complete.⁵⁶ This was intended to assure communities living near the stockpile sites that the demilitarization facilities would not be used as hazardous waste disposal sites after the stockpile was destroyed.⁵⁷

B. The National Defense Authorization Act for Fiscal Years (FY) 1988 and 1989⁵⁸

In the Act, Congress extended the stockpile elimination deadline from 1994 to April 30, 1997⁵⁹ and prohibited any activity for equipment prove out and systems testing of a full-scale demilitarization facility in

⁵² See Rouse, *supra* note 11; FPEIS, *supra* note 43, app. D, for excellent discussions of the early development of the chemical stockpile disposal program.

⁵³ Pub. L. No. 99-145, 99 Stat. 747 (1985) (codified at 50 U.S.C. § 1521).

⁵⁴ 50 U.S.C.A. § 1521(a) (1993). The Act allows the Secretary of Defense to defer, however, the destruction of not more than ten percent of the stockpile. *Id.* at § 1521(b)(3)(A).

⁵⁵ *Id.* § 1521(e). This organization was called the United States Army Chemical Materiel Destruction Agency (USACMDA) until October 1, 1994, when it was reorganized and renamed the United States Army Chemical Demilitarization and Remediation Activity (USACDRA). The USACDRA falls under the command of the United States Army Chemical and Biological Defense Command, which is a part of the United States Army Materiel Command.

⁵⁶ "Facilities constructed to carry out this section may not be used for any purpose other than the destruction of lethal chemical weapons and munitions, and when no longer needed to carry out this section, such facilities shall be cleaned, dismantled, and disposed of in accordance with applicable laws and regulations." *Id.* § 1521(c)(2) (1991).

⁵⁷ Some critics of the program base their opposition on the suspicion that Congress will renege on the commitment to clean and dismantle the facilities after the stockpile is gone, and authorize their use as regional hazardous waste disposal sites. See NRC Alternative Technologies Report, *supra* note 22, at 30. Perhaps to allay public suspicion, Congress has repeatedly emphasized its commitment not to use the demilitarization facilities after the stockpile is destroyed. The most recent example appears in the 1994 Defense Appropriations Act.

⁵⁸ Pub. L. No. 100-456, 102 Stat. 1918 (1988).

⁵⁹ 50 U.S.C.A. § 1521(b)(5) (1992).

CONUS until Operational Verification Testing (OVT) was successfully completed by the Army for the JACADS.⁶⁰ The Secretary of Defense had to certify OVT completion in a report submitted to Congress. The Secretary of Defense also was directed to issue a Final Programmatic Environmental Impact Statement (FPEIS) on the chemical stockpile demilitarization program by January 1, 1988. In this context, the Army was directed to decide whether to carry out the chemical demilitarization mission by on-site destruction, through regional destruction centers, or through a national destruction site.⁶¹ The Army met the deadline, and selected on-site incineration⁶² in its Record of Decision.⁶³

In a subsequent letter to Congressman Larry Hopkins, then a member of the House Committee on Armed Services, the Army agreed to conduct a two-phased approach to its site specific environmental impact statements and related documents. The first phase would consist of the Army gathering updated and new data at each of the eight proposed demilitarization sites and comparing that data with the information used for the FPEIS. This was to confirm that the data used for the FPEIS was still valid. The Phase I report would certify that updated site specific information had been evaluated and compared to the FPEIS for each site. Phase II would start at the completion of the Phase I certification, and would consist of writing a site specific EIS for each stockpile location.⁶⁴

C. *The National Defense Act for FY 1991*⁶⁵

Congress directed the Army to assess the safety status and integ-

⁶⁰ The OVT was required to demonstrate the demilitarization process before full-scale operations could begin. Four separate OVTs were conducted to show that the facility could safely operate for the time periods and production rates required to destroy four different types of chemical agents and munitions. JACADS Environmental Report *supra* note 37, at 4.

⁶¹ See H. CONF. REP. NO. 1748, 100th Cong., 1st Sess., § 112 (1987).

⁶² Incineration is a treatment, rather than a disposal system, for wastes. High temperatures are used to reduce the volume and hazardous quality of a particular waste. Stated differently, organic wastes fed into an incinerator are thermodynamically converted, through oxidation, to simpler forms (gases). The mass at the start of the process is the same as the mass at the end. The oxidation process breaks down the larger molecules into smaller molecules, mostly water and carbon dioxide. Other elements, to include nitrogen, sulfur, chlorine, phosphorus, and trace metals, may be present in the exhaust gas. Pollution abatement systems (PAS) are added to the furnace systems to remove or minimize acidic gases and particles from the exhaust. See David Kopel, *Burning Mad: The Controversy Over Treatment of Hazardous Waste in Incinerators, Boilers, and Industrial Furnaces*, 23 ENVTL. L. REP. (ENVTL. INST.) 10,216 (Apr. 1993); JACADS Environmental Report, *supra* note 37, at 2.

⁶³ The Programmatic EIS was released in January 1988, and the Under Secretary of the Army signed the Record of Decision selecting on-site disposal at each of the eight existing storage installations on February 23, 1988.

⁶⁴ See Letter from John Shannon, Assistant Secretary of the Army, to the Honorable Larry Hopkins, Committee on Armed Services (May 11, 1988). The intent was for the site-specific EIS to be tiered from the FPEIS to eliminate repetitive discussions. See also 40 C.F.R. § 1502.20 (1992).

⁶⁵ Pub. L. No. 101-510, 104 Stat. 4739 (1990) (amending 50 U.S.C. § 1521).

urity of the stockpile of chemical agents and munitions, to include providing an estimate of how much longer the stockpile could continue to be stored safely.⁶⁶ The Army must include this assessment in its annual report to Congress on the Army's demilitarization activities.⁶⁷ Congress also required the Secretary of Defense to develop a plan setting forth the steps that he would take if the chemical weapons stockpile deteriorated at an accelerated rate.⁶⁸

*D. House Committee on Appropriations Report for 1992*⁶⁹

The House Committee on Appropriations recommended that the DOD create a single organization for all chemical warfare destruction activities that would be responsible for total program execution.⁷⁰ On October 1, 1992, the Army's chemical demilitarization program was reorganized to comply with the Committee's guidance. The Office of the Program Manager for Chemical Demilitarization was restructured and renamed the United States Army Chemical Materiel Destruction Agency (USACMDA), with two subordinate program managers, the Program Manager for Chemical Demilitarization and the Program Manager for NonStockpile Chemical Materiel. Commensurate with this change in organization, the mission of the organization was expanded from demilitarizing the chemical stockpile to include demilitarizing:

- (1) Chemical warfare materiel manufacturing and testing facilities;
- (2) Binary munitions and production facilities; and
- (3) Abandoned chemical warfare materiel on active and formerly used defense sites (FUDS).⁷¹

Yet another organizational change occurred in the fall of 1994, when the USACMDA became the United States Army Chemical Demilitariza-

⁶⁶ 101 Pub. L. No. 510, § 171 (1990).

⁶⁷ 50 U.S.C.A. § 1521 (1993).

⁶⁸ 101 Pub. L. No. 510, § 173 (1990).

⁶⁹ REPORT ON THE DEPARTMENT OF DEFENSE APPROPRIATIONS BILL FOR 1992, H.R. REP. NO. 102-95, 102d Cong. (1991). Congressional committees have provided specific direction to the chemical demilitarization program throughout the life of the program. Although these directives do not have the force of law, they are usually complied with. Executive agencies ignore congressional direction at their peril, as funding for subsequent years can be placed in jeopardy.

⁷⁰ *Id.*

The Committee believes that recent developments in chemical warfare arms control make the creation of a single organization even more urgent than was the case last year. The current fragmented approach makes no sense. The Secretary of Defense is directed to move vigorously on last year's direction and report on actions taken to comply with this direction by September 30, 1991.

Id.

⁷¹ 1992 Annual Status Report, *supra* note 34, at iii.

tion and Remediation Activity (USACDRA)⁷³ upon merging with the United States Army Chemical and Biological Defense Command.⁷³

*E. The National Defense Authorization Act for 1993*⁷⁴

Congress once again extended the chemical weapons stockpile elimination deadline, ostensibly to conform it with United States treaty and diplomatic obligations.⁷⁵ The new deadline is December 31, 2004.⁷⁶ Congress also directed new efforts towards consultation with local communities and investigating new technologies.

Specifically, Congress directed the Army to establish a Chemical Demilitarization Citizen's Advisory Commission for any state in which there is a chemical munitions storage site, to receive citizen and state concerns regarding the chemical demilitarization program.⁷⁷

Congress also required the Army to submit a report to Congress not later than December 31, 1993,⁷⁸ on potential alternative technologies to the Army's baseline disassembly and incineration process for the disposal of lethal chemical agents and munitions.⁷⁹ The report had to in-

⁷³ In this article, the USACMDA is referenced for all Army chemical disposal activities, because the events and issues described herein predate this latest organizational change.

⁷⁴ The merger centralizes management of all chemical stockpile, surety, safety, treaty compliance, and demilitarization and remediation activities under a single command within the U.S. Army Materiel Command. The Assistant Secretary of the Army (Installations, Logistics, and Environment) (ASA(IL&E)), as the Executive Agent for the Chemical Demilitarization Program, retains special oversight and policy authority for the destruction of the U.S. unitary chemical stockpile and non-stockpile chemical materiel.

Dep't of Army, Annual Status Report on the Disposal of Lethal Chemical Weapons and Materiel, v (Dec. 15, 1994) [hereinafter 1994 Annual Status Report].

⁷⁵ Pub. L. No. 102-484, 106 Stat. 2315 (1992) (amending 50 U.S.C. § 1521 (1993)).

⁷⁶ 50 U.S.C. § 1521(b).

⁷⁷ 50 U.S.C. § 1521(b)(5).

⁷⁸ National Defense Authorization Act for Fiscal Year 1993, Pub. L. No. 102-484, § 171, 106 Stat. 2315 (1992) (codified at 50 U.S.C.A. § 1521(b)(5) (1993)). The Commission must be established for the three low-volume states (Kentucky, Indiana, and Maryland). These are the states where opposition to the demilitarization program has been the most strident. The Army is directed to establish a commission for the remaining sites on request by each state's governor.

⁷⁹ The deadline for the report was later extended. The United States Army's Alternative Demilitarization Technology Report for Congress was submitted on April 11, 1994.

⁸⁰ This reflects Congress's sensitivity to the intense local opposition to on-site incineration at the low volume sites. Local politicians and certain members of Congress are pressing the Army to develop an alternate plan, either to develop a new treatment technology, or to transport the materials to another site. See 138 CONG. REC. 8244 (1992) (Representative McMillen of Maryland, stated, "The bottom line is that incineration is becoming an unacceptable disposal method at the low volume sites. It is time for the Army to devise an alternative plan. . . ."). See also *id.* at S8527, where Senator Ford stated:

Demographics at the storage sites have also changed over time. Large residential communities have grown within only a few miles of formerly isolated areas, particularly in three places: Kentucky, Maryland, and Indiana. Residents there are extremely concerned about the prospect of having chemical muni-

clude an analysis of the report prepared by the National Research Council (NRC) of the National Academy of Sciences.⁵⁰ Congress chose to impose the following limitation on progressing with preparations at the other designated sites:

the Secretary of the Army may not commence site preparation for, or construction of, a facility for disassembly and incineration of chemical agents until the report required under subsection (a) [Alternative Technologies Report] is submitted to Congress.⁵¹

The limitation above does not apply to TEAD, where construction of the demilitarization facility had already begun.⁵² For four of the stockpile sites (ANAD, PUDA, PBA and UMDA), certain listed activities were allowed, to include: facility design activities, obtaining environmental permits, project planning, procurement of equipment, and dual purpose depot support construction projects.⁵³ These activities were not allowed at the three low-volume sites (APG, BGAD, and NAAP) where the use of an alternative technology may be required.⁵⁴

Congress required the Army to use an alternative technology at a low-volume site if the Secretary of the Army determines:

- (1) The alternative technology is significantly safer and equally or more cost effective than baseline technology; and
- (2) The alternative technology process will demilitarize all chemical munitions at the site within the congressionally mandated deadline (December 31, 2004).⁵⁵

If an alternative technology is required for a site, the Secretary of the Army must submit a revised concept plan to Congress, explaining how the technology will be used to process the munitions. No funds may be obligated for the procurement of equipment or for facility planning and design activities until the revised concept plan is submitted to Congress.⁵⁶

Congress used the National Defense Authorization Act for 1993 to

tions burned in their backyards, and rightfully so. . . . But perhaps even more compelling is the cold hard fact that the Army has no contingency plan in the event a state denies an environmental permit to build the incinerator, or if cost overruns or technical problems bring the baseline technology to a screeching halt.

⁵⁰ Pub. L. No. 102-484, § 173(a) (1992).

⁵¹ *Id.* § 173(B).

⁵² *Id.* § 173(B)(2).

⁵³ *Id.* § 173(B)(3).

⁵⁴ *Id.* § 173(B)(2), (3).

⁵⁵ *Id.* § 174(a).

⁵⁶ *Id.* § 175.

address yet another problem—nonstockpile chemical warfare materiel. In chemical weapons development from World War I until recently, burial was the common way to dispose of spent chemical munitions. These burial sites are located on military installations as well as on FUDS. Although chemical warfare research occurred away from civilian communities, many sites have reverted to civilian use. As a result, some former farmlands where chemical warfare research took place are now well-established residential and commercial communities.⁸⁷

To understand the magnitude of the problem, Congress directed the Army to prepare a report on nonstockpile chemical materiel and submit it by February 1, 1993.⁸⁸ Nonstockpile materiel was defined to include binary chemical munitions, buried chemical munitions, chemical munitions recovered from ranges, chemical weapons production facilities, and all other chemical warfare materiel.⁸⁹ Congress directed that the report include certain information, to include:

- (1) A list of all suspected locations of buried or unexpended chemical munitions.
- (2) An inventory of former chemical weapons production facilities.
- (3) An inventory of binary chemical munitions and the plans to destroy these munitions.
- (4) A description of the use, if any, that will be made of CAMDS

⁸⁷ A recent example serves as an illustration of the scope of the nonstockpile problem. A World War I era chemical material burial site was uncovered on January 5, 1993, when a construction crew working a backhoe uncovered several buried munitions in a residential development in Washington, D.C. (Spring Valley). The location of the burial site in the nation's capital, and its proximity to the homes of two senior United States Senators, added to the interest of the press. An Army explosive ordnance detachment responded to the scene, and determined that the uncovered munitions could contain chemical warfare agents, to include mustard, phosgene, and lewisite. Research of available records showed that the Army, in cooperation with American University, had used the site as a testing site for chemical weapons during World War I. The Army, as the designated lead agency under the National Contingency Plan, assumed responsibility for the cleanup of the munitions located at the site. See 40 C.F.R. § 300.120(c) (1992). Brigadier General Friel, Commander of the Chemical Biological Defense Agency (this command was later renamed the United States Army Chemical and Biological Defense Command), was designated as Service Response Force Commander on January 7, 1993. Under his direction, the Army undertook to determine what was buried at the site, and to remove all munitions and related material. In the course of three weeks, 31 liquid filled munitions and 110 solid filled munitions were recovered. Testing revealed trace amounts of World War I era chemical agent in a few of the munitions. The liquid-filled munitions were flown by military aircraft as RCRA hazardous waste to the PBA for storage and eventual demilitarization. The solid-filled munitions (conventional ordnance) also were considered to be hazardous waste, and were flown to Fort A.P. Hill, Virginia, and destroyed by demolition. See O'Donnell, *WASH. POST*, Jan. 29, 1993; Weil, *WASH. POST*, Jan. 27, 1993, at B6.

⁸⁸ Pub. L. No. 102-484 § 176(a). The Army received a deadline extension and submitted an interim report in April 1993. The final report, titled, "The Non-Stockpile Chemical Materiel Program Survey and Analysis Report," was submitted in November 1993.

⁸⁹ *Id.* § 176(b).

in destroying nonstockpile chemical materiel, and other future uses of the facility.

(5) An estimate of the cost and time needed to destroy the nonstockpile materiel.

(6) A determination of whether it is a realistic option to transport chemical agents and munitions stored at the low-volume sites to other locations for destruction.⁸⁶

Reflecting concern over the continued delays in the scheduled destruction of the chemical stockpile, Congress also tasked the Army to submit a report by May 1, 1993,⁸⁷ on the physical and chemical integrity of the chemical weapons stockpile, to include a critical analysis of the near-term, mid-term, and long-term storage life.⁸⁸

The Conference Report on House Report 5504, the Department of Defense Appropriations Act, FY 1993, provided additional guidance to the Army.⁸⁹ It recommended that the Army "assume the lead in all affairs of the Chemical Stockpile Emergency Preparedness Program."⁹⁰ The report also criticized the Army for its slow development and use of cryofracture technology.⁹¹

⁸⁶ *Id.* § 176(c).

⁸⁷ Pursuant to the Act, the Army submitted a report in July 1993, titled, "Physical and Chemical Integrity of the Chemical Weapons Stockpile. Assessment of the U.S. Chemical Weapons Stockpile: Integrity and Risk Analysis," prepared for the United States Army by the MITRE Corporation.

⁸⁸ Pub. L. No. 102-484 § 177.

⁸⁹ 135 CONG. REC. H 11518 (1992).

⁹⁰ This program is designed to enhance emergency preparedness in the local communities, states, and installations where the eight stockpile sites are located. In cooperation with the Federal Emergency Management Agency (FEMA), the Army conducts periodic exercises to evaluate emergency response plans as well as installation and local responses to simulated accidental releases of chemical agent. See DEP'T OF ARMY, REG. 50-6, CHEMICAL SURETY, ch. 5 (Nov. 12, 1989) (I01, May 19, 1991) [hereinafter AR 50-6]; DEP'T OF ARMY, PAMPHLET 50-6, CHEMICAL ACCIDENT OR INCIDENT RESPONSE AND ASSISTANCE OPERATIONS, para. 17-6 (May 17, 1991) [hereinafter DA PAM. 50-6].

⁹¹ The Committee noted its long support of cryofracture technology, and noted:

The Army's reluctance to pursue a vigorous cryofracture program has been justified in the past on its strong confidence that the baseline approach will prove to be technically viable and cost effective. Experience to date belies this confidence. Costs have quadrupled and the schedule has slipped by ten years. Furthermore, the House Surveys and Investigations Staff has called into question a recent Army estimate which unfavorably compared the cost of a cryofracture facility with a baseline facility.

If the Army elects to proceed without including a cryofracture facility in its program, the Army is to submit to the committee a detailed justification and rationale for that decision at least 30 days before obligating any further funding for a baseline facility at a site which has been considered for a cryofracture plant.

This report indicates the conflicting signals which the Congress is giving the Army. The Army is criticized for failing to meet previous deadlines and for cost overruns, yet it also is criticized for not proceeding with a variation on the baseline technology which is more expensive and not proven in field operating conditions.

F. Department of Defense Appropriations Act for FY 1994

The DOD Appropriations Act⁹⁶ continues congressional spending policy for the demilitarization program. It continues to prohibit spending funds for studies on the feasibility of removing and transporting unitary chemical weapons from the eight CONUS stockpile sites, as well as studies on potential future uses of the nine chemical demilitarization facilities (except the CAMDS facility). It also extends the prohibition on shipping chemical munitions to JACADS.⁹⁷

III. What Has Been Done to Destroy the Stockpile?

A. Demilitarization Operations at Johnston Island

Johnston Island is a United States territory located approximately 800 miles southwest of Hawaii.⁹⁸ Lethal chemical agents originally were shipped to the atoll from Okinawa for storage in 1971.⁹⁹ The island was later selected as the site for the first full-scale chemical demilitarization facility.¹⁰⁰ The JACADS was built to destroy the chemical stockpile located on the island, and to serve as the prototype for the demilitarization facilities to be built in CONUS. The JACADS has subsequently demonstrated that the technology selected to destroy the stockpile works in field conditions.¹⁰¹ The JACADS disposal technology, otherwise known as baseline technology:

[i]nvolves the disassembly of the chemical agent-filled munitions and uses four separate incinerators for the destruction process. Each munition type is disassembled by machinery

⁹⁶ DEPARTMENT OF DEFENSE APPROPRIATIONS BILL, 1994, COMMITTEE ON APPROPRIATIONS, S. REP. NO. 103-153, 103d Cong., 1st Sess. (1993) [hereinafter DOD 1994 APPROPRIATIONS BILL]; see also NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1994, H.R. REP. NO. 103-357, 103d Cong., 1st Sess. (1993).

⁹⁷ DOD 1994 APPROPRIATIONS BILL, *supra* note 96.

⁹⁸ Johnston Island is one of four small islands that make up the Johnston Atoll. The island is managed by three separate military commands, which include: (1) The Program Manager for Chemical Demilitarization (PMCD); (2) the United States Army Chemical Activity Pacific (USACAP); and (3) the Defense Nuclear Agency (DNA). The PMCD operates the Johnston Atoll Chemical Agent Disposal System (JACADS), and the USACAP is responsible for the receipt, inspection, maintenance, and storage of the lethal chemical weapons. The DNA is responsible for the island itself, and operations unrelated to the missions of storing and destroying the chemical munitions. See P. Belanger, *EPA Report* (Mar. 22, 1993); 1992 Annual Compliance Report for the Johnston Atoll Chemical Agent Disposal System (JACADS) Facility.

⁹⁹ Johnston Atoll Chemical Agent Disposal System, Final Second Supplemental Environmental Impact Statement for the Storage and Ultimate Disposal of the European Chemical Munition Stockpile, 2-1, 2-3 (1990).

¹⁰⁰ *Id.* at 2-3.

¹⁰¹ See NRC Alternative Technologies Report, *supra* note 22, at 1, 24-26; see also Record of Decision, 53 Fed. Reg. 5816 (1988).

uniquely designed for it. The chemical agent is drained from the munitions and incinerated in a special furnace designed for agent destruction. Explosives and propellants are destroyed in a separate deactivation furnace. Metal (such as from munitions bodies) that has been in contact with chemical agent is decontaminated in the metal parts furnace. A dunnage incinerator is used to burn combustible wastes. A pollution abatement system for each furnace or incinerator is used to control atmospheric emissions.¹⁰²

The technology described above also is referred to as the JACADS process, or baseline technology. This choice of technology was endorsed by

¹⁰² FPEIS *supra* note 43, at 2-3, app. C. A more detailed explanation of the incineration technology, as provided in MITRE Corp., Evaluation of the Johnston Atoll Chemical Agent Disposal System: Operational Verification Testing, app. A (May 1993) [hereinafter Summary Evaluation on OVT], follows:

JACADS contains four incinerators designed to destroy material from different parts of the demilitarization process. Each incinerator has a primary chamber which provides the temperature, oxidizing conditions, and residence time to provide the desired destruction, and a secondary chamber to provide additional assurance that any vapors remaining will be fully destroyed. Each incinerator has a PAS [Pollution Abatement System] that reduces the pollutants in the exhaust gas to below the levels established in the environmental permits.

The Liquid Incinerator (LIC) is designed to incinerate liquid agent. Agent is injected into the primary chamber which operates at a nominal 2700F [degree]. The exhaust gases pass to the secondary chamber operating at 2000F, and are then treated in a PAS (including acid gas scrubbing), before being released from the common stack. Decontamination solutions from the demilitarization operations are collected and injected into the LIC secondary chamber to ensure destruction of any residual agent or organic byproducts of agent neutralization.

The Deactivation Facility (DFS) primary chamber is a rotary kiln designed to incinerate solid materials including rocket propellant and explosives, as well as agent-contaminated materials. Solids remain in the kiln for about 12 minutes, then the incinerated residue passes through a heated discharge conveyor for at least 15 minutes at 1000F to ensure thorough decontamination before discharge to a residue bin. The gases from the kiln pass through an afterburner operating at 2000F, and are then treated in the DFS PAS before discharge from the common stack.

The Metal Parts Furnace (MPF) is a refractory-lined furnace designed to thermally decontaminate drained metal parts (ton containers, bombs, or trays of projectile bodies). Trays of drained metal parts are conveyed through the furnace during which time any residual agent is destroyed by incineration. The metal parts are heated to at least 1000F for 15 minutes to ensure decontamination, then they are removed and cooled before disposal. The exhaust gases pass through the afterburner at 2000F, are treated in the MPF PAS, and are then discharged from the common stack.

The Dunnage Incinerator (DUN) contains a refractory-lined furnace designed to incinerate packing materials (dunnage) and other miscellaneous solid wastes that may be agent contaminated. The DUN operates at 1400F, the exhaust gases pass through an afterburner at 2000F, are treated in the DUN PAS, and are discharged from the DUN stack. The solid residue (ash) is cooled and removed for disposal.

the National Research Council (NRC)¹⁰³ in 1984.¹⁰⁴

Johnston Island was later selected to receive the United States-owned stockpile of lethal unitary chemical munitions that were stored in Europe.¹⁰⁵ The operation was divided into three phases: movement of the chemical agents within Germany; shipment over international waters; and receipt, storage, and ultimate destruction at Johnston Atoll.¹⁰⁶ Shipment of the European stockpile was completed in November 1990.¹⁰⁷

Construction of the JACADS facility was completed in 1987. This was followed by extensive systems testing, and facility modifications. Equipment acquisition and installation was completed in early 1989.¹⁰⁸

Certain problems related to systemization of the facility required correction before toxic operations could begin. As a result, operations to destroy toxic chemical agents did not begin until mid-summer of 1990.¹⁰⁹

To ensure that the baseline technology worked in field operating conditions, Congress required OVT. The intent was to prevent the Army from proceeding with equipment and systems testing at any recently constructed demilitarization facility before baseline technology was shown

¹⁰³ "The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government." Council members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. NRC Alternative Technologies Report, *supra* note 22, at ii.

¹⁰⁴ NRC Alternative Technologies Report, *supra* note 22, at 23-24; FPEIS, *supra* note 43, at 1-6, D-14.

¹⁰⁵ See FPEIS, *supra* note 43, at 3-1; Record of Decision, 55 Fed. Reg. 29,880 (1990).

¹⁰⁶ Record of Decision, 55 Fed. Reg. 29,880 (1990).

¹⁰⁷ See USACMDA, Annual Status Report on the Disposal of the Lethal Chemical Stockpile (Dec. 1990). Approximately 100,000 artillery projectiles filled with nerve agents were removed from Germany to Johnston Island in 1990. NRC Alternative Technologies Report, *supra* note 22, at 49. Additional shipments of chemical munitions to Johnston Atoll are prohibited by law. Pub. L. No. 102-172, 105 Stat. 1150, § 8108A(a) (1991). "None of funds appropriated or otherwise made available in this Act may be used to transport or provide for the transportation of chemical munitions to the Johnston Atoll for the purpose of storing or demilitarizing such munitions." *Id.* This prohibition does not extend to the stockpile withdrawn from Germany or obsolete World War II chemical munitions found in the World War II Pacific Theater of Operations, Section 8108A(b). See also COMM. ON ARMED SERVICES, S. REP. NO. 102-352, 102d Cong. (1992); President's Address to the South Pacific Forum, 26 WEEKLY COMP. PRES. DOC. 1583 (Oct. 27, 1990). "We assured the leaders [of the Pacific Islands] that we plan to dispose of only the chemical munitions from the Pacific theater currently stored at Johnston Atoll, any obsolete materials found in the Pacific Islands, and those relatively small quantities shipped from Germany. We confirmed that these munitions will be destroyed safely on a prioritized schedule and that, once the destruction is completed, we have no plans to use Johnston Atoll for any other chemical munitions purpose or as a hazardous waste disposal site."

¹⁰⁸ Cheryl Maggio, Information Paper (Sept. 25, 1991) (on file with author) [hereinafter Maggio Paper].

¹⁰⁹ *Id.*

to work in field operating conditions.¹¹⁰ As a result, a four-phase operational verification campaign was conceived to prove that the baseline technology would work for four different weapon configurations that would be representative of the chemical munitions stored in the United States.¹¹¹ Phase One began in July 1991, and was completed in seven months.¹¹² Significant delays were encountered in preparing for Phase Two.¹¹³ This led Congress to stop spending for any new equipment related to demilitarization at the follow-on facilities (except at TEAD).¹¹⁴ The HD projectile test associated with Phase Four (OVT 4) was completed on March 6, 1993.¹¹⁵ On August 24, 1993, the Secretary of Defense submitted a letter to the Committees on Armed Services of the Senate and the House of Representatives certifying the completion of JACADS OVT.¹¹⁶

¹¹⁰ National Defense Authorization Act for Fiscal Year 1989, Pub. L. No. 100-456, § 118(b), 102 Stat. 1918 (1988).

¹¹¹ Summary Evaluation OVT, *supra* note 102. The Army designed OVT to proceed in four distinct phases. Each phase required an evaluation report before the next phase could begin. The phases involved demilitarizing the following munitions and containers:

- (1) OVT1—M55 Rockets containing GB nerve agent.
- (2) OVT2—M55 Rockets containing VX nerve agent.
- (3) OVT3—Ton (bulk) Containers of HD Mustard agent.
- (4) OVT4—105mm M60 Projectiles containing HD Mustard lister agent.

¹¹² HOUSE COMM. ON APPROPRIATIONS, CONFERENCE REPORT ON THE NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1993, H.R. REP. DOC. NO. 102, 102d Cong., 2d Sess. 966 (1992) [hereinafter 1992 CONFERENCE REPORT]. See also MITRE Corp., Evaluation of the GB Rocket Campaign: Johnston Atoll Chemical Agent Disposal System Operational Verification Testing (June 1991) which reflects that Phase One concluded with the demilitarization of 7449 rockets in 32 weeks.

¹¹³ On September 19, 1990, a grand jury began to investigate allegations that a contractor had committed fraud in the course of performing radiographic (X-ray) and magnetic particle (MT) tests of the welds that were done on the process piping in the JACADS. The JACADS specifications required that all piping welds meet certain stringent requirements and that all welds undergo testing (by X-ray or MT) to verify weld quality. As a result, the Program Manager for Chemical Demilitarization directed an independent investigation into the quality of the welds after phase one was completed. All the welds were retested. A number of welds were found to be of questionable quality, and were redone. Maggio Paper, *supra* note 108. These repairs, and certain upgrades of plant systems, took eight months before OVT2 could begin.

¹¹⁴ 1992 CONFERENCE REPORT, *supra* note 112 states in part:

The Committee believes that it is not wise, safe, or cost effective to initiate equipment procurement before OVT is complete and the design is verified. . . . The Committee bill includes the requested funding for equipment procurement. However, the appropriation language includes a proviso prohibiting obligations for equipment procurement (other than Tooele) until the Secretary of Defense certifies that (1) OVT is complete, (2) a report on the results of OVT has been submitted to Congress, (3) plant design has been verified, and (4) necessary environmental permits have been secured."

¹¹⁵ During this test, 18,949 HD-filled M60 projectiles stored on Johnston Island were drained and thermally decontaminated. The agent and projectile bodies were incinerated in the liquid incinerator and the deactivation furnace, respectively. MITRE Corp., Evaluation of the HD Projectile Test: Johnston Atoll Chemical Agent Disposal System Operational Verification Testing, xviii (May 1993).

¹¹⁶ The pertinent portion of this letter is as follows:

The OVT revealed a number of shortcomings that require correction.¹¹⁷ Nevertheless, the OVT demonstrated that the JACADS process can safely destroy chemical agent while meeting regulatory standards.¹¹⁸ The Summary Evaluation prepared by the MITRE Corporation¹¹⁹ on JACADS OVT concluded, in part:

JACADS demonstrated its ability to destroy rockets, ton containers, and projectiles containing three types of agent. The plant approached or met short-term throughput goals, but did not meet long-term average process rate goals. Although not achieving the throughput goals specified prior to OVT, the performance was within the range of startup performance for similar industrial pioneer processing plants. . . . The implementation of the lessons learned from the OVT combined with additional engineering refinement should enable JACADS and U.S. plant performance to approach or exceed the OVT throughput rate and design goals.¹²⁰

Pursuant to 50 U.S.C. section 1521 (k)(2), I hereby certify to the Congress that the Army completed the Operational Verification Test of the Johnston Atoll Chemical Agent Disposal System (JACADS) equipment and facility on March 6, 1993. This four-phase test demonstrated the destruction of the following munitions which are representative of the stockpile: nerve agent filled M55 rockets; mustard filled one-ton containers; and mustard filled 105mm projectiles.

Throughout all phases, this test was independently observed and evaluated by the MITRE Corporation, a not-for-profit Federally funded Research and Development Center. In addition, the Environmental Protection Agency and the Department of Health and Human Services' Center for Disease Control provided oversight during the test period. Based on the independent assessment and the Army's thorough evaluation, I have determined that the requirement to prove out the equipment and facility at Johnston Atoll has been completed.⁷

Letter from the Honorable Les Aspin, Secretary of Defense (Aug. 24, 1993).

¹¹⁷ See Summary Evaluation on OVT, *supra* note 102, at 5-2. These shortcomings include the following:

- Failure of the backup power and related control system software to operate properly when restarting the facility following loss of power.
- Ventilation system inadequacies that on occasion did not fully contain agent migration within the facility.
- Inadequate control and documentation of software and system design changes (keeping track of lessons learned).
- Control systems that did not maintain accounting of the processing status of each munition.

Id.

¹¹⁸ *Id.* at 5-1 to 5-7.

¹¹⁹ The Army has contracted with the MITRE Corporation "to observe and evaluate the results of the tests [OVT], and to prepare reports documenting each test and a summary report. *Id.* at ix. The MITRE Corporation is a not-for-profit federally funded research and development center.

¹²⁰ Summary Evaluation on OVT, *supra* note 102, at xiii. A summary of OVT results, as provided in 2 USACMDA, CHEMICAL DEMILITARIZATION UPDATE (Apr. 1993) (hereinafter CHEMICAL DEMILITARIZATION UPDATE), is as follows:

In addition to the MITRE Corporation's evaluation, the NRC conducted its own evaluation of the data produced from the four OVTs at JACADS. The NRC concluded that:

[t]he JACADS OVT has provided additional assurance that the baseline technology is capable of the safe disposal of the Army's chemical stockpile. . . . Operating experience during the OVT has identified opportunities for improvements in operations and performance with regard to safety, environmental performance, and plant efficiency.¹²¹

The JACADS is proceeding with demilitarization operations which will continue until the remaining stockpile at Johnston Island is thermally decontaminated.¹²² Additionally, with OVT completed and the required certification submitted to Congress, equipment prove out and systems testing (systemization) is now proceeding at Tooele, Utah, where the first CONUS facility has been constructed.¹²³

Based on the results of OVT, the NRC recommended that the Army use systemization at Tooele to implement improvements relating to safety, environmental performance, and plant efficiency. As a result, the Senate Appropriations Committee predicted that the systemization phase at Tooele would take substantially more than the eighteen months presently scheduled.¹²⁴

OVT Results

Phase I, GB Rocket Campaign	
M55 Rockets demiled	7,490
Agent GB	75,000 lbs
Phase II, VX Rocket Campaign	
M55 Rockets demiled	13,889
Agent VX	134,000 lbs
Phase III, Mustard Ton Container Campaign	
Ton Containers destroyed	68
Blister Agent Mustard	113,000 lbs
Phase IV, Mustard-Filled Projectiles	
Projectiles demiled	23,978
Blister Agent Mustard	35,484.6 lbs

¹²¹ S. REP. NO. 103-153, 103d Cong. (1990).

¹²² As of October 1, 1994, the JACADS had destroyed the following:

- 13,889 VX-filled M55 rockets (69- tons of VX);
- 20,320 GB-filled M55 rockets (106- tons of GB);
- 45,108 HD-filled 105mm projectiles (66+ tons of HD);
- 68 HD-filled ton containers (57+ tons of HD); and
- 66 GB-filled ton containers (49- tons of GB).

See 1994 Annual Status Report, *supra* note 78, at 19.

¹²³ See 100 Pub. L. No. 456, § 118(k), 102 Stat. 1918 (1988).

¹²⁴ *Id.* The Senate Appropriations Committee did not believe that the Army would meet this schedule. The Committee stated that the JACADS OVT identified the need for

B. Operations at Tooele, Utah

Construction of the first full-scale demilitarization facility within CONUS was finished in early August 1993.¹²⁵ This is a second-generation demilitarization facility, which incorporates many of the lessons learned at JACADS in its design. Systemization¹²⁶ of the disposal facility began in late August 1993, and is expected to be completed in September 1995.¹²⁷ Surrogate trial burns (testing of the furnaces without using chemical agent) began in June 1995.¹²⁸ Trial burns using chemical warfare agents are scheduled to begin in September 1995, provided that all RCRA permit requirements are approved.¹²⁹ If successful, demilitarization operations will proceed until the stockpile is destroyed. Demilitarization operations at Tooele are scheduled to be completed in April 2000.¹³⁰ Once operations are completed, the site will undergo cleanup and closure operations.¹³¹

C. Demilitarization Operations at Pine Bluff, Arkansas

The Army began to operate a demilitarization facility at Pine Bluff Arsenal (PBA) in 1988 to incinerate the stockpile of BZ, a nonlethal but incapacitating agent. The BZ stockpile was destroyed by September 1989.¹³² The existing facility is only designed, however, to demilitarize

improvements in regard to safety, environmental performance, and plant efficiency which should be made at the Tooele Chemical Agent Disposal Facility (TOCDF). As a result, "the systemization phase at Tooele will take substantially longer than the 18 months now scheduled." S. REP. NO. 103-153, 103d Cong., 1st Sess. (1993). In hindsight, the Committee was overly generous, systemization is now expected to take 24 months to complete. Telephone interview with Timothy Thomas, Project Manager, Tooele Chemical Demilitarization Facility (May 1, 1995). Much of the delay is attributable to extensive public comment during the state RCRA hazardous waste permitting process. Public comment requires response and dialogue. Additionally, extensive public interest has a natural tendency for state regulators to proceed with great caution, which adds to the delay. For example, surrogate trial burns will not begin until Utah issues a facility construction certificate. The Army will be compelled to delay surrogate trial burns if the state is unwilling to execute the required certification.

¹²⁵ The ribbon cutting ceremony for the TOCDF occurred on August 11, 1993.

¹²⁶ Systemization must occur before any toxic operations begin within the demilitarization facility, and includes: (1) preoperational checkout of equipment to ensure that everything works; (2) training of facility personnel; and (3) integrated systems operations under mock conditions with simulant munitions. See Record of Decision, 54 Fed. Reg. 37017 (1989).

¹²⁷ See 1994 Annual Status Report, *supra* note 73, at 32.

¹²⁸ Telephone interviews with Timothy Thomas, Project Manager of TOCDF (May 1, 1995) and with David Jackson, Assistant Project Manager of TOCDF (June 23, 1995).

¹²⁹ *Id.*; see also 1994 Annual Status Report, *supra* note 73, at 32.

¹³⁰ "Once toxic agent operations are initiated, destruction of the stockpile is expected to take approximately four years based on a 24-hour day, five-day per week schedule." Record of Decision, 54 Fed. Reg. 37017 (1989).

¹³¹ See Chemical Demilitarization Update, *supra* note 120.

¹³² The results of this operation were summarized in the Final Phase I Environmental Report, Disposal of Chemical Agents and Munitions Stored At Pine Bluff Arsenal Pine Bluff, Arkansas, 3-54 (May 1990), as follows:

nonlethal chemical agents. A new facility, patterned after the JACADS, will be needed to demilitarize the stockpile of lethal chemical munitions at the PBA.¹³²

D. Preparations at the Other Sites

Preparations are being made to construct demilitarization facilities at the seven remaining proposed sites, subject to limitations imposed by law. The next facility to be built is at the ANAD. The Request for Proposal for the Anniston Chemical Agent Disposal Facility (ANCDF) was released in April 1992. Award of the system contract was delayed, however, because funding for this construction project was deleted in the National Defense Authorization Act for FY 1993.¹³⁴ Congress subsequently restored funding.¹³⁵ The ANCDF systems contract to construct, operate, and close the demilitarization facility at Anniston is scheduled to be awarded in the early fall of 1995, pending state approval of the RCRA permit.¹³⁶

The 1993 Authorization Act also prohibited site preparation and construction of any demilitarization facility, except TOCDF, until a report on alternative technologies was submitted to Congress.¹³⁷ This pro-

Operations began on May 9, 1988. . . . All BZ munitions had been destroyed by September 1989, and all of the BZ-contaminated inventory had been destroyed by January 1990. Approximately 42,600 kg (94,000 lb) of agent BZ were destroyed by incineration. During these demilitarization operations, no facility emissions were detected that exceeded regulatory limits.

¹³² The new facility will be built adjacent to the BZ disposal facility. *Id.* at 1-3.

¹³⁴ See USACAMDA, 1992 Annual Status Report on the Disposal of the Lethal Chemical Stockpile, iii (Dec. 15, 1992). The Congress also imposed delay in 1991, when it specified:

That none of the funds in this Act may be obligated or expended for the procurement of equipment for chemical weapon disposal facilities at Anniston Army Depot or Umatilla Army Depot until the Secretary of the Army certifies to the Congress that Phase III of Operational Verification Testing at [the JACADS] has begun.

Pub. L. No. 102, 105 Stat. 1150 (1991).

¹³⁵ See CONFERENCE REPORT ON H.R. REP. NO. 2401, 103d Cong., 1st Sess. (1993) (citing Military Construction Authorization Act for FY 1993, Pub. L. No. 102-484 (1993)).

¹³⁶ 1994 Annual Status Report, *supra* note 73, at 32.

¹³⁷ The National Defense Authorization Act for FY 1993, Pub. L. No. 102-484, § 173, 106 Stat. 2315 (1992), states in part:

the Secretary of the Army may not commence site preparation for, or construction of, a facility for disassembly and incineration of chemical agents until the report required under subsection (a) [Alternative Technologies Report] is submitted to Congress.

This limitation did not apply to facility design activities, obtaining environmental permits, project planning, procurement of equipment, or dual purpose depot support construction projects. There was no such exception, however, for the three low-volume sites (the proposed facilities at the APG, BGAD, and NAAP).

hibition no longer applies, however, because the Army has subsequently submitted the required report to Congress.¹³⁸

Another limitation imposed by law is the RCRA preconstruction ban. This ban prohibits physical construction of a new hazardous waste management facility¹³⁹ without first submitting parts A and B of the permit application and receiving an effective RCRA permit in return.¹⁴⁰ "Physical construction" means:

excavation, movement of earth, erection of forms or structures, or similar activity to prepare an HWM [hazardous waste management] facility to accept hazardous waste.¹⁴¹

Distilled to its essence, the ban means that construction on any project related to the treatment, storage, or disposal of hazardous waste may not proceed without a RCRA permit first being issued.

While these definitions appear clear, their application at a given site is ambiguous. For example, every stockpile facility has an ongoing mission to store, secure, and maintain the stockpile of chemical munitions and containers. Many of these facilities also serve as storage sites for conventional munitions as well. Certain depots have proposed proceeding with certain construction projects before a RCRA permit is issued for the demilitarization facility.¹⁴² These generally fall into the following categories:

¹³⁸ Alternative Demilitarization Technology Report, *supra* note 12.

¹³⁹ A demilitarization facility qualifies as a hazardous waste management facility because it is used to treat, store, or dispose of hazardous waste. 40 C.F.R. § 270.2 (1992).

¹⁴⁰ *Id.* § 270.10(f). A Part A permit application refers to the requirement of a hazardous waste management facility to apply for interim status. The application contains an abbreviated description of the operations at the facility. *Id.* § 270.13. After the application is submitted, the facility will normally receive an EPA identification number, and will have interim status. *Id.* § 270.70. The facility is required to operate in compliance with the requirements set forth in 40 C.F.R. § 265 (and applicable state regulations). By November 8, 1988, all hazardous waste management facilities were expected to submit Part B permit applications or cease operating. Part B applications require much more detailed information (*see id.* § 270.14) and involve a lengthy review and public comment period prior to a final permit being issued. Once the Part B permit application has been approved, the hazardous waste management facility is issued a final permit, and must follow the requirements of 40 C.F.R. § 264, and any conditions incorporated into the final permit. *Id.* § 270.30. *See UNITED STATES AIR FORCE LEGAL SERVICES AGENCY, 1992 RCRA HANDBOOK*, 26 (1992).

¹⁴¹ 40 C.F.R. § 270.2 (1992).

¹⁴² The RCRA permit applications are typically submitted two to three years before construction on the proposed demilitarization facility is scheduled to begin. The states that issue the permits usually delay processing the permit application for several reasons, to include the relative complexity of the RCRA permit applications, staff shortages, and frequent requests submitted by the Army to modify the permit in order to implement changes deemed necessary at the JACADS. Consequently, a RCRA permit will not be processed and approved any significant time before construction is scheduled to begin. This can play havoc with the Army's schedule, because site preparation and depot support projects (to include upgraded utility lines, roads, and sewer lines) must be completed before construction of the demilitarization facility may begin.

- (1) Site preparation (to include land clearing and grading);
- (2) Building a new download/reconfiguration facility;
- (3) Building new depot support facilities; and
- (4) Building new roads and utilities.

These projects often serve a dual purpose. They are needed to support existing facility operations and also are required for the proposed demilitarization facility. Even site preparation, which would normally fall within the preconstruction ban, should be permissible if it is limited to the area needed to build projects to support normal depot operations. Analysis of the specific justification for each project is, therefore, required to determine if it violates the prohibition on physical construction.¹⁴³ State environmental regulators also play an important role by reviewing proposed construction projects. For instance, the Alabama Department of Environmental Management, after conferring with Region IV of the Environmental Protection Agency (EPA), determined that four proposed construction projects at Anniston (similar to those listed above) were subject to the RCRA preconstruction ban unless "the Army can demonstrate that these projects are independent of the Chemical Stockpile Disposal Program."¹⁴⁴ The Army was able to satisfy this requirement and the projects were able to proceed.¹⁴⁵ While approval from state and federal regulators is often necessary, it is not the final test. Ultimately, the Department of the Army must determine that any proposed project is consistent with all applicable laws and regulations before proceeding with any project.¹⁴⁶

Other forms of preparation also are being made at some of the other sites. While construction is not taking place, environmental documentation pursuant to the National Environmental Policy Act (NEPA)¹⁴⁷ and

¹⁴³ While state environmental regulators provide oversight on depot and installation construction activities, the first level of review occurs in the Department of the Army. Legal advisors often serve as "honest brokers," by reviewing the justification for proposed construction projects to determine if they qualify as facility support activities.

¹⁴⁴ Letter from Sue R. Robertson, Chief, Land Division, Alabama Department of Environmental Management to the Department of the Army, ANAD (Aug. 24, 1992).

¹⁴⁵ See Letter from Sue R. Robertson, Chief, Land Division, Alabama Department of Environmental Management to the Department of the Army, ANAD (Sept. 8, 1992), which states, in part:

Based on the information included in your letter, the Land Division has determined that construction projects 2, 3 and 4 [the download/reconfiguration facility, depot support facilities, roads and utilities] are not integrally related to the Chemical Stockpile Disposal Program and thus, are not subject to the "preconstruction ban" under RCRA. . . .

¹⁴⁶ The DOD is committed to rigorous compliance with all environmental laws and regulations. See Memorandum from Dick Cheney, Secretary of Defense, on Environmental Management Policy (Oct. 10, 1989).

¹⁴⁷ 42 U.S.C.A. §§ 4321-4370c (1992).

environmental permit applications¹⁴⁸ are being prepared and submitted to the appropriate states for review and comment. The NEPA documents, in particular, are time consuming to prepare, and require extensive public and agency comment before a record of decision can be issued.¹⁴⁹ Construction may not proceed at any of the remaining sites until the required permits are issued by the authorizing state.

The USACMDA's stockpile disposal schedule for the issuing of a RCRA permit to construct and actual construction form the basis for the following schedule:

INSTALLATION	PERMIT TYPE	PERMIT ISSUE DATE	BEGIN to CONSTRUCT
TEAD	RCRA	JUN 89*	SEP 89
ANAD	RCRA	AUG 95	AUG 95
UMDA	RCRA	Unknown	MAR 96
PBA	RCRA	Unknown	JUN 96
PUDA	RCRA	Unknown	APR 97
BGAD	RCRA	Unknown	JAN 98
APG	RCRA	Unknown	JAN 99
NAAP	RCRA	Unknown	JAN 00

* Permit issued.

IV. The Nonstockpile Program

In the 1993 Defense Authorization Act, Congress directed the Army to submit a report on the nonstockpile problem.¹⁵⁰ This report

identifies the locations, types and quantities of nonstockpile chemical materiel; explains the methods to be used for their

¹⁴⁸ Every proposed demilitarization facility requires a RCRA permit and may require permits under the Clean Air Act and Clean Water Act before construction or operations may begin.

¹⁴⁹ Following the Record of Decision on February 26, 1988 for the FPEIS on the Chemical Stockpile Disposal Program, site specific environmental impact statements (EIS) were prepared for the TOCDF, JACADS, and ANAD. Each site-specific EIS is tiered from the FPEIS to eliminate repetitive discussions without the need to revisit the fundamental decision to demilitarize the chemical stockpile at the eight CONUS sites. See 40 C.F.R. § 1502.20 (1992); Record of Decision, 53 Fed. Reg. 5816 (1988). Each EIS completed to date has been followed by a Record of Decision electing to proceed with a full scale disposal facility to demilitarize the stockpile of chemical agents and munitions stored at the respective facility. The ROD for TOCDF was announced on September 6, 1989 and the ROD for the Second Supplemental EIS for the Storage and Ultimate Destruction of the European Chemical Munition Stockpile was announced on July 23, 1990. The ROD for the destruction of the stockpile of lethal unitary chemical agents and munitions stored at ANAD was announced on July 25, 1991, 56 Fed. Reg. 34,055 (1991). (The Army selected construction and operation of a JACADS-type facility to destroy the stockpile on-site). A draft EIS for the UMDA was released for review and comment on Oct. 23, 1991. Public comment on the draft EIS was reopened on February 26, 1992, 57 Fed. Reg. 6,589 (1992).

¹⁵⁰ See National Defense Authorization Act for Fiscal Year 1993, Pub. L. No. 102-484, 106 Stat. 2315 (1992) (codified at 50 U.S.C.A. § 1521(b)(5) (1993)).

destruction; provides the estimated cost and schedule for their destruction; and discusses transportation alternatives.¹⁵¹

Subsequently, the Army has prepared a more complete report, entitled "The Survey and Analysis Report,"¹⁵² which includes all available information on the five categories of nonstockpile materiel, to include:

- (1) Buried chemical materiel;
- (2) Recovered chemical weapons;
- (3) Former chemical weapon production facilities;
- (4) Binary chemical weapons; and
- (5) Miscellaneous chemical warfare materiel.¹⁵³

The findings of the Survey and Analysis Report indicate:

possible burials at 82 locations in 33 states, the U.S. Virgin Islands and the District of Columbia. Of the 82 locations, 48 are DOD installations and 34 are formerly used defense sites (FUDS).¹⁵⁴ Some of the 82 locations have multiple burial sites. The current total is 215 suspect burial sites. . . .¹⁵⁵

The sites identified in the report include chemical weapon storage facilities, both current and historical, former chemical weapons manufacturing facilities, areas where chemical weapons were loaded and off loaded for transport, training areas where chemical agent identification sets were used, test centers and ranges where chemical agents were used and chemical rounds impacted, and disposal locations.¹⁵⁶

There is a variety of chemical warfare materiel buried at the 215 sites. The Survey and Analysis Report indicates:

¹⁵¹ Non-Stockpile Chemical Materiel Program, Interim Survey and Analysis Report, ii (Apr. 1993) [hereinafter Interim Report]; see also Pub. L. No. 102-484, § 176(c), 106 Stat. 2315 (1992).

¹⁵² Non-Stockpile Chemical Materiel Program, Survey and Analysis Report (Nov. 1993) [hereinafter Survey and Analysis Report].

¹⁵³ Interim Report, *supra* note 151. Miscellaneous chemical warfare materiel includes unfilled munitions and devices, and equipment specifically designed for use directly in connection with employment of chemical weapons. Survey and Analysis Report, *supra* note 152, at 7-1.

¹⁵⁴ Formerly used defense sites (FUDS) are properties previously owned, leased, or otherwise possessed or used by the DOD for military purposes, or those properties conveyed to a contractor for industrial purposes under an official permit (government owned-contractor operated) and later disposed of. DEP'T OF ARMY, REG. 200-1, ENVIRONMENTAL QUALITY: ENVIRONMENTAL PROTECTION AND ENHANCEMENT, at 84 (23 Apr. 1980) [hereinafter AR 200-1].

¹⁵⁵ Survey and Analysis Report, *supra* note 152, at i. The number of sites and locations can be expected to increase as surveys continue. The report indicates that the presence of chemical material at a burial site cannot be confirmed until site characterization studies and in some cases, site excavation, is done.

¹⁵⁶ *Id.* at 2-2.

Munitions that may be found at these potential burial sites include 4.2-inch and Stokes mortar rounds, aerial bombs, rockets and projectiles, and containers of agent in both 55-gallon drums and ton containers. Potential chemical agents in these munitions and containers include blistering agents [mustard (H) and lewisite (L)], nerve agents (GA, GB, and VX), blood agents (hydrogen cyanide (AC) and cyanogen chloride (CK)), and choking agent [phosgene (CG)]. Many burial sites also contain other hazardous substances, such as white phosphorus (a screening smoke).¹⁵⁷

The Survey and Analysis Report provides detailed information on all suspected locations and an inventory of munitions, as well as cost and schedule information.¹⁵⁸ The report's cost estimate for destroying all nonstockpile materiel is \$17.7 billion. The program is projected to take thirty-one years to complete (the year 2034).¹⁵⁹

The Survey and Analysis Report provides a brief sketch of the approach the Army will take to remediate the buried chemical warfare materiel (CWM) sites. The sites have been divided into four types, and include chemical agent identification set burial sites (these sets contain small glass vials, or bottles, of agent);¹⁶⁰ small CWM sites with no explosives; small CWM burial sites with explosives; and large CWM burial sites with or without explosives.¹⁶¹ The Army, and specifically the Nonstockpile Program, must develop site characterization, excavation, and removal and treatment procedures for each burial type.¹⁶² Different destruction technologies are currently under review, to include using portable incinerators that could treat recovered CWM on site, other thermal treatment systems, chemical neutralization, as well as other technologies.¹⁶³ The Nonstockpile Program is in the process of formulating its strategy on how to carry out its mission to clean up all the suspected sites. The Executive Summary of the Survey and Analysis Report sets

¹⁵⁷ *Id.* at 2-6.

¹⁵⁸ See Survey and Analysis Report, *supra* note 152.

¹⁵⁹ *Id.* at 9-1.

¹⁶⁰ These sets were used at military installations during and immediately after World War II. The sets were used to train soldiers to successfully identify agents in the field. Included in each kit are a number of glass vials with small quantities of chemical agent, to include blistering, choking, blood, and tearing agents (no nerve agents). The content of the kits vary, depending on the kit type and the date of manufacture. The sets were considered to be an expendable training item, so records and accountability of the items were not maintained. See Interim Report, *supra* note 151, at A-4; Survey and Analysis Report, *supra* note 152, at 5-7, 5-8; Interview with William Brankowitz, Office of the Program Manager for Non-Stockpile Chemical Materiel (Dec. 6, 1993).

¹⁶¹ Interim Report, *supra* note 151, at iii.

¹⁶² *Id.*

¹⁶³ See *id.*

out the alternative courses of action the Army is considering for the nonstockpile program, and its preferred alternative:

Alternative courses of action include on-site treatment, leaving the CWM in the ground while controlling access to the site and containing potential contamination, and transporting the CWM to a facility capable of storage and destruction . . . [g]enerally, on-site treatment of NSCM [nonstockpile chemical materiel] would be the preferred option for much of the materiel, especially recovered chemical weapons. In cases where it is not practical to treat the materiel on-site, transportation to an appropriate storage and treatment facility may be necessary.¹⁶⁴

While the Army continues to investigate other suspected burial locations and studies different treatment technologies and alternative courses of action, it also must consider the environmental impact of all reasonable alternatives.¹⁶⁵ This requires the preparation of a programmatic EIS for the entire nonstockpile program.¹⁶⁶ This EIS

must be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made.¹⁶⁷

The Nonstockpile Program is in the process of preparing a Request for Proposals in order to solicit competitive proposals for a contract to prepare the necessary Programmatic EIS.¹⁶⁸ This will allow the final decision makers in the Army to evaluate the reasonable alternatives and consider the environmental impacts associated with each.¹⁶⁹ The EIS would identify the Army's preferred alternative (which is on-site treatment, using a yet to be determined technology or technologies) as well as the environmentally preferred alternative.¹⁷⁰ The Record of Decision

¹⁶⁴ *Id.* at iv; see also Survey and Analysis Report, *supra* note 152, at h.

¹⁶⁵ See 40 C.F.R. § 1502.5 (1992).

¹⁶⁶ *Id.* § 1505.28. The use of a programmatic EIS is recognized in the tiering provisions of the EPA's regulations. Although subsequent environmental analysis may be required for the individual sites, such analysis may incorporate by reference the general discussions contained in the Programmatic EIS for the Non-Stockpile Program.

¹⁶⁷ *Id.* § 1502.5; see also *id.* § 1506.1. "Until an agency issues a record of decision . . . no action shall be taken which would:

- (1) Have an adverse environmental impact; or
- (2) Limit the choice of reasonable alternatives."

¹⁶⁸ See CIBINC & NASH, FORMATION OF GOVERNMENT CONTRACTS, 362-69 (2d ed. 1966).

¹⁶⁹ 40 C.F.R. § 1502.14 (1992).

¹⁷⁰ The EIS must identify all alternatives considered, specifying the alternative or alternatives which were considered to be environmentally preferable. *Id.* § 1505.2(b). This alternative is the one that causes the least damage to the biological and physical environment. The agency is not, however, required to select the environmentally preferred alterna-

will state what the Army's final decision will be, and identify all relevant factors that were used in making the decision.¹⁷¹

The NEPA requirement to consider all reasonable alternatives has the potential to place the Nonstockpile Program in conflict with federal law. The original statute establishing the chemical demilitarization program provides that facilities constructed to destroy the stockpile of lethal chemical agents and munitions, as it existed on November 8, 1985

*may not be used for any purpose other than the destruction of lethal chemical weapons and munitions, and when no longer needed to carry out this section, such facilities shall be cleaned, dismantled, and disposed of in accordance with applicable laws and regulations.*¹⁷²

In other words, the Nonstockpile Program's Programmatic EIS could recommend using the existing stockpile demilitarization facilities to treat recovered CWM, but any action to do so would violate the statutory provision stated above.

The principle that studies required by the NEPA may consider future use of the stockpile demilitarization facilities by the Nonstockpile Program is also supported by legislative history.¹⁷³ The possibility of using a stockpile demilitarization facility to treat nonstockpile CWM is much less clear. The first problem is one of technology. Although using a facility that costs over 390 million dollars¹⁷⁴ to treat recovered CWM appears to make good economic sense, it may not work. Baseline technology is based on the ability to disassemble munitions through robotics. Typically, recovered nonstockpile CWM has been in the ground for many years,

tive. See Council on Environmental Quality Questions and Answers on National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026 (1981).

¹⁷¹ See 40 C.F.R. §§ 1502.1, 1505.2, 1506.1. One of the purposes of preparing an EIS is to provide a mechanism for the proposing agency to hear and consider comments from other federal agencies with jurisdiction or special expertise, as well as private organizations and individuals. This helps to ensure that the agency has all available information and viewpoints before making a decision that will impact the quality of the human environment. See also *id.* pt. 1503, § 1502.19. The agency preferred alternative will not necessarily be the environmentally preferred alternative. DEP'T OF ARMY, REG. 200-2, ENVIRONMENTAL QUALITY: ENVIRONMENTAL EFFECTS OF ARMY ACTIONS, para. 6-5i(3) (23 Dec. 1988) [hereinafter AR 200-2].

¹⁷² 50 U.S.C.A. § 1521(c)(2) (1992) (emphasis added).

¹⁷³ DEPARTMENT OF DEFENSE APPROPRIATIONS ACT, FY 1993, § 9092, 102d Cong., 2d Sess. (1992), states in part:

None of the funds in this or any other Act shall be available for the preparation of studies on—

(a) the feasibility of removal and transportation of unitary chemical weapons from the eight chemical storage sites within [CONUS]; Provided, That this prohibition shall *not* apply to non-stockpile material in the United States or to studies needed for environmental analysis required by the National Environmental Policy Act.

¹⁷⁴ See NRC Alternative Technologies Report, *supra* note 22, at 220-22.

and often is heavily corroded. If explosively configured, it also may be highly unstable. Retooling a demilitarization facility would be necessary to process the CWM.¹⁷⁵

At first glance, cryofracture would seem to be well suited to treat recovered CWM. Simply cryofreeze a munition, crush it, and incinerate the remains. The utility of using cryofracture, however, loses its allure under closer examination. No evidence exists to demonstrate that it would work. Technology reports prepared to date indicate that it would not be suitable. Cryofracture relies on the precise alignment of the munition within the hydraulic press to work properly. This would be difficult to do with recovered CWM, because of the wide variety of munitions that will be recovered, and their corroded condition.¹⁷⁶ Additionally, using cryofracture to process recovered CWM may subject the equipment to premature detonations. Another problem is that of politics. Segments of the public are adamantly opposed to the stockpile program. Suggesting that the facilities would have a future use (for the Nonstockpile Program) would be the equivalent of throwing gasoline on a three-alarm fire.

As a result, cryofracture is not suitable for recovered CWM. In addition, it is unlikely that Congress would consider amending the statutory prohibition on future use of any demilitarization facility (except CAMDS).¹⁷⁷ Although Congress did not consider the nonstockpile prob-

¹⁷⁵ The JACADS technology requires the mechanical disassembly of the munition or container. Only one munition and agent combination can be processed at one time. Reconfiguration of the equipment is necessary to process a different munition type or agent. As a result, any attempt to process nonstockpile material in a facility designed to process stockpile munitions would pose significant technical difficulties. It remains to be seen if corroded munitions are even capable of mechanical disassembly. See Summary Evaluation on OVT, *supra* note 102, at 1-6. Additionally, any proposal to use a stockpile facility would require congressional authorization and preparation of a site specific EIS, as well as a supplement to the FPEIS, to consider the environmental impacts of using any demilitarization facility for this purpose. Modifications of the RCRA and Clean Air permits also would be necessary.

¹⁷⁶ After munitions are cooled in a cryobath, the munition is mechanically removed and placed inside the hydraulic press. The tooling is specially designed to hold a particular type of munition or munition package. After placement on the hydraulic press lower tooling, the upper press tooling automatically lowers and fractures the munition or munition package. Panel on the Current Status of the Cryofracture Process, Demilitarization of Chemical Weapons by Cryofracture: A Technical Assessment (National Research Council 1991) [hereinafter NRC 1991 Cryofracture Report], see also 1 MITRE Corp., Cryofracture/Incineration Demonstration Plant (CIDP): Assessment of Implementation Options (June 1993) [hereinafter MITRE Cryofracture Assessment Report].

¹⁷⁷ Congress has not prohibited study on the future use of the CAMDS. This signals a willingness to at least consider the use of this facility to process recovered CWM. See COMM. ON ARMED SERVICES, S. REP. NO. 102-352, 102d Cong. (1992). See also COMM. ON APPROPRIATIONS, DEPARTMENT OF DEFENSE APPROPRIATIONS BILL, 1992, S. REP. NO. 102-406, 102d Cong. (1992), which states, in part:

The Committee strongly believes that CAMDS and its scientific personnel are a national asset which have great potential for continues research in the area

lem when it wrote the prohibition on future use of demilitarization facilities into law in 1985, it consistently has insisted on the strict application of this prohibition.¹⁷⁸ However, not every member of Congress shares this view with the same zeal.¹⁷⁹ There is even an indication that some members of Congress are hoping that the Army will revisit the option of transporting the stockpiles at the three low-volume sites to some other location as it considers what to do with nonstockpile CWM.¹⁸⁰

of chemical and conventional weapons disposal. There are at least three possible future research missions for CAMDS; (1) *destruction of non-stockpile munitions*, (2) testing of alternative chemical demilitarization technologies. . . .

[emphasis added]

¹⁷⁸ COMM. ON APPROPRIATIONS, 102D CONG., DEP'T OF DEFENSE APPROPRIATIONS BILL, 1993, S. REP. NO. 102-408, 2d Sess. (1992):

The Committee continues its very strong opposition to any studies or exploration of the possible use of the chemical destruction facilities. To insure the law requiring the dismantling of the facilities after the completion of the on-site chemical weapons destruction is complied with fully, the Committee has included a general provision prohibiting the expenditure of any fund for the study of the possible future use of these facilities. The Committee cannot emphasize strongly enough that any discussions or studies of future use of these facilities is moot. This Committee *will not break faith* with the communities that surround these sites by allowing any study that may lead to any further use of these facilities. The Committee does not intend this provision to apply to the CAMDS facility at Tooele, UT.

(emphasis added).

¹⁷⁹ See THE HOUSE APPROPRIATIONS COMMITTEE REPORT ON THE DEPARTMENT OF DEFENSE APPROPRIATIONS BILL, 102D CONG., H.R. REP. NO. 1st Sess. 102-95 (1991), which seems to "leave the door open" that Congress would consider future use of the demilitarization facilities for destroy nonstockpile CWM:

Pursuant to the fiscal year 1989 Defense Appropriations Conference Report, the Department of the Army has transmitted to Congress a study on the desirability and feasibility of using chemical weapons disposal facilities for other purposes after the destruction of the U.S. chemical stockpile has been completed. While stating that it is premature at this time to make decisions regarding future use of demilitarization facilities, the study found that there are several uses for which these facilities are potentially suited. To make the fullest use of these facilities the Committee believes the Department of the Army *should keep open the option of their future use* after the mission of destroying the chemical stockpile is accomplished.

(emphasis added).

¹⁸⁰ See SENATE ARMED SERVICES COMM. REP., CHEMICAL DEMILITARIZATION AND CHEMICAL/BIOLOGICAL DEFENSE, S. REP. NO. 102-352, 102d Cong. (1992). In this report, the Committee recommended inserting a provision into the 1993 Defense Authorization Act which would require the Army to submit a report on the nonstockpile program by February 1, 1993 (which was adopted). The Committee went on to recognize the prohibition on future use of the eight demilitarization facilities, and "did not intend to question that restriction." Nevertheless, the Committee specified:

The report would also require a determination by the Secretary of the Army as to whether in light of the likely need to transport substantial quantities of "non-stockpile" chemical munitions to various locations for destruction, there is still a requirement to destroy existing unitary stockpiles on-site at the Lexington-Blue Grass, Aberdeen and Newport CSDP sites rather than move these munitions elsewhere for destruction.

Evidently, some members of Congress hope that the stockpiles at the low-volume sites could

What conclusions may be drawn from this discussion? Using one or more of the eight demilitarization facilities for anything other than destroying the stockpile is prohibited. Consequently, facilities that cost over \$390 million each to build and operate¹⁵¹ will be cleaned and dismantled while the Army seeks to destroy recovered nonstockpile munitions and materiel which may be recovered from the same installation or the surrounding community.¹⁵²

V. Chemical Weapons Convention

In 1990, the United States and the former Soviet Union (now the Commonwealth of Independent States, (CIS), commonly referred to as Russia) entered into a Bilateral Destruction Agreement (BDA) to ban the development, production, and use of chemical weapons and to reduce their chemical weapons stockpiles to 5000 metric tons.¹⁵³ A major purpose of the bilateral agreement was to encourage all nations with chemi-

be transported to some unspecified location and treated by a technology developed by the Nonstockpile program. However, the devil in such a concept is in the details. I propose that there is no community willing to accept a large-scale shipment of chemical munitions into their locale for treatment. Although the Army is considering transporting recovered CWM for treatment, as well as mobile demilitarization equipment, the numbers of munitions that must be treated, in comparison to the low-volume sites, is inconsequential. For instance, the Army transported 141 suspect munitions from Spring Valley by air in 1993. This mission required two separate flights to the PBA by a C-141, and one flight by two helicopters to Fort A.P. Hill, Virginia. In contrast, moving the entire inventory from Maryland (APG) and Kentucky (BGAD) to Utah (TEAD) would require approximately 2100 to 2700 flights by a C-141 aircraft. See FPEIS, *supra* note 43, at 2-66.

¹⁵¹ Army 1993 cost estimates to build, operate, and close the proposed facilities at the three low-volume sites range from \$438,000 million (APG) and \$396,000 million (NAAP) to \$657,000 million (BGAD). See NRC Alternative Technologies Report, *supra* note 22, at 221-22.

¹⁵² As an example, the demilitarization facility to be built at Aberdeen, Maryland (APG) will be designed and constructed to only process the stockpile of one-ton containers of mustard agent. APG was a major chemical weapons testing center for the Army after World War I. As a result, the Army is in the process of cleaning up areas in the installation that have significant quantities of buried chemical munitions and agent contaminated materiel. Recovered items are secured and stored pending treatment. Even if there was no statutory prohibition, the demilitarization facility planned for APG will not be configured to treat projectiles. Equipment designed to punch and drain one-ton containers cannot be altered to disassemble corroded munitions. Different equipment would be required.

¹⁵³ On September 23, 1989, the United States and the Soviet Union signed a Memorandum of Understanding at Jackson Hole, Wyoming, regarding a bilateral verification experiment and data exchange related to the prohibition of chemical weapons. On June 1, 1990, the United States and the Soviet Union signed the Agreement on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons [hereinafter Bilateral Agreement], and issued a joint statement on nonproliferation on June 4, 1990. See Edward Tanzman & Barry Kellman, *Legal Implementation of the Multilateral Chemical Weapons Convention: Integrating International Security with the Constitution*, 22 N.Y. U. J. OF TENSIOUS LAW & POLY. 473, 481 (1990); 29 I.L.M. 934, American Society of International Law (1990); 56 Fed. Reg. 25,404 (1991).

cal weapons capability to sign the multinational CWC.¹⁸⁴ Without the leadership and demonstrated resolve of the United States to destroy its stockpile of chemical weapons, there would be little encouragement for the international community to take such action. Subsequently, from January 13 to 15, 1993, 132 countries, including the United States, signed the International Convention on Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction (known as the CWC).¹⁸⁵ Under the terms of the CWC, which has yet to be ratified,¹⁸⁶ the United States and all signatory nations are required to cooperate in developing methods and technologies used to destroy chemical weapons and "to assign the highest priority to ensuring the safety of people and to protecting the environment." Each party shall destroy its chemical weapons in accordance with stringent national standards for safety and emissions.¹⁸⁷

The BDA and the CWC are separate agreements, and have distinct differences. As a result, it is necessary to review the provisions separately. The BDA requires the United States to take the following actions:¹⁸⁸

- (1) Destroy fifty percent of the aggregate quantity of the Nation's stockpile of chemical weapons by a date to be designated;¹⁸⁹
- (2) Reduce the aggregate quantity of the chemical stockpile to less than 5000 agent tons by a designated date;¹⁹⁰
- (3) Reduce the aggregate quantity of the stockpile to 500 agent tons by the end of the eighth year after the treaty goes into effect.¹⁹¹

¹⁸⁴ The introduction to the Bilateral Agreement calls on all nations to join the United States and the Soviet Union to take comparable measures to stem chemical weapons proliferation. See Tanzman & Kellman, *supra* note 183, at 480.

¹⁸⁵ See NRC Alternative Technologies Report, *supra* note 22, at vi.

¹⁸⁶ The CWC came before the United States Senate for ratification with signatures from 154 nations, to include the United States and the CIS (Russia). The signatory nations possess 95% of the world's stockpile of chemical weapons. Iraq, North Korea, Libya are among the nations that have refused to sign. President Clinton has urged swift ratification of the treaty. *ARMY TIMES*, Dec. 13, 1993, at 34. By May 1, 1995, 158 nations had signed the CWC and 26 nations had ratified it. Interview with William Dee, Director, Arms Control & Treaty Assistance, United States Army Chemical and Biological Defense Command (May 3, 1995).

¹⁸⁷ Convention on Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction, art. IV [hereinafter CWC].

¹⁸⁸ See Bilateral Agreement, *supra* note 183; see also Tanzman & Kellman, *supra* note 183.

¹⁸⁹ Article IV, Bilateral Agreement, *supra* note 183. The United States and the CIS are developing milestones which will correspond with the milestones established in the CWC. Interview with Kevin Flamm, Technology Exchange & Treaty Compliance Office, USACMDA (Dec. 28, 1993).

¹⁹⁰ Bilateral Agreement, *supra* note 183.

¹⁹¹ *Id.* art. VI.

- (4) Destroy the munitions, devices and containers from which the chemicals have been removed;¹⁸²
- (5) Reduce its chemical weapons storage facilities to eight or less no later than December 31, 2002;¹⁸³
- (6) Those parties not experiencing problems in destroying its chemical weapons will not be required to continue at a more rapid rate than a party that is experiencing such difficulties;¹⁸⁴
- (7) Provide access to each of its chemical weapons production facilities for on-site inspections to confirm that the production of chemical weapons is not occurring;
- (8) Allow all parties, after all chemical weapons have been removed from a site, to inspect the facility once a year to ensure that removal is complete;¹⁸⁵
- (9) Declare its intent to be among the original parties to the multilateral convention.¹⁸⁶
- (10) Each party shall have the right to inspect once a year each chemical weapon storage facility not already subject to annual inspections.¹⁸⁷

The BDA has been styled as an Executive Agreement, rather than a treaty. Although ratification may not be necessary, it was the intent of the Bush Administration to seek congressional approval of the agreement.¹⁸⁸ Although ratification has not occurred to date, the Army is preparing to comply with the terms of the agreement.

Additionally, as part of a separate cooperative agreement, six Russian engineers and chemists arrived in the United States in September 1993, to undergo training as interns in chemical demilitarization at the Army's Chemical Demilitarization Training Facility, at Aberdeen Proving Ground, Maryland, followed by two-months of on-the-job training.¹⁸⁹ The Russians had the opportunity to observe demilitarization operations

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Id.* art. V.

¹⁸⁶ *Id.* art. VI.

¹⁸⁷ *Id.* art. V; see Edward Tanzman, *Constitutionality of Warrantless On-Site Arms Control Inspections in the United States*, 13 *YALE J. OF TORTIOUS LAW* 21 (1988). This article addresses the problem of the challenge of on-site inspection, in which the party being inspected must provide access to the location or facility within 24 hours of notification. The right to inspect goes beyond government-owned or controlled facilities to that of privately-owned companies that have contracts with the federal government.

¹⁸⁸ See Tanzman & Kellman, *supra* note 183, at 481 n.27.

¹⁸⁹ The Intern Familiarization Training program is part of the support that the United States is providing the CIS under the Cooperative Threat Reduction Program. This program

at JACADS, as well as systemization at TOCDF, before returning to Russia to participate in organizing the Russian chemical warfare materiel destruction program.²⁰⁰

The Army, under the USACMDA's present schedule, expects to meet the conditions and deadlines established by either the BDA or the CWC. The BDA deadlines, however, are only obligatory, if the CIS is able to conduct an effective demilitarization program of its own.²⁰¹ In view of the unstable internal political and economic situation within the CIS, it is unlikely that the Russians will be able to destroy significant amounts of its stockpile in the next few years.²⁰² Consequently, the major contribution of the BDA is that it has promoted cooperation between the two nations, and served to promote widespread acceptance of the CWC. Nevertheless, while the BDA has promoted cooperation, there is credible evidence to suggest that the CIS continues to pursue chemical warfare development, to include producing and stockpiling binary chemical weapons.²⁰³ This activity, and the difficulty in verifying compliance, is causing serious (and understandable) concern in Congress which will continue to delay ratification of the BDA.

In contrast to the BDA, the CWC establishes milestones that all signatory parties must meet. The milestones are predicated on the date that the CWC enters into force and not the date the CWC enters into force for the individual state party. These milestones require all signatory nations to completely destroy all chemical weapons and all chemical weapon production facilities within ten years after the CWC enters

is distinct from either the BDA or the Chemical Weapons Convention. Interview with Kevin Flamm, Technology Exchange & Treaty Compliance Office, USACMDA (Dec. 28, 1993). See also 2 USACMDCA, CHEMICAL DEMILITARIZATION UPDATE (July 1993).

²⁰⁰ The Intern Familiarization Training program was successfully completed in April 1994, see 1994 Annual Status Report, *supra* note 73, at 9. It represents a significant step towards providing technical support to the CIS in destroying its massive stockpiles. The BDA will continue the cooperative relationship between the United States and the CIS. Articles I and II of the BDA require the parties to cooperate regarding methods and technologies for the safe and efficient destruction of chemical weapons. Meetings and discussions among experts and the exchange of information and technologies are among the ways that the parties are called on to cooperate.

²⁰¹ The CIS (Russia) has only destroyed between 200 and 300 tons of chemical agent in the past decade. This represents a minuscule portion of their entire stockpile of chemical warfare materiel, which exceeds 40,000 tons. Interview with William Dee, Director, Arms Control & Treaty Assistance, United States Army Chemical Biological Defense Command (May 3, 1995).

²⁰² See Betsy Carpenter & David Bowermaster, *Death Rattle of Poison Gas*, U.S. NEWS & WORLD REP., July 19, 1993, at 56. United States analysts believe that the Russians "have no realistic hope of meeting the treaty's destruction deadline, even with an optional five-year extension to 2009." *Id.*

²⁰³ 140 CONG. REC. H374-02 (1994) (statement of Rep. Solomon) (1994); 140 CONG. REC. E1317-01 (1993) (statement of Rep. Solomon, quoting Gordon, *Russia Hides Effort to Develop Deadly Poison Gas*, N.Y. TIMES, June 23, 1994).

into force.²⁰⁴ This duty persists even if other nations are not complying with the CWC.²⁰⁵ Sanctions for noncompliance are specified in the CWC, which could include bringing the matter before the United Nations General Assembly.²⁰⁶ The CWC also commits each signatory nation not to use or develop chemical weapons, nor to use riot control agents as a method of warfare.²⁰⁷

A number of CWC provisions address the demilitarization program, to include the following requirements:

- (1) To provide access to any chemical demilitarization facility and storage areas for the purpose of systematic verification through inspection and on-site monitoring with on-site instruments;²⁰⁸
- (2) To declare any additional chemical weapons discovered after a nation makes an initial declaration of all chemical weapons known to be in its possession or control;²⁰⁹
- (3) To assign the highest priority to ensure the safety of people, and to protect the environment during the transport, sampling, storage and destruction of chemical weapons; and²¹⁰

²⁰⁴ CWC, *supra* note 187, pt. IV(A)(17) sets forth the following destruction deadlines:

(i) Phase 1: Not later than two years after entry into force of the CWC, testing of the first destruction facility shall be completed. 1 percent of Category I (stockpile) chemical weapons shall be completed three years after entry into force of the CWC.

(ii) Phase 2: 20 percent of chemical weapons shall be destroyed five years after entry into force of the CWC.

(iv) Phase 3: 45 percent of chemical weapons shall be destroyed after seven years after entry into force of the CWC.

(v) Phase 4: All Category I chemical weapons shall be destroyed ten years after entry into force of the CWC.

See also *id.* art. IV, para. 6; art. V, para. 8. The CWC allows a party to request an extension of the 10-year deadline for completing destruction of its' stockpile of chemical weapons. The maximum extension is five years, for a total of 15 years. *Id.* pt. IVc.

²⁰⁵ The CWC establishes an Executive Council which has 41 representative nations. The Executive Council has the responsibility to monitor compliance by all signatory nations, to submit to the Conference of the States Parties (which consists of all signatory nations) a report on implementation of the CWC, and to consider cases of noncompliance. Cases of noncompliance can be brought to the attention of the Conference. *Id.* art. VIII.

²⁰⁶ *Id.* art. XII.

²⁰⁷ *Id.* art. I (supersedes existing United States Policy, as set forth in Exec. Order No. 11850, 40 Fed. Reg. 16187 (1975), which renounces, as a matter of national policy, the first use of herbicides in war, and the first use of riot control agents in war, except in defensive military modes to save lives).

²⁰⁸ *Id.* art. IV, para. 5.

²⁰⁹ See art. IV, para. 9. This affects the nonstockpile program, which will have periodic reporting obligations as it carries out its mission to locate and recover buried munitions. The duty to report will be triggered when the presence of chemical agent can be determined to a reasonable certainty.

²¹⁰ *Id.* art. IV, para. 10. This duty is consistent with the Army's pre-existing duty to provide for maximum protection for the environment, the general public, and the personnel involved in the destruction of lethal chemical agents and munitions; see 50 U.S.C.A. § 1521(c) (1992).

(4) To destroy all chemical weapons abandoned by a nation on the territory of another party.²¹¹ This includes a duty to declare whether it has abandoned chemical weapons on the territory of other states and provide all available information.²¹²

Whether there are "abandoned" United States chemical weapons overseas is uncertain. Under the terms of the CWC, "abandoned chemical weapons" mean old chemical weapons, abandoned by a state after January 1, 1925 on the territory of another state without the consent of the latter.²¹³ Information on overseas burial sites of suspected chemical munitions is contained in a classified report.²¹⁴ Although there may be sites overseas where the United States buried or stored chemical weapons, a duty to declare such sites and destroy the chemical weapons is not triggered unless it is determined to be abandoned.²¹⁵ As a result, it remains to be determined whether the nonstockpile program will have the mission to carry out the destruction of chemical weapons located in a foreign country.

The CWC goes into force 180 days after the sixty-fifth instrument of ratification is filed, but no earlier than two years after its opening for signature.²¹⁶ Twenty six nations have ratified the CWC to date.²¹⁷ It is expected to go before the United States Senate for ratification in 1995.²¹⁸

The CWC's primary impact on the nation relates to the inspection and destruction provisions of former chemical warfare destruction facilities, and the inspection of demilitarization and storage facilities. As the CWC will not enter into force until sixty-five nations have submitted instruments of ratification, the earliest date that the CWC could require the complete destruction of the chemical stockpile is 2005, which roughly corresponds with the deadline set by Congress. Prior to the CWC, Congress was free to grant additional delays to the stockpile destruction deadline. On ratification of the CWC, this flexibility no longer will exist. The deadline for destroying the chemical stockpile will become a treaty obligation that Congress cannot extend. Another potential impact rests

²¹¹ CWC, *supra* note 187, art. I, para. 3.

²¹² *Id.* art. III, para. 1(b)(iii).

²¹³ *Id.* art. II, para. 6.

²¹⁴ See Survey and Analysis Report, *supra* note 152, para. 9.9.

²¹⁵ The DOD will make this decision, in coordination with the United States Department of State.

²¹⁶ CWC, *supra* note 187, art. XXI.

²¹⁷ Telephone interview with William Dee, Director Arms Control and Treaty Assistance, United States Army Chemical Biological Defense Command (May 3, 1995).

²¹⁸ Congress urged the President to seek early ratification of the CWC. See 1994 Defense Appropriations Act, § 1105, 103d Cong., 1st Sess. (1993). President Clinton submitted the CWC on November 23, 1993 to the Senate for its advice and consent. "The United States continues to press for prompt ratification of the Convention to enable its entry into force as soon as possible." 141 CONG. REC. S2821 (1995) (Report Relative to Chemical and Biological Weapons-Message from the President).

on the determination of whether the United States has any abandoned chemical weapons on the soil of another nation. An affirmative answer would propel the Army into an overseas recovery and treatment mission that would carry well into the twenty-first century.

VI. Cryofracture Technology

Cryofracture is an alternative destruction method to baseline technology, and is still in the research and development stage.²¹⁹ The cryofracture process submerges nonbulk munitions in a liquid nitrogen bath and fractures them in a hydraulic press. The frozen agent and fractured parts then are incinerated (thermally treated) in a single rotary kiln.²²⁰ Cryofracture differs from baseline technology in two major respects; first, it replaces the mechanical disassembly and drain process with cryofreezing and mechanical fracture; second, it uses one kiln rather than separate kilns for liquid agent, metal parts, explosives and propellant, and dunnage (one incinerator rather than four).²²¹ Both processes treat chemical agent and all related materiel by incineration.²²²

Cryofracture development began in 1981, and included design studies and prototype studies.²²³ Testing was conducted in three phases. It began with initial feasibility tests, followed by design development tests and most recently, design verification tests.²²⁴ In 1984, the NRC prepared

²¹⁹ See Record of Decision for the Chemical Stockpile Disposal Program (23 Feb. 1988). Although significant testing of cryofracture has occurred since 1985, there has been no testing of an integrated process in a toxic operational environment. Testing has been segmented at different locations and times. There is no prototype cryofracture facility in existence or under construction. See NRC 1991 Cryofracture Report, *supra* note 176, at 3-4.

²²⁰ NRC Alternative Technologies Report, *supra* note 22, at 24 n.3.

²²¹ See *id.* at 24.

²²² *Id.*

²²³ MITRE Cryofracture Assessment Report *supra* note 176, at xi, xvi: "By 1985, the important components of the cryofracture process, from unpack operations through PAS [Pollution Abatement System], were proven to be technically feasible, for the most part. There was no indication of insuperable problems and test performance was sufficiently good to recommend further testing."

²²⁴ *Id.* at xvi-xviii. Cryofracture Demonstration Verification Test (DVT) activities started in early February 1990, to support and verify the design of a full scale Cryofracture/Incinerator Demonstration Plant (CIDP). "Individual and integrated robotic testing was performed in 1990 and 1991 using the prototypic bridge robots and material transfer robot (MTR) at the General Atomics pilot facility at La Jolla, California." This testing focused on unpack and cryopretreatment processes. "Live (explosively configured) munitions were cryocooled and fractured during the tests conducted at Dugway Proving Ground, Utah, from 1991 through 1993." These munitions contained chemical agent simulant, and were cryocooled and fractured to determine if this process could be done without causing the live munitions to detonate. Munitions tested included 155mm artillery projectiles, boxed 4.2 inch mortars, 105mm cartridges, 105mm artillery projectiles, and M61 rockets. "The Dugway cryofracture tests are contributing to the assurance that cryocooled munitions will not ignite or explode during cryofracture." The DVT also was conducted at the CAMDS, where cryocooled mustard agent and spent decontamination solution was successfully incinerated. *Id.* at 3-8 to 3-11.

a study "to recommend the most effective, economical, and safest means for disposing of the Army's aging and obsolete stockpile of chemical agents and munitions."²²⁵ This report endorsed thermal destruction of chemical agents as the preferred chemical agent destruction technology.²²⁶ It also discussed cryofracture, finding it to be "attractive and certainly worthy of continued development, but practical implementation remains to be developed."²²⁷ In 1988, the MITRE Corporation completed assessments of cryofracture and baseline technology in separate reports for the Program Manager for Chemical Demilitarization.²²⁸ "The Army subsequently awarded a contract to General Atomics to continue cryofracture development in a Design Verification Test (DVT) program."²²⁹

When the Army decided to proceed with baseline technology in 1988, cryofracture was considered as an alternative technology, but was not selected because it required more testing and prove-out operations. The Record of Decision made a commitment, however, that

if cryofracture proves to be a superior process, the Army will prepare a Supplemental EIS to determine the feasibility of replacing the JACADS disassembly/incineration process with "cryofracture" at a portion of the eight sites. . . .²³⁰

From the inception of the demilitarization program, Congress has urged the Army to evaluate alternatives to baseline technology.²³¹ Congress initially urged the Army to continue development of cryofracture technology as an alternative destruction method.²³² In subsequent years, Congress directed the Army to "proceed expeditiously to design and construct a full-scale cryofracture facility."²³³ The Army continued to test and develop cryofracture throughout this time, but did not build a full-scale cryofracture facility. Nevertheless, Congress did not pass legislation requiring the Army to build a full-scale cryofracture facility. It has, however, continued to appropriate money for cryofracture, while extolling its virtues as an alternative technology in the legislative record.²³⁴

²²⁵ See NRC 1984 Report, *supra* note 33, at ix.

²²⁶ *Id.* at 137.

²²⁷ *Id.* at 105.

²²⁸ *Id.*; MITRE Cryofracture Assessment Report, *supra* note 176, at xi.

²²⁹ *Id.*

²³⁰ Record of Decision for the Chemical Stockpile Disposal Program (Feb. 23, 1988).

²³¹ See 133 CONG. REC. 8404 (1987) (National Defense Authorization Act for FY 1988 and 1989, § 112(c)). This law prohibited the obligation of funds under the demilitarization program until the Secretary of Defense provided a written certification that the overall concept plan for the demilitarization program included an: "Evaluation of alternate technologies for disposal of the existing stockpile and selection of one such technology to be used for such purpose."

²³² See 131 CONG. REC. S 16954 (1985).

²³³ 134 CONG. REC. H8500 (1988); see also 136 CONG. REC. S12099 (1990).

²³⁴ See 137 CONG. REC. H9868, E4015 (1991) (Conference Report on H.R. 2100, National Defense Authorization Act for FY 1992 and 1993, 102d Cong., 1st Sess.). 138 Cong.

The tension between Congress and the Army over whether to build a cryofracture facility illustrates the separation of powers which exists between the legislative and executive branches of government. Congress has the power to provide for the general welfare of the United States and to make all laws necessary and proper to carry into execution its powers.²³⁵ Congress also exercises an oversight function through its committees. The Senate Armed Services Committee has tried to persuade the Army to use cryofracture technology.²³⁶ Absent legislation to the contrary, however, Congress has entrusted the Army, as the executive agent for chemical demilitarization, with the discretion to select the appropriate technology to destroy the chemical stockpile. In the exercise of its discretion, the Army selected baseline technology. Whether Congress will allow the Army to exercise its best professional judgment, or require the Army to develop an unproven technology, remains to be seen.

What is the status of cryofracture technology? The Army has requested and received several independent evaluations of cryofracture as an alternative technology. Each evaluation stopped short of endorsing cryofracture. For example, the NRC, in its independent evaluation of the cryofracture process, raised concerns about process uncertainties, safety, and the likelihood that cryofracture would require a significant delay in start up time for a full scale facility.²³⁷

REC. H11518 (1992) (Conference Report on H.R. 5504, Dept. of Defense Appropriations Act, 1993), states in part:

"In continuance of the Appropriations Committees' long standing support of the cryofracture technology, the conferees now expect the Army to proceed with construction of a cryofracture plant unless there is overwhelming evidence to the contrary which has not been provided to the Congress.

The Army's reluctance to pursue a vigorous cryofracture program has been justified in the past on its strong confidence that the baseline approach will prove to be technically viable and cost effective. Experience to date belies this confidence. Costs have quadrupled and the schedule has slipped by ten years. Furthermore, the House Surveys and Investigations Staff has called into question a recent Army estimate which unfavorably compared the cost of a cryofracture facility with a baseline facility.

If the Army elects to proceed without including a cryofracture facility in its program, the Army is to submit to the committee a detailed justification and rationale for that decision at least 30 days before obligating any further funding for a baseline facility at a site which has been considered for a cryofracture plant."

The Army considered building a cryofracture plant at PUDA, but elected to proceed with baseline technology at this site. 1994 Annual Status Report, *supra* note 73, at vii.

²³⁵ U.S. CONST. art. I, § 8.

²³⁶ See JOHN CIBINC, JR. & RALPH NASH, ADMINISTRATION OF GOVERNMENT CONTRACTS 10 (2d ed. 1986). Congressional oversight is carried out through each committee of Congress that has authority over programs of a procuring agency, such as the Senate and House Armed Services Committees. These committees monitor the procurement practices of the agency. "Although the committees do not formally adopt binding procurement rules, their views are normally given great respect by agencies in formulating contract administration policies." *Id.*

²³⁷ See NRC 1991 Cryofracture Report, *supra* note 176, at 3-4. The NRC summarized its concerns as follows:

The MITRE Corporation noted that a cryofracture plant would be a first-generation facility, and as such, unforeseen problems could reasonably occur. Because cryofracture has not been tested in an integrated facility, "the level of confidence in any of the performance factors for the cryofracture process must be less than that of the baseline process."²³⁸

The Army considered building a cryofracture facility at Pueblo Depot Activity (PUDA), Colorado, which is the installation where cryofracture is best suited to process the stockpile.²³⁹ The PUDA's chemical agent inventory consists of about ten percent of the nation's stockpile. It consists only of explosively configured 105-mm and 155-mm projectiles (HD), and 4.2 inch mortar rounds (HD and HT). This inventory is well suited for cryofracture, because unlike the other locations, the stockpile at PUDA consists exclusively of projectiles containing mustard agent.²⁴⁰ Additionally, the DVT has demonstrated, to a limited extent, cryofracture's ability to successfully process cryofrozen mustard agent and projectiles.²⁴¹

There is no means to control the size of explosive fragments, to separate such elements, or even to assure that burster fragments do not remain assembled to fuses. Thus, fuses—which will detonate in a furnace—could well lead to the detonation of nearby burster elements. Unsteady, very rapid burning of explosive and propellant elements would lead to variable residence times for agents in downstream components, thus making complete combustion difficult to achieve. The combustion of so many different types of components simultaneously, with the potential for generating undesirable complex gases or solids in the process, plus the strong corrosive nature of the chemical agents make the use of a common kiln a most questionable procedure from the standpoint of both efficiency and safety.

Uncertainties in the cryofracture process and still-to-be-proven aspects of its procedures imply, at the very least, that a large effort over a long period of time to develop the system and then prove its safety would be required before demilitarization operations employing cryofracture could be started.

²³⁸ MITRE Cryofracture Assessment Report, *supra* note 176, at xviii.

²³⁹ See COMM. ON ARMED SERVICES, S. REP. NO. 102-352, 102d Cong. 2d. Sess. (1992):

On March 26, 1992, the Army informed Congress that if a decision to build the plant [cryofracture] is made, from a technical and fiscal perspective, it should be located at Pueblo Depot Activity, Colorado. One of the principal arguments for siting the cryofracture plant at Pueblo is that it could substitute for the baseline disassembly/incineration facility now planned for that location and thus significantly lower the costs that otherwise would be incurred by adding the cryofracture technology to the Army's chemical munitions destruction infrastructure.

The committee agrees with the Army's determination. . . .

²⁴⁰ Cryofracture is best suited to process nonbulk munitions. NRC Alternative Technologies Report, *supra* note 22, at 24 n.3. Additionally, the freezing point for mustard agent (H/D) is 14.45 degrees centigrade. *Id.* at 39. This provides an inherent advantage for cryofracture over baseline technology—it eliminates the mustard thaw process. This reduces the risk of an accidental release of agent into the atmosphere, because it can remain frozen during its transport and processing into the incinerator. See MITRE Cryofracture Assessment Report, *supra* note 176, at 24.

²⁴¹ Baseline has a high data quality rating because 100% design packages exist for first-generation (CAMDS) and second-generation (JACADS) plants; cryofracture has a medium data quality rating because of 60% process design. MITRE Cryofracture Assessment Report, *supra* note 176, at xxi.

Related with the decision to build a baseline or cryofracture facility at PUDA, the Army must also prepare a site-specific EIS. The NEPA²⁴³ requires preparation of a detailed statement on the environmental impacts of any proposed major federal action that may have a significant effect on human health or the environment.²⁴³ This statement must include all reasonable alternatives to the proposed action. The alternatives section is the heart of an EIS.²⁴⁴ Because the Army determined that cryofracture is a reasonable alternative from the standpoint of technical feasibility, schedule, and cost, the site specific EIS for PUDA will include cryofracture in the site specific EIS.²⁴⁵ Although the Army is not obligated to select the environmentally preferred alternative, the EIS and subsequent Record of Decision must be issued for the demilitarization facility at PUDA before any final decision or construction may begin.²⁴⁶

This discussion begs the question of whether the Army should build a cryofracture facility. The various reports indicate that cryofracture technology is unproven. No final evaluation of the technology is possible without a full-scale integrated facility. But for what purpose? Cryofracture stills relies on incineration as the treatment process, so it will not silence the critics, most of whom oppose incineration, in any form. Additionally, there are serious questions regarding its safety. Any serious defect in equipment or facility design also could jeopardize compliance with Congress's deadline to destroy the stockpile. From a standpoint of safety, cost, and plain common sense, cryofracture is a bad investment.²⁴⁷

VII. Cooperative Agreements

To construct and operate a demilitarization facility, the Army must apply for and receive the necessary environmental permits. The two key statutes that require permits for a demilitarization facility are the RCRA and the CAA.²⁴⁸ The preparation of a permit application under either statute is a labor and time intensive process. The RCRA permit applications prepared for the demilitarization facilities to date consist of multiple volumes of detailed technical information. The host states where the

²⁴³ 42 U.S.C.A. §§ 4321-4370c (1992).

²⁴⁴ See 40 C.F.R. § 1502.1 (1992).

²⁴⁵ *Id.* § 1502.14.

²⁴⁶ The Army will include cryofracture as a potential alternative to baseline technology in the site-specific EIS for the PUDA. 1994 Annual Status Report, *supra* note 73, at 12; see also *Druid Hills Civic Ass'n v. Federal Highway Admin.*, 772 F.2d 700 (11th Cir. 1985) (relative merits of all reasonable alternatives must be considered and evaluated).

²⁴⁷ See 40 C.F.R. §§ 1502.5, 1506.1 (1992); see also AR 200-2, *supra* note 171, para. 6-5(i)(3).

²⁴⁸ On March 4, 1994, the Army designated baseline technology as the preferred alternative at the PUDA; see 1994 Annual Status Report, *supra* note 73, at vii.

²⁴⁹ 42 U.S.C.A. §§ 7401-7671q (1992).

facilities are to be built must be able to conduct a meaningful review of these permit applications. The review process usually takes between two to three years. As a result, the host states that have received permit applications have requested funding for related personnel costs, as well as office space, furniture, and equipment to carry out the permit review function.

The Army is entering into cooperative agreements with host states to provide state and local governments with funds and other support for the purpose of assisting them in the processing of environmental permit applications for the construction and operation of proposed demilitarization facilities.²⁴⁹ In the program's beginning, the Army lacked the authority to enter into cooperative agreements without congressional approval.²⁵⁰ Congress granted the Army this authority in 1991.²⁵¹ At the time, Congress expressly limited funding to processing and approving licenses and permits for the construction and operation of a demilitarization facility.²⁵² However, enactment of the Federal Facilities Compliance Act

²⁴⁹ See JOHN CIBINIC, JR. & RALPH NASH, JR., *FORMATION OF GOVERNMENT CONTRACTS* 24-26 (2d ed. 1986). The use of cooperative agreements is specified in 31 U.S.C. § 6305 as follows:

An executive agency shall use a cooperative agreement as the legal instrument reflecting a relationship between the United States Government and a State, a local government, or other recipient when—

(1) the principal purpose of the relationship is to transfer a thing of value to the State, local government, or other recipient to carry out a public purpose of support or stimulation authorized by a law of the United States instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government; and

(2) substantial involvement is expected between the executive agency and the State, local government, or other recipient when carrying out the activity contemplated in the agreement.

Id.

²⁵⁰ *Id.* at 26 (citing 59 Comp. Gen. 1 (1979)).

²⁵¹ Pub. L. 102-190 (codified at 50 U.S.C.A. § 1521 (c)(3) (1993)), which states in part: the Secretary may provide funds through cooperative agreements with State and local governments for the purpose of assisting them in processing and approving permits and licenses necessary for the construction and operation of facilities to carry out this section. The Secretary shall ensure that funds provided through such a cooperative agreement are used only for the purpose set forth in the preceding sentence.

This provision was amended in Defense Authorization Act for 1994, *supra* note 84, so that the words "approving and overseeing" were inserted in lieu of the words "and approving" within the text of the clause stated above.

²⁵² See H.R. REP. NO. 102-311, 102d Cong., 1st Sess. 411 (1991); see also 137 CONG. REC. S12369 (1991), where Senator Garn of Utah introduced an amendment (which was not accepted by the Conference Committee) which would have provided funding for oversight activities as well. In justification of this amendment, the Senator stated, in part:

The State of Utah has dedicated an average of 2,000 man-hours over the past year to review and write the actual permits for the chemical demilitarization program. This does not include the amount of time required to provide over-

(FFCA) removed most of the restrictions on providing funds for state oversight functions.²⁵³ The FFCA authorizes federal agencies to pay for inspections and monitoring activities by state regulators.²⁵⁴ The Defense Authorization Act for FY 1994 removed any doubt about funding authority by expressly expanding cooperative agreement authority to allow the Army to pay for oversight activities.²⁵⁵

The Army already has entered into a cooperative agreement with Utah's Department of Environmental Quality.²⁵⁶ The agreement covers the processing and issuing of all hazardous waste permits and their modifications for the demilitarization facility.²⁵⁷ The Army also has entered into discussions with Oregon and Kentucky about the possibility of entering into cooperative agreements. However, there was a question as to whether the Army could enter into cooperative agreements with Maryland, Kentucky, and Indiana, which are the host states for the three low-volume sites. The 1993 Defense Authorization Act²⁵⁸ required the Secretary of the Army to submit a report on alternative technology to Congress not later than December 31, 1994.²⁵⁹ The Act prohibited site preparation for and construction of any demilitarization facility (except TOCDF) until

sight of these permits, which would, if added to that number, total 7,000 hours, or an increase of four staff positions.

Once a permit is written, the Utah Department of Environmental Quality must then review and approve any modifications to those permits. In addition to reviewing the federal permit applications the department receives, the department is also responsible for permitting and oversight of all other hazardous waste storage, waste treatment, and disposal facilities in the state, including four major commercial facilities which are host to much of the hazardous waste capacity for the Western United States. . . . The increase in workload has created an undue burden on the state.

Id.

²⁵³ Pub. L. 102-386 (codified as amended at 42 U.S.C. § 6961).

²⁵⁴ Section 102(a) of the Act authorizes federal agencies to pay reasonable service charges, which include:

fees or charges assessed in connection with the processing and issuance of permits, renewal of permits, amendments to permits, review of plans, studies, and other documents, and inspection and monitoring of facilities, as well as any other nondiscriminatory charges that are assessed in connection with a Federal, State, interstate, or local solid waste or hazardous waste regulatory program.

²⁵⁵ 50 U.S.C. § 1521(c)(3).

²⁵⁶ This agreement was entered into on August 20, 1992.

²⁵⁷ Cooperative Agreement Between the U.S. Army Chemical Materiel Destruction Agency and the Utah Department of Environmental Quality for Hazardous Waste Permitting of Chemical Demilitarization Facilities (Aug. 20, 1992).

²⁵⁸ Pub. L. No. 102-484, § 173, 106 Stat. 2315 (1992).

²⁵⁹ This report, entitled the "U.S. Army's Alternative Demilitarization Technology Report for Congress," was released on 11 April 1994. The report analyzed the reports and recommendations on potential alternative technologies prepared by the NRC. The recommendations prepared by the NRC were not released until mid-February 1994. Congress provided the Army 60 days to publish its report after the NRC recommendations were released.

the required report was submitted to Congress.²⁶⁰ This limitation, however, did not apply to:

- (1) Facility design activities;
- (2) Obtaining environmental permits;
- (3) Project planning;
- (4) Procurement of equipment for installation in a facility;
- (5) Dual-purpose depot support construction projects needed to ensure the continuing safe storage of chemical weapons stocks and their ultimate disposal regardless of the technology employed.²⁶¹

The Act, however, provided special requirements for the three low-volume sites, to include:

- (1) The Secretary of the Army is required to use an alternative technology if the process is determined to be significantly safer and equally or more cost effective than baseline technology;
- (2) If an alternative technology is required, no funds may be obligated for the procurement of equipment, facilities planning, and design activities until a revised concept plan incorporating the alternative technology and revised stockpile disposal schedule is submitted to Congress.²⁶²

In response, the Army submitted its report on alternative technologies to Congress on April 11, 1994.²⁶³ This eliminated any statutory impediment posed by Public Law 102-484 to obtain environmental permits for the low-volume sites.

VIII. Contractor Liability and Indemnification

The Army cannot destroy the stockpile without an effective partnership with private companies, obtained through the competitive bid process, to successfully accomplish the mission. While Army personnel provide leadership and oversight, private companies provide facility management, expertise in the fields of industrial operations and environmental compliance, and personnel, to operate the facility. Additionally, the Army relies on private companies to design the demilitarization facilities, as well as to construct, install equipment, operate, and decom-

²⁶⁰ Pub. L. No. 102-484, § 173(b), 106 Stat. 2315 (1992).

²⁶¹ *Id.* § 173(b)(3).

²⁶² *Id.* §§ 173(b), 175.

²⁶³ Alternative Demilitarization Technology Report, *supra* note 12.

mission the facilities. This does not mean that the Army relinquishes responsibility. Instead, responsibility is shared between the Army and the contractor at a particular site to destroy the stockpile, while providing for maximum protection of the environment as well as adequate and safe facilities. As facility owner and executive agent for demilitarization, the Army remains accountable and exercises oversight.²⁶⁷

At any demilitarization site, the systems contractor (SC) is contractually committed to build and operate the demilitarization facility. But does this mean that the SC is the operator as defined by the RCRA? This statute defines operator as "the person responsible for the overall operation of a facility."²⁶⁸

For purposes of this discussion, the systemization contract for the Tooele Chemical Disposal Facility (TOCDF) is used for an example.²⁶⁹ Although this contract is not an exact template for all demilitarization facilities to follow, the contract sets forth the basic relationship between the Army and the SC.²⁶⁷

The terms of the contract make it clear that although the Army

²⁶⁴ Owner is defined as "the person who owns a facility of part of a facility." 40 C.F.R. § 260.10 (1992). Demilitarization facilities are contracted for by the Army, paid for with Army money, and are built on Army installations. The Army is the facility owner. Within the Department of the Army, the installation commander has been designated as facility owner. Consequently, the installation commander signs the RCRA hazardous waste management permit as facility owner. See AR 200-1, *supra* note 154, para. 6-4d(1). In this capacity, the installation commander exercises oversight of all activities on the installation. Nevertheless, the installation commander is not the only person responsible for demilitarization operations. The Office of the Program Manager for Chemical Demilitarization provides the centralized intensive management and direction for demilitarization operations. Technical and managerial oversight are carried out through an on-site field office (the Project Manager is the senior on-site USACMDA management official) (see sections 1.4.1. and 1.4.4 of the TOCDF contract). The Army Corps of Engineers also plays an important role in negotiating and awarding the contract and serving as contracting officer for the construction, equipment installation, and systemization (prove-out) phases of the contract (see sections 1.4.2 and 1.4.3 of the TOCDF contract). The responsibility for administration of the TOCDF contract transferred from the Corps of Engineers to AMCCOM in October 1994.

²⁶⁵ "Operator" means the person responsible for the overall operation of a facility. 40 C.F.R. § 260.10 (1992). Courts generally have imposed operator liability under the RCRA on those who are actively involved in a facility's operation. See *Lincoln Properties, LTD v. Higgins*, 733 F. Supp. 1215, 1221-22 (N.D. Ind. 1989).

²⁶⁶ This cost-plus-award-fee contract was awarded to EG&G, Inc. on September 6, 1989.

²⁶⁷ The Systems Contract sets forth the principle responsibilities of the parties. Section 1.4.1 of the Systems Contract for the TOCDF provides that the Program Manager, USACMDA, has life cycle management and execution responsibility for:

design, development, acquisition of equipment and facilities, transportation of chemical agents and munitions for disposal operations, disposal of waste products, and facility cleanup and closure.

Section 1.4.5 of the contract describes the principle responsibilities of the SC:

The recipient of the contract shall be the systems contractor (SC). The SC has the responsibility to construct, install process equipment, systemize, operate, and decommission the demilitarization facility.

exercises oversight over facility operations, the SC is the facility operator, and is responsible for overall operations. Section 1.4.5 of the contract states:

The recipient of this contract shall be the systems contractor (SC). The SC has the responsibility to construct, install process equipment, systemize, operate, and decommission the demilitarization facility.

Other sections of the contract expand on the operational responsibilities of the SC. For instance, section 2.3.5 of the contract provides:

The SC shall be responsible for complying with all environmental requirements as described in the TEAD EIS, the TSCA permit, and the RCRA Part B permit. The SC shall develop and provide an environmental compliance plan that shall draw together the policies and procedures for meeting the compliance requirements of the various permits, laws and agreements governing operations at TEAD.

Section 7.2 states:

The SC shall provide for the complete operation and maintenance of all CSDP demilitarization facilities located at TEAD. The operations shall be in accordance with approved SOPs, safety, QA/QC, Facility security, Environmental Compliance Plan and any other plans and procedures required by the Contracting Officer.

In contrast to the contract provisions above, section VI of the contract (Waste Management and Environmental Compliance) states:

RCRA Requirements for Plant Operations. The RCRA Part B applications for the CSDP facilities are submitted as amendments to the host installation's existing permit. The host installation commander is the "owner" of the demil facility and the Program Manager for Chemical Demilitarization will be identified in the permit as the operator.²⁶⁶

²⁶⁶ This provision must be understood in its context. The RCRA Part B permit application was submitted prior to contract award. Consequently, the Program Manager for Chemical Demilitarization was identified as the operator, and signed the RCRA Part B permit application. The intent was to award the contract, and then annotate the necessary RCRA permit with the name and address of the SC. The RCRA Part A application, which was used to obtain interim status from the State of Utah, stated:

OPERATOR INFORMATION: AT THIS TIME THE OPERATOR(S) OF THE CHEMICAL DISPOSAL SYSTEM HAS NOT BEEN DETERMINED BY THE U.S. DEPARTMENT OF THE ARMY. ONCE AN OPERATOR(S) HAS BEEN SELECTED FOR THIS FACILITY, THE OPERATOR WILL BE ASKED TO COMPLETE THE OPERATOR INFORMATION IN ITEM VII OF FORM I AND ITEM X OF FORM 3 OF THE PART A PERMIT APPLICATION.

A Part A application is used to obtain interim status. It is a short form containing basic information. The Part B application requires substantially more detailed information.

The terms of the contract make it difficult to determine who the operator is—the Army, the SC, or both?

Review of the contract reveals that the SC is responsible for day-to-day operations while the Army retains oversight responsibility. While the Army is responsible for, and oversees, facility operations, and the signature of the Program Manager appears on the Part B permit, this does not relieve the SC of its responsibility as an operator. The EPA has consistently read the term "operator" to include GOCO operators.²⁶⁹ As a general rule, GOCO contractors have been required by the EPA to sign RCRA permits as operator, while the government signs as owner, although there are instances in which both the contractor and the government have signed a permit as co-operators.²⁷⁰

The Army has adopted the EPA's policy. Consequently, as the facility owner, the installation commander will typically sign a RCRA permit for the treatment, storage, and disposal of hazardous waste (TSD permit), while the GOCO signs as the facility operator.²⁷¹

Contractors would like to reduce their exposure to liability for environmental noncompliance or releases of hazardous substances, because the potential costs associated with this liability can threaten the solvency of even well-capitalized companies.²⁷² With a view toward reducing this exposure, contractor representatives have suggested that signing the RCRA Part B permit as an operator of a demilitarization facility will in-

²⁶⁹ "GOCO" means government owned contractor operated facility.

²⁷⁰ See *In the Matter of: Olin Corp., Badger Army Ammunition Plant*, RCRA Appeal No. 88-18, (22 Nov. 1988). In this case, the contractor argued that no contractor at a GOCO facility should ever be named as a co-permittee because they do not have sufficient operational control. The Administrator of the EPA determined that "identification of a facility operator should be based on the performance of certain critical functions, not on whether the facility owner retains statutory authority to approve particular activities." See also EPA Memorandum from Gene Lucero, Director, Office of Waste Programs Enforcement, Determination of Operator at Government-Owned Contractor-Operated (GOCO) Facilities (June 24, 1987), which states in part:

Whenever a contractor or contractors at a government-owned facility, are responsible or partially responsible for the operation, management or oversight of hazardous waste activities at the facility; they should sign the permit as the operator(s). In some instances both the Federal agency and the contractor(s) are the operators and multiple signatures to that effect would be appropriate. A review of the facility's operating records, contingency plans, personnel training records, and other documents relating to waste management should indicate who the operator(s) are.

See also EPA Enforcement Policy for Private Contractor Operators at Government-Owned/ Contractor Operated (GOCO) Facilities, *Env. Daily (BNA)* (Jan. 24, 1994); EPA Memorandum from J. Winston Porter, Asst. Administrator, Office of Solid Waste and Emergency Response: Enforcement Actions Under RCRA and CERCLA at Federal Facilities, 18 *ELR* 35,141 (Jan. 25, 1988).

²⁷¹ AR 200-1, *supra* note 154, para. 6-4d.

²⁷² See Sharon McCarthy, *CERCLA Cleanup Costs Under Comprehensive General Liability Insurance Policies: Property Damage or Economic Damage*, 56 *FORDHAM L. REV.* 1169 (1988).

crease the SC's exposure to liability. While a permit may be one source of publicly available information to determine responsibility, liability determinations are not tied to the signatories on a permit. Regulatory authorities look to both the owner of the facility, and the actual operator, generator, transporter of the hazardous substance when it is time to issue notices of violations. Additionally, joint and several liability is imposed for RCRA violations,²⁷³ or for releases of hazardous substances under the CERCLA.²⁷⁴ Although joint and several liability is commonly imposed, it is not mandatory. If the harm is divisible and if there is a reasonable basis for apportionment of damages, each party may be liable only for the portion of the harm which it caused.²⁷⁵ However, if the harm is indivisible, or the contribution of each cause to a single harm cannot be determined, then each party found liable is subject to liability for the entire harm.²⁷⁶ This means that the SC stands potentially liable, regardless of whether it signs a RCRA permit.

Another concern is that the EPA's position may make GOCO contractors liable to remedy a violation, while lacking authority under the contract to make changes in the facility without the consent of the government. Contractors also the fear that a RCRA violation may provoke an order to engage in immediate remediation of possible contamination. If the installation or the USACMDA did not have budgeted funds to handle it, the GOCO must pay the bill. However, these fears are not well founded. As a federal facility, the Army is subject to state fines and penalties just as any private person.²⁷⁷ Although contingency funding may not be budgeted to pay fines and penalties, funding would be available from a vari-

²⁷³ The RCRA regulates the ongoing management of hazardous waste from "cradle to grave." Therefore, possible contamination at a site can trigger a duty by the GOCO to take corrective action under the RCRA. See 42 U.S.C.A. § 6924(v) (1993). The EPA has recently issued a new regulation on Corrective Action Management Units (CAMU) which are designed to implement corrective action at a facility. This new regulation is designed to facilitate the clean up of hazardous waste at a facility. 58 Fed. Reg. 8658 (1993).

²⁷⁴ See Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C.A. § 9607(a); *id.* §§ 6928, 6973, 6992d (RCRA); United States v. NEPACCO, 810 F.2d 726 (8th Cir. 1986); United States v. Conservation Chem. Co., 619 F. Supp. 162 (D.C. Mo. 1985); United States v. A & F Materials Co., 578 F. Supp. 1249 (S.D. Ill. 1984); United States v. Chem-Dyne Corp., 572 F. Supp. 802 (S.D. Ohio 1983); New Jersey v. Gloucester Envtl. Management Serv., Inc., 621 F. Supp. 998 (D. N.J. 1993); United States v. Rohm and Haas Co., 2 F.3d 1265 (3d Cir. 1993); United States v. Conservation Chemical Co., 619 F. Supp. 162 (W.D. Mo. 1985).

²⁷⁵ *Chem-Dyne Corp.*, 572 F. Supp. at 811.

²⁷⁶ See *EPA v. Sequa Corp.*, 3 F.3d 889 (5th Cir. 1993); *Chem-Dyne Corp.*, 572 F. Supp. at 811. However, in CERCLA contribution actions, responsible parties who are jointly and severally liable have a less demanding burden of proof. Courts may allocate response costs among liable parties using equitable factors, to include an allocation of response costs to correspond with the relative responsibilities of the parties. See *In re Hemingway v. Kahn*, 993 F.2d 915 (1st Cir. 1993).

²⁷⁷ The Federal Facilities Compliance Act, 42 U.S.C.A. § 6961 (1993), waives sovereign immunity with respect to administrative orders and all civil and administrative penalties and fines.

ety of sources.²⁷⁶ Additionally, funding is available from the Department of the Army under the Defense Environmental Restoration Program to carry out remediation and restoration actions.²⁷⁹

Although the SC is liable for its operation of the facility, it has substantial protection under the terms of the cost reimbursement contract.²⁸⁰ As a result, the contracting officer will review any cost incurred due to environmental compliance orders, corrective actions, or notices of violations and will apply the cost principles set forth in the *Federal Acquisition Regulation (FAR)*.²⁸¹

Despite the protections afforded to the SC, in the cost reimbursement provisions of the contract, the potential for protracted litigation and liability in the treatment of chemical agents presents an argument that something more is needed. For the contractors, that something more is indemnification.

To reach this question, however, it is necessary to resolve a threshold issue of whether it is possible to provide indemnification for CERCLA liability. Section 107(e) of the CERCLA provides:

[n]o indemnification, hold harmless, or similar agreement or conveyance shall be effective to transfer from the owner or operator of any vessel or facility . . . who may be liable for a release or threat of release under this section, to any other person the liability imposed under this section. Nothing in this subsection shall bar any agreement to insure, hold harmless, or indemnify a party to such agreement for any liability under this section.

This provision appears to be internally inconsistent, because it seems to make indemnification or hold harmless agreements ineffective in one sentence, and to allow them in the next. As a result, the clause has provoked extensive litigation over its meaning. However, the leading case on this subject reconciled the two provisions, holding that private parties may contract with respect to indemnification and contribution, but

²⁷⁶ Funding is available from a variety of sources, to include the installation's Operational and Maintenance Account, operational funds for USACMDA, or monies from either the AMC or the Department of the Army.

²⁷⁷ See 10 U.S.C.A. § 2701 (1993); AR 200-1, *supra* note 154, para. 9-4. However, under the Federal Facilities Compliance Act, 42 U.S.C.A. § 6961 (1993), the DERP funds may not be used to pay fines and penalties assessed against an Army installation or activity for environmental violations. In signing the Act, President Bush denied use of the Department of Justice judgment fund, directing that fines and penalties be paid from agency appropriations.

²⁸⁰ Under this form of a contract, the government bears the cost risk to provide additional funding to the contractor for costs which are allowable, reasonable, and allocable. See GENERAL SERVS. ADMIN. ET AL., FEDERAL ACQUISITION REG. pt. 31 (1995) [hereinafter FAR]; see also Cibinic Jr. & Nash, Jr., *supra* note 236, at 490-94.

²⁸¹ See FAR, *supra* note 260, pt. 31 (Contract Cost Principles and Procedures).

that all "responsible parties will be fully liable to the government regardless of the indemnification contracts they have entered into."²⁸² Accordingly, the majority of courts have enforced indemnification and hold harmless agreements between potentially responsible parties, allowing them to allocate environmental liability among themselves as they see fit.²⁸³

While indemnification agreements between private parties are generally permissible, the rules governing indemnification agreements within government contracts are quite restrictive.²⁸⁴ For instance, open-ended indemnification provisions are prohibited in government contracts because they violate the Anti-Deficiency Act.²⁸⁵ However, the government may provide indemnification through several means. One mechanism is through the "Insurance Liability to Third Persons" clause, which is limited to the availability of appropriated funds at the time the contingency occurs.²⁸⁶ A second mechanism allows the Army to enter into indemnification agreements for unusually hazardous risks pursuant to Public Law 85-804.²⁸⁷ Executive Order 10,789²⁸⁸ implements this law, and authorizes the DOD to hold harmless and indemnify the contractor engaged against any claims or losses resulting from negligence or a wrongful act or omission of the contractor. The duty to indemnify only applies to claims or losses arising out of, or resulting from, risks that the contract defines as unusually hazardous or nuclear in nature, to the extent the claim is not compensated by insurance.²⁸⁹ Any indemnification provision must be ap-

²⁸² *Olin Corp. v. Consolidated Aluminum Corp.*, 807 F. Supp. 1133, 1138 (S.D.N.Y. 1992) (quoting *Mardan Corp. v. C.G.C. Music, Ltd.*, 804 F.2d 1454, 1458-59 (9th Cir. 1986).

²⁸³ See *Olin Corp.*, 807 F. Supp. at 1138-39; see also *Robertshaw Controls Co. v. Watts Regulator Co.*, 807 F. Supp. 144 (D. Me. 1992); *Jones-Hamilton Co. v. Beazer Materials & Servs., Inc.*, 973 F.2d 688 (9th Cir. 1992); *Commander Oil Corp. v. Advance Food Serv. Equip.*, 891 F.2d 49 (2d Cir. 1993).

²⁸⁴ See Mark Connor, *Government Owned-Contractor Operated Munitions Facilities: Are They Appropriate in the Age of Strict Environmental Compliance and Liability?*, 131 MIL. L. REV. 1, 34-54 (1991).

²⁸⁵ 31 U.S.C.A. § 1341 (1993); see *To the Honorable Howard M. Metzbaum*, B-174839.2, 63 Comp. Gen. 145 (1984).

²⁸⁶ FAR, *supra* note 280, 52.228-7(c) & (d), which states in part:
the Contractor shall be reimbursed—

(1) For that portion (i) of the reasonable cost of insurance allocable to this contract, and (ii) required or approved under this clause; and

(2) For certain liabilities (and expenses incidental to such liabilities) to third persons not compensated by insurance. . . . These liabilities must arise out of the performance of the contract, whether or not caused by the negligence of the Contractor. . . .

Liabilities covered include loss or damage to property, and death or bodily injury. See also CONTRACT ATTORNEYS COURSE, CONTRACT LAW DESKBOOK, ch. 14 (1992).

²⁸⁷ 50 U.S.C.A. § 1431 (1993). This statute authorizes a federal agency to enter into contracts without regard to other provisions of law relating to the making of contracts whenever such action would facilitate the national defense.

²⁸⁸ Exec. Order No. 10,789, 28 Fed. Reg. 8,897 (1958), reprinted as amended in 50 U.S.C.A. § 1431 at 498 (1991).

²⁸⁹ See FAR, *supra* note 280, 52.250-1 (1991).

proved at a level not lower than the Service Secretary—in this case, the Secretary of the Army.²⁹⁰

To process a request for indemnification, contractors must provide certain information to the contracting officer,²⁹¹ who must then review the indemnification request, and either deny the request or forward it to the Secretary of the Army recommending approval.²⁹² If the request is approved, the contracting officer will insert the prescribed indemnification clause into the contract.²⁹³

The TOCDF contract contains an indemnification clause authorized by the Secretary of the Army in 1992.²⁹⁴ However, whether it adequately covers the risks associated with operating a demilitarization facility is questionable. The authorized clause provides indemnification to the GOCO for the risks of:

- (1) sudden or slow release of, and exposure to, lethal chemical agents during the disposal of stockpiles of chemical munitions, mines or other forms of weapons-related containerization; and
- (2) explosion, detonation or combustion of explosives, propellants or incendiary materials during the course of disposal of the stockpiles at the Tooele Army Depot, Tooele, Utah.

This indemnification is only available for claims or losses and damage arising out of supplies furnished or services rendered by the contractor and does not indemnify the contractor for criminal fines or penalties or the costs of defending, settling, or participating in the same.²⁹⁵

This clause extends indemnification to the release of chemical agents, or the explosion of materials during disposal. In contrast, operators of Army Ammunition Plants generally are provided broader indemnification. These indemnification clauses cover the risk of release of any substance or materiel authorized for use by the government—onsite or offsite—the handling of which is, or becomes, regulated by law.²⁹⁶ Applying this language to a demilitarization, the SC would provide complete coverage of the waste stream generated at the facility. Addition-

²⁹⁰ See also *id.* 50.201(d), which limits the ability of the Secretary to delegate this authority: "Regardless of dollar amount, authority to indemnify against unusually hazardous or nuclear risks . . . shall be exercised only by the Secretary or Administrator of the agency concerned."

²⁹¹ *Id.* 50.403-1. The request for indemnification shall include a statement from the contractor identifying the unusually hazardous or nuclear risk and how the corporation is exposed to it, and information relating to all applicable insurance coverage.

²⁹² See *id.* 50.403-2.

²⁹³ *Id.* 50.403-3.

²⁹⁴ Memorandum of Decision by M. P. W. Stone, Secretary of the Army (Mar. 27, 1992).

²⁹⁵ *Id.*; see also Amendment to Contract P00048, DACA87-89-C-0076.

²⁹⁶ See indemnification clause for the operation and maintenance of the Louisiana Army Ammunition Plant (Nov. 14, 1990).

ally, it would indemnify for any pre-existing site contamination that may be subject to corrective action requirements under the terms of the RCRA permit.

Several questions arise when considering the application of ammunition plant indemnification to a demilitarization facility. First, can the waste stream generated at a demilitarization facility be fairly characterized as an ultrahazardous activity? Although the treatment of chemical agent fits this criteria, postincineration processing of wastes, to include brine, ash, and scrap metal, is a normal industrial plant activity. Extending indemnification to these activities may encourage less than diligent compliance with RCRA requirements pertaining to the storage, transport, and record keeping of hazardous wastes. Additionally, Army ammunition plants do not provide an appropriate model on which to base an indemnification agreement. These facilities are old, and may already be contaminated with hazardous waste. In contrast, demilitarization facilities are newly constructed. Ammunition plants also must have a surge capacity to accommodate mobilization needs in times of armed conflict. This potential for increased production and a huge influx of relatively untrained workers make ammunition plants a unique industrial operation. Finally, ammunition plants have been historically awarded a low fee (two to four percent), because of the low risk attributable to the operator. Demilitarization SCs, however, are able to earn a high fee, and are asked to assume a higher level of risk.

The decision to provide additional indemnification is largely a business and policy choice for the government. In considering a contractor's request for indemnification, however, the government must protect the public interest by ensuring that contractors are held accountable for environmental compliance, while effecting an equitable distribution of the potential liability.²⁹⁷ To do otherwise would negate the public policy considerations that serve as the foundation for the fines and penalties provisions of the Nation's environmental laws. In short, there must be a financial incentive for diligent environmental compliance by the SC.

Regardless of the terms of the indemnification provision, there are limits on the extent to which the government may indemnify a contractor. For example, indemnification and hold harmless agreements may not be used to cover claims or losses caused by the willful misconduct or lack of good faith by the contractor or any subcontractor.²⁹⁸ Neither may the Army indemnify a contractor for civil fines or criminal penalties.²⁹⁹

²⁹⁷ Private insurance generally is unavailable or extremely expensive for many forms of environmental liability, although the costs of insurance for liability arising from performance of the contract generally are allowable. FAR, *supra* note 280, 28.311-2, 52.228-7.

²⁹⁸ Exec. Order No. 10,789 (1956) (as amended).

²⁹⁹ AR 200-1, *supra* note 154, para. 1-35b, which provides in part: "The Army cannot reimburse the contractor for payment of fines. . . ."; see also FAR, *supra* note 280, 31.205-15, which provides that civil fines and penalties are generally not allowable costs. They are payable, however, when the contractor can show that the fine or penalty was incurred as a

These limits are designed to prevent the government from shielding its contractors for violations of the law.

Public policy does not justify providing additional indemnification solely to protect the contractor. Contractors should be held financially accountable to the public for their failure to comply with environmental requirements. It would not defeat public policy considerations, however, to indemnify the contractor for potential liability that is limited to pre-existing site contamination or which may arise after the facility is closed. The contractor's performance of the contract has little or no impact on pre-existing site contamination, or on the condition of the site after the plant is closed and clear of contamination.³⁰⁰

Although the cost of corrective action for pre-existing site contamination and postclosure clean-up actions probably would be covered by the cost reimbursement provisions of the existing contract, providing indemnity for this risk would serve to assure the contractor that it will not be unfairly exposed to liability over which it has little or no control.³⁰¹ The contract's cost reimbursement and expanded indemnification provisions, as discussed, provide ample protection for regular facility operations. In forging a partnership with private enterprise, the Army must balance the contractor's desire to limit liability against the public interest of financial accountability.

IX. Compliance with the Clean Air Act

Army demilitarization facilities are required to comply with all federal, state, and local air pollution requirements to the same extent as any nongovernmental entity.³⁰² Certain provisions of the CAA and the CAA

result of a written instruction from a contracting officer or as a result of a specific contractual provision.

³⁰⁰ There are financial incentives available to the Army to encourage a contractor to diligently comply with all environmental requirements. Connor, *supra* note 284, at 51-52, recommends the following two incentives:

(1) Insert a deductible provision into indemnity provided by Pub. L. 85-804, so that the contractor would have to pay up to 25 percent of its yearly base fee; and

(2) alter the award fee criteria so that at least twenty-five percent of the available award fee is based on compliance with environmental laws. Under the current contract at TOCDF, 4 percent of the award fee is tied to environmental requirements. Other award fees that are somewhat associated with environmental compliance include meeting schedule (14 percent), management responsiveness (3 percent), and quality of schedule performance and planning (5 percent).

³⁰¹ A bill has been introduced in Congress (H.R. 3477, Nov. 7, 1993) which would add environmental response costs to the list of unallowable costs set forth at 10 U.S.C. § 2324(e)(1). This legislation is targeted at defense contractors, which are allegedly held to a lesser standard than that applied to companies that do business within the private sector. 35 GOVERNMENT CONTRACTOR, No. 44, para. 707 (Nov. 17, 1993).

³⁰² 42 U.S.C.A. § 7418(a) (1993).

Amendments of 1990 (CAAA) will affect the demilitarization program. Accordingly, this article will examine these provisions—to include the National Ambient Air Quality Standards (NAAQS)³⁰³ and the New Source Review (NSR) process. The NSR process imposes permit requirements for new major sources of air pollution or major modifications to existing large sources that create a significant net increase of air emissions.³⁰⁴ While these requirements are not new, the CAAs impose new, more stringent requirements, that will be implemented in the near future.

The CAAs include the attainment program (Title I), rewritten section 112 of the CAA, and the operating permit program (Title V). Title I establishes new standards for nonattainment areas, section 112 establishes strict controls over hazardous air pollutants, and Title V establishes a national operating permit program for stationary sources of air pollution and hazardous emissions.³⁰⁵

While the CAA is a federal statute, the states have the primary responsibility for assuring air quality. As a result, every state has its own state implementation plan (SIP)³⁰⁶ and state air permit system.³⁰⁷

A. State Air Quality Programs

State environmental agencies are primarily responsible for ensuring compliance with the NAAQS.³⁰⁸ States attain or maintain compliance with the NAAQS through the execution of a SIP, which the EPA must approve.

³⁰³ The CAA requires the EPA to establish NAAQS for each air pollutant "which may reasonably be expected to endanger public health to welfare." Air quality criteria for each pollutant are developed based on the latest scientific knowledge which indicates all identifiable effects on public health or welfare that can be expected from the presence of such pollutant in the ambient air. 42 U.S.C.A. § 7408(a)(2) (1992). The NAAQS represent minimum standards for national air quality. The states are free to adopt more stringent standards, but not less stringent standards. Warren Husband, *Comment: New Approaches and New Polluters: The Practical Impact of The Clean Air Act Amendments of 1990*, 18 FLA. ST. U. L. REV. 861, 865 (1992).

³⁰⁴ EPA NEW SOURCE REVIEW WORKSHOP MANUAL PREVENTION OF SIGNIFICANT DETERIORATION AND NONATTAINMENT AREA PERMITTING, 4 (Oct. 1990) [hereinafter EPA NSR MANUAL].

³⁰⁵ 42 U.S.C.A. § 7661 (1993); see also Timothy Williamson, *A Review of Major Provisions: Fitting Title V into the Clean Air Act: Implementing the New Operating Permit Program*, 21 ENVTL. L. SUMMER, 1991, at 2085, 2086; A Department of Defense Commanding Officer's Guide for Compliance to the Clean Air Act Amendments of 1990, at 5 (1992) [hereinafter DOD Compliance Guide].

³⁰⁶ 42 U.S.C.A. § 7407(a) (1993). A SIP is a plan: "prepared by the states, subject to federal approval, setting forth strategies for attaining and maintaining ambient standards. Such plans consist largely of emission limitations for sources of air pollution." See Craig Oren, *Prevention of Significant Deterioration: Control-Compelling Versus Site Shifting*, 74 IOWA L. REV. 1, 299 (1988); see also 42 U.S.C.A. § 7410(a) (1993).

³⁰⁷ Air permits are designed to enhance the authority of the state regulating agencies to enforce the provisions of state clean air requirements and the CAA, and to establish enforceable standards for stationary sources of air pollution. See Clean Air Act Amendments of 1990—Impacts on the Department of the Army, (prepared by United States Army Environmental Hygiene Agency) [hereinafter USAEHA Report].

³⁰⁸ 42 U.S.C.A. § 7407(a) (1993); Husband, *supra* note 303, at 865.

Each state's SIP is a roadmap for air pollution control. It establishes emissions limitations, permitting requirements, and other control measures each state will use to regulate specific sources of air pollution (or source categories) within an area to ensure attainment or maintenance of the NAAQS.³⁰⁹ For nonattainment areas, the SIP must include emission limits and control measures designed to bring the areas into compliance with the NAAQS over time. Nonattainment areas must achieve annual incremental reductions, that represent reasonable further progress within specified time limits.³¹⁰

Additionally, most states require individuals planning to construct or modify major stationary sources of air pollution to obtain construction permits before they begin work. Moreover, more than forty states have their operating permit programs,³¹¹ some of which have been in place for more than a decade.³¹² State construction and operating permit programs vary widely in their scope and requirements.³¹³ The common feature is that sources of air pollution must be constructed and operated in compliance with the terms of the applicable permit.³¹⁴

Army demilitarization facilities are subject to state air permitting requirements.³¹⁵ Consequently, the Army must comply with all state preconstruction review and operating permit requirements for air pollution.³¹⁶

A brief survey of some of the applicable state laws reveals the variety of state permit requirements that the Army must satisfy to construct and operate demilitarization facilities in the various states. Utah, for instance, required the Army to submit its plans and specifications to the state for approval prior to beginning construction of the TOCDF.³¹⁷ The next state scheduled for construction—Alabama—prohibits the construction, installation, modification, or use of any equipment that may cause

³⁰⁹ See Husband, *supra* note 303.

³¹⁰ *Id.*

³¹¹ Michael Barr, *How States Can Successfully Implement the New Operating Permit Title V* NATURAL RES. & ENV'T. 7 (1992).

³¹² *Id.* Title V of the CAA requires the states to implement its requirements for operating permit programs by November 1995. States are required to submit their permit programs to the EPA for approval. 40 C.F.R. § 70.4 (1993).

³¹³ Cf. David Novello, *EPA's Title V Operating Permit Rules: The Blueprint for State Permitting Programs*, 7 NATURAL RES. & ENV'T. 3 (1992).

³¹⁴ *Id.*

³¹⁵ 42 U.S.C.A. § 7416(a) (1993). Each agency and department of the federal government shall "comply with, all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of air pollution in the same manner, and to the same extent as any nongovernmental entity." See also AR 200-2, *supra* note 171, para. 4-2b(5).

³¹⁶ *Cf. id.*

³¹⁷ See UTAH CODE ANN. § 19-2-108 (1991).

air pollution unless a permit has been obtained.³¹⁸ Similarly, Oregon prohibits the construction or operation of any source of air contamination without first obtaining a permit.³¹⁹ Maryland requires separate permits to construct and operate installations that generate air pollution.³²⁰

While state air permit requirements may vary, the CAA set the minimum standard for the Army. The CAAs created new, more stringent requirements that states must implement. Before examining these, however, it is useful to review the CAA provisions that have been in effect from the inception of the demilitarization program.

B. New Source Review Requirements

The CAA imposes technology based emission controls for new and existing major sources of air pollution. Under the CAA, new major stationary sources of air pollution and major modifications to major stationary sources that create a significant net increase in air emissions are required to obtain a permit before beginning construction (preconstruction review). The process to obtain a permit is called New Source Review (NSR).³²¹ The CAA also establishes air pollution control requirements for geographic areas of the country that fail to meet NAAQS (the nonattainment program). The NAAQS are enforceable limits established for six criteria pollutants (ozone, carbon monoxide, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), inhalable particulate matter (PM₁₀), and lead).³²²

Under the CAA, areas where air quality is acceptable for a specific criteria pollutant are designated as in "attainment." Proposals to build a major new source or make a major modification to a major stationary source in an attainment area must obtain a "prevention of serious dete-

³¹⁸ ALA. CODE § 22-28-16 (1986)

³¹⁹ OR. REV. STAT. §§ 468A.040, 468A.045 (1991).

³²⁰ MD. CODE ANN. tit. 26, §§ 26.11.02.03, 26.11.02.04 (1989). Maryland departs from the pattern in one respect, it has elected to require hazardous waste incinerators to obtain a hazardous waste facility permit rather than an air permit. Under the scheme, air emission and operating standards are consolidated in a single permit for air emissions and hazardous waste.

³²¹ See EPA NSR MANUAL, *supra* note 304, at 4; Novello, *supra* note 313, at 3). "Major stationary sources" of air pollution are defined by statute and regulation.

³²² "The NAAQS are maximum concentrations 'ceilings' measured in terms of the total concentration of a pollutant in the atmosphere. . . ." The NAAQS are the foundation of the national strategy to improve air quality. The states are charged with the primary responsibility of ensuring compliance with the NAAQS. The SIP is the state's compliance mechanism to ensure attainment or maintaining the NAAQS. The SIP is based on the total estimated air quality, to include ambient estimates from existing sources of air pollution plus measured background concentrations and the modeled ambient impact caused by the applicant's proposed emissions increase and other emission increases in the area. See EPA NSR MANUAL, *supra* note 304 at C.3; DOD Compliance Guide, *supra* note 305, at 273; Husband, *supra* note 303, at 864 (1992). Demilitarization facilities emit several criteria pollutants, to include sulfur dioxide (SO₂), carbon monoxide (CO), nitrogen dioxide (NO_x) and particulate matter (PM₁₀).

rioration" (PSD) permit. In nonattainment areas, a major source must obtain a nonattainment area permit.³²³ Both programs require a permit before construction of a "major source" facility may begin.

C. The PSD Program

The PSD program is intended:

to make sure that clean air stays clean—that areas with air quality better than the national ambient air quality standards (NAAQS) not be "degraded" to bare compliance with the standards. In a nutshell, PSD requires that each new or expanded "major emitting facility" in "clean air areas" use the "best available control technology" (BACT) for minimizing additional air pollution. The program also establishes "increments" [for SO₂, PM₁₀ and NO₂] that limit the cumulative increase in pollution levels over the "baseline concentrations" in clean air areas.³²⁴

Demilitarization facilities must undergo a new source review under the PSD program if they are determined to be a "major stationary source" of air pollution, or if they will be constructed on an installation that is a major stationary source.³²⁵ For attainment areas, a "major stationary source" means a building, structure, facility, or installation³²⁶ which emits, or has the potential to emit, 100 tons per year of any air pollutant from a specified type of stationary source,³²⁷ or any other source with the potential to emit 250 tons per year, or more, of any air pollutant.³²⁸ A demilitarization facility which qualifies as a major source must obtain a PSD permit before construction may begin in an attainment area.³²⁹

³²³ EPA NSR MANUAL, *supra* note 304, at 4.

³²⁴ Oren, *supra* note 306, at 2; *see also* 42 U.S.C.A. §§ 7470-7479 (1993).

³²⁵ All pollutant-emitting activities located on a military installation are considered as part of the same industrial grouping and are assigned the same Standard Industrial Classification (SIC) code. *See* 40 C.F.R. § 52.21 (1993). If emission sources on the installation can be reduced at other locations to levels below 100 tons, a new source review may be avoided. This concept is known as the EPA's "bubble policy." The total emissions from a facility are treated as if enclosed in a bubble. In this way, a facility may reduce its emissions from various sources while building or modifying an emission point. Emission requirements can be satisfied if an overall reduction in emissions is achieved. GOVERNMENT INSTITUTES, INC., ENVIRONMENTAL LAW HANDBOOK 533 (11th ed. 1991) [hereinafter ENVIRONMENTAL LAW HANDBOOK].

³²⁶ 40 C.F.R. § 52.21(b)(6) (1992).

³²⁷ This threshold is predicated on the source's industrial category. Any stationary source that belongs to a list of 28 listed source categories which emit, or have the potential to emit, 100 tons per year or more of a pollutant qualifies as a major source. Included among the 28 source categories, for example, are kraft pulp mills and Portland cement plants. *See* EPA NSR MANUAL, *supra* note 304, at A.1; *see also* 42 U.S.C.A. § 7479(1) (1993).

³²⁸ 42 U.S.C.A. § 7479 (1) (1993); EPA NSR MANUAL, *supra* note 304, at 6.

³²⁹ *See* EPA NSR MANUAL, *supra* note 304, at 4. *See also* Husband, *supra* note 303, at 866-67. The PSD permit requirements affect the demilitarization facilities proposed for construction at ANAD (Alabama) and PB³ (Arkansas), because both installations are major

As part of the permit process, a PSD review must be done prior to construction to ensure compliance with the NAAQS and applicable PSD increments.³³⁰ The review ensures that the BACT is used to minimize the plant's air emissions, while continuous monitoring is required to ensure that plant emissions do not exceed maximum allowable increases.³³¹

The PSD increments for SO₂, NO₂, and PM are based on a system of area classifications that allow state and local governments to prevent deterioration of air quality (the "PSD increment").³³² "In effect, the PSD increments, when added to baseline concentrations, represent new ambient air quality standards for PSD areas."³³³ The state—or the EPA—determines how much of the available increment the new source is allowed to consume.³³⁴ Three area classifications exist,³³⁵ which differ in the amount of development allowed before significant air quality deterioration will be deemed to have occurred.³³⁶ All attainment areas not established as Class I are automatically designated as Class II, unless redesignated.³³⁷

All of the proposed demilitarization sites are located in Class II areas, which allow for moderate, well-controlled industrial growth. Demilitarization facilities should have a de minimis impact on visibility in Class I areas.³³⁸

The facility must demonstrate that it will install the BACT for every pollutant subject to PSD review.

[The] BACT must reflect the maximum achievable degree of emission reductions, taking into account energy, environmental, and economic impacts, and other costs. If there is a NSPS

sources of air pollution for a criteria pollutant (sulfur dioxide (ANAD) and volatile organic compounds (VOC) (PBA)). Interview with Major Lester Pitcher, Chief, Environmental and Monitoring Division, USACMDA (Dec. 13, 1993).

³³⁰ See EPA NSR MANUAL, *supra* note 304, at 5.

³³¹ *Id.*; 42 U.S.C.A. § 7475 (1993); Husband, *supra* note 303, at 867.

³³² See ERT, Air Quality Handbook—A Guide to Permitting and Compliance Under the Clean Air Act (9th ed. June 1986) [hereinafter ERT Handbook]; ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 540-44.

³³³ ERT Handbook, *supra* note 332, at 22.

³³⁴ *Id.* at 22-23.

³³⁵ The three area classifications are: Class I, which includes national parks and wilderness areas in excess of a specified acreage; Class II; and Class III. Increases in ambient air increments over baseline concentrations are limited according to the maximum allowable increase for an area's classification. The maximum allowable increase over the baseline concentration in Class I areas are the most restrictive. Larger increases in pollutant concentrations are allowed in areas designated as Class II or Class III. 40 C.F.R. § 52.21(c) (1992).

³³⁶ EPA NSR MANUAL, *supra* note 304, at C.3.

³³⁷ 42 U.S.C.A. § 7472(b) (1993).

³³⁸ EPA NSR MANUAL, *supra* note 304, at C.3; 40 C.F.R. §§ 51.166(e), 52.27(c), 52.28 (1992).

[new source performance standards] for a facility's category, [the] BACT must be defined at least as stringently.³³⁶

The BACT analysis is done on a case-by-case basis with NSPS³⁴⁰ used as a minimum requirement. Under the BACT analysis, the reviewing authority identifies those air pollution technologies that have a practical application to the emissions unit under evaluation. Some technology options may be rejected if they are shown to be technically infeasible or have unacceptable impacts.³⁴¹ This has been described as the "top-down" approach, in which the permit applicant is required to justify why it cannot use the most effective pollution control technology available.³⁴² After the reviewing authority rejects certain technology options, the remaining control alternatives are listed in order of effectiveness for emission control, and evaluated for energy, environmental, and economic impacts.³⁴³ The most effective control option not eliminated is selected as the BACT for the source under review.³⁴⁴

After the BACT is selected, the Army, in applying for a PSD permit, must show that it will not exceed any primary or secondary NAAQS or PSD air increments by the construction or operation of the proposed demilitarization facility.³⁴⁵

This demonstration is expensive and time consuming because the applicant must present one year of continuous air quality monitoring data, and base its demonstrations on that data.³⁴⁶

This demonstration is part of the air quality analysis which must be done for criteria and all other regulated pollutants. A separate air quality analysis is required for each regulated pollutant that is expected to be emitted from the proposed project in a significant amount.³⁴⁷ A new source or modification may be exempt from the requirement to conduct air quality

³³⁶ *Oren*, *supra* note 306, at 21-22; see also 40 C.F.R. § 51.166(b)(12) (1982).

³³⁷ The CAA requires the EPA to establish stringent new source performance standards (NSPSs) for all stationary source categories deemed to be significant contributors to air pollution that reasonably may be anticipated to endanger public health or welfare, 42 U.S.C.A. § 7411(b) (1963). The NSPSs apply to all new or modified sources within these categories and are to reflect a reduction in emissions to be obtained from using the "best technological system of continuous emission reduction." The SIP must show how a state intends to implement and enforce these NSPSs. There are now more than 60 categories of sources that are subject to the NSPSs. See Husband, *supra* note 303, at 866; ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 537-38.

³³⁸ EPA NSR MANUAL, *supra* note 304, at B.5.

³³⁹ *Citizens for Clean Air and Council for Land Care and Planning v. EPA*, 959 F.2d 839, 845 (9th Cir. 1992); *In the Matter of Hibernia Taconite Co.*, PSD Appeal No. 87-3 LEXIS at 8 (July 19, 1989); EPA NSR MANUAL, *supra* note 304, at B.5-B.9.

³⁴⁰ EPA NSR MANUAL, *supra* note 304, at B.5-B.8.

³⁴¹ *Id.*

³⁴² *Id.* at C.1; *Oren*, *supra* note 306, at 23.

³⁴³ ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 543.

³⁴⁴ EPA NSR MANUAL, *supra* note 304, at C.1.

analysis—to include gathering air quality monitoring data—if the expected emissions increase is de minimis. Environmental Protection Agency regulations establish de minimis limits.³⁴⁸

Each air quality analysis is unique, because it must be tailored for topography of the specific location, regional weather patterns, other air emitters in the vicinity, and the projected emissions from the proposed project.³⁴⁹

Generally, the analysis will involve (1) an assessment of existing air quality, which may include ambient monitoring data and air quality dispersion modeling results, and (2) predictions, using dispersion modeling, of ambient concentrations that will result from the applicants proposed project and future growth associated with the project.³⁵⁰

The EPA describes how the air quality analysis protects the NAAQS as follows:

For a new or modified source, compliance with any NAAQS is based upon the total estimated air quality, which is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured concentrations) and the modeled ambient impact caused by the applicant's proposed emissions increase (or net emissions increase for a modification) and associated growth.³⁵¹

The NAAQS and PSD increments are not mutually exclusive. As a result, air quality must not degrade beyond the ceiling set by the NAAQS, even if the source does not consume the PSD increment.³⁵² Increments in pollutant concentrations over the baseline concentration must fall within the limits set by the EPA for each class area.³⁵³ If insufficient increments exist, the permitting authority will deny a permit application to construct a new source of air pollution.

The PSD permit applicant must show that the proposed facility "will not cause, or contribute to, air pollution in excess of any . . . maximum allowable increase [increments] or maximum allowable concentration for any pollutant. . . ."³⁵⁴ To accomplish this, the applicant must use com-

³⁴⁸ 40 C.F.R. §§ 52.21(i)(8), 52.21(m) (1992); ERT Handbook, *supra* note 332, at 27.

³⁴⁹ EPA NSR MANUAL, *supra* note 304, at C.1.

³⁵⁰ *Id.*

³⁵¹ *Id.*

³⁵² *Id.* at C.3.

³⁵³ 40 C.F.R. § 52.21(e) (1992). Class I areas are the most restrictive. For instance, ambient air increments for nitrogen dioxide (annual mean) in Class I areas is 2.5 micrograms per cubic meter; in Class II areas, it is 26; in Class III areas, it is 50.

³⁵⁴ 42 U.S.C.A. § 7475(a)(3) (1993).

puterized modeling to predict whether the expected pollutants from the proposed project will exceed the increments for the particular location.³⁵²

D. The Nonattainment Program and Title I

Areas of the country that do not meet the NAAQS are known as nonattainment areas, and fall under stricter regulations. Each SIP must include a nonattainment plan for each nonattainment area within its borders.³⁵³ "The plan must demonstrate to the satisfaction of EPA that the area will attain that primary NAAQS as expeditiously as practicable."³⁵⁷

Title I of the 1990 amendments to the CAA impact the nonattainment program by creating a new control program directed toward three criteria pollutants, ozone, CO, and PM-10. These standards apply for all areas designated as nonattainment for any NAAQS.³⁵⁸

There are two stockpile sites located in nonattainment areas for a

³⁵² Dispersion air quality models used to predict contamination from a proposed source are:

essentially mathematical equations that attempt to predict how a "plume" of air pollution from a source will behave. The programmer feeds into the equations information about the quantity of pollution, the height at which it is dispersed, and foreseeable weather conditions in the area. In calculating increment consumption, the proposed source must take into account not only its own intended emissions, but most other changes in emissions since the "baseline date" and even some changes occurring before then. Projects that were too small to necessitate permits also consume increments, and thus must be included in the modeling. Finally, the applicant must take into account any quantifiable "secondary emissions" — emissions from other sources, such as support facilities, that would occur as a result of the project's construction.

Oren, *supra* note 306, at 26 (footnotes omitted); see also *State of Ohio v. EPA*, 784 F.2d 224 (6th Cir. 1986).

³⁵³ Jefferson Houpt, *The Clean Air Act's Revitalized Attainment Program*, 7 NAT'L RES. & ENV'T, Fall, 1992, at 10.

³⁵⁴ *Id.* There are certain elements which must be included in a nonattainment plan, to include:

- (1) An inventory of emissions from all stationary sources of air pollution within the nonattainment area.
- (2) A permit program for the construction and operation of new sources, or modifications to existing major sources.
- (3) Restrictions on issuing permits, to include compliance with strict requirements before a permit may be issued. These become increasingly restrictive as the level of nonattainment degrades from marginal to extreme. For instance, in a marginal area for nonattainment for nitrogen dioxide or ozone, a major source is one that emits 100 tons or more of nitrogen dioxide or volatile organic compounds (VOC) per year, thereby requiring the source to get an air permit. In a severe area for nonattainment, the major source threshold decreases to 25 tons. In an extreme area, a major source is any source which has the potential to emit at least 10 tons of nitrogen dioxide or VOC per year.

Houpt, *supra* note 356, at 11; 42 U.S.C.A. § 7511a (1993).

³⁵⁵ Henry Waxman et al., *A Review of Major Provisions: A Roadmap to Title I of the Clean Air Act Amendments of 1990: Bringing Blue Skies Back to America's Citizens*, 21 ENV'T. L. 1849, 1850 (1991).

criteria pollutant. These locations, listed below, are directly affected by new emission standards established by Title I.³⁵⁹

APG Ozone—Current nonattainment area (severe-15), major source = 25 tons per year of VOC (or nitrogen dioxide).

BGAD Ozone—Current nonattainment area (marginal), major source = 100 tons per year of VOC.³⁶⁰

For these nonattainment areas, the Army must demonstrate to the satisfaction of the applicable state that the proposed demilitarization facility will not exceed applicable nonattainment limits.³⁶¹ To accomplish this, the Army must meet stringent conditions to ensure that the new source's emissions will be controlled to the greatest degree possible, that more than equivalent offsetting emission reductions (offsets) will be obtained from existing sources, and that there will be progress toward achievement of the NAAQS.³⁶² Accordingly, a proposal to construct a major stationary source must apply emission control technology that results in the lowest achievable emissions rate (LAER).³⁶³ In contrast, existing sources of air pollution in a nonattainment area are required to use reasonably available control technology (RACT) to reduce emissions for the affected criteria pollutant.³⁶⁴

Additionally, the Army will have to certify that all other major sources under its control in the state comply with all applicable air quality requirements, and provide an analysis to show that the benefits of the proposed source outweigh its environmental and social costs, and provide adequate emission offsets.³⁶⁵

³⁵⁹ The information on the installations located in nonattainment areas was obtained from the United States Army Environmental Hygiene Agency, see USAEHA Report, *supra* note 307. See also 42 U.S.C.A. § 7511a (1993).

³⁶⁰ See USAEHA Report, *supra* note 307.

³⁶¹ Hout, *supra* note 356, at 10-11. Nonattainment areas may be classified as marginal, moderate, serious, severe, or extreme. As the severity of nonattainment increases, the threshold quantity that defines a major stationary source decreases. As a result, in a marginal area, a source with the potential to emit 100 or more tons per year of VOCs or Nox is a major source, and must obtain a construction permit. In an extreme area, a source that has the potential to emit 10 tons or more per year is a major source. These standards represent the more stringent standards effected by Title I of the CAAA. See 42 U.S.C.A. § 7511a (1993). It is necessary to evaluate the expected emissions from a proposed demilitarization facility located in a nonattainment area to determine whether it is a major source for a criteria pollutant, and therefore, must meet NAA requirements.

³⁶² Title I established graduated control requirements that include increasing offset ratios. These control ratios require a greater level of pollution reductions from other sources in the nonattainment area to offset increases in pollution from new sources or modifications. The offset ratio for marginal areas is 1.1 to 1. The required offset ratio in severe ozone nonattainment areas (such as APG) is 1.3 to 1. Waxman, *supra* note 358, at 1882; 42 U.S.C.A. § 7511a (1993).

³⁶³ 42 U.S.C.A. § 7503(a) (1993); Husband, *supra* note 303, at 867.

³⁶⁴ See 42 U.S.C.A. § 7502(c)(1) (1993).

³⁶⁵ Offsets are emission requirements created by controlling emissions of the same pollutant elsewhere within the nonattainment area. See *id.* § 7503. See also GOVERNMENT INSTITUTES, INC., ENVIRONMENTAL LAW HANDBOOK, 130 (12th ed. 1993).

E. Application of NSR Requirements to the Chemical Demilitarization Program

How do NSR requirements impact the chemical demilitarization program? A demilitarization facility is an emission source for air pollution, to include the following criteria pollutants: sulfur dioxide (SO₂), carbon monoxide (CO), nitrogen oxides (NO_x), and particulate matter (PM₁₀).³⁶⁵ As a result, whenever the Army proposes to construct a demilitarization facility on an installation, it first must decide whether PSD or nonattainment requirements apply.³⁶⁷ The Army then must determine whether the expected emissions from a proposed facility qualify it as a major stationary source.³⁶⁵

If a demilitarization facility is to be built on an installation that is a major stationary source, then the Army must evaluate the potential emissions from the proposed facility to determine if its operation will result in a significant "net emissions" increase at the installation.³⁶⁶ If it does, then the plant is a major modification which requires either a PSD or a nonattainment area permit.³⁷³

The EPA defines a stationary source as "any building, structure, facility, or installation which emits or may emit any air pollution subject to regulation under the [Clean Air Act]."³⁷¹ "Building, structure, facility, or installation" includes all:

pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person. . . .³⁷²

³⁶⁵ Interview with Major Lester Pilcher, Chief (subsequently retired), Environmental and Monitoring Division, USACMDA (Dec. 13, 1993).

³⁶⁶ The United States Army Environmental Hygiene Agency (renamed the United States Army Center for Health Promotion and Preventive Medicine (Provisional)), located at Aberdeen Proving Ground, Maryland, maintains the current nonattainment status for all major Department of the Army activities.

³⁶⁷ Detailed emissions data is available from the full-scale JACADS facility.

³⁶⁸ See ERT Handbook, *supra* note 332, at 21; EPA NSR MANUAL, *supra* note 304, at 4. A.2-A.5. "Significant" net emissions increase is defined at 40 C.F.R. § 52.21 (1992).

³⁶⁹ See 40 C.F.R. § 52.21 (1992).

³⁷⁰ *Id.* § 52.21(4).

³⁷¹ *Id.* § 52.21(6). The EPA has assigned military installations the same standard industrial classification (SIC)—95. This interpretation subjects a military installation to the same treatment as an industrial plant. As a result, activities as diverse as a dry cleaning operation, a coal burning generator, or a chemical demilitarization facility are considered as part of the same industrial grouping. Rather than likening a military installation to an industrial plant, it would be more appropriate to liken it to a municipality. Similar to a municipality, military installations usually have a large population of persons living in residential communities, with supporting infrastructure, to include power facilities, waste water treatment facilities, schools, fire and police stations, various stores, service stations, dry cleaners, motor pools and vehicular maintenance facilities. Some installations also have industrial facilities with missions separate from normal post operations.

Thus, a permit issued for a proposed demilitarization facility may cover many different air emission points within the installation, some of which have no connection to the demilitarization facility.³⁷³

To determine if the demilitarization facility is a major stationary source, it is necessary to determine the potential to emit. The EPA defines this as:

the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.³⁷⁴

The maximum design capacity includes any emission reductions due to the effects of any planned pollution control technology.³⁷⁵

Although the demilitarization facility—or any other air emitters on the installation—may only operate eight hours a day, five days a week, air emission calculations are based on the maximum design capacity, which could be twenty-four hours per day, seven days a week.³⁷⁶ Only restrictions that are federally enforceable may be factored into the maximum capacity calculation.³⁷⁷ An example illustrates how significant this can be. One stockpile location has several coal-fired boilers that have not been used for several years. Although the facility does not intend to use the boilers, they are capable of being operated and must be included in determining the installation's potential to emit. Assuming that the boilers would operate continuously, their potential to emit makes the installation a major stationary source.³⁷⁸ Consequently, a proposal to build a demilitarization plant at this location requires a PSD permit if the demilitarization plant's potential to emit exceeds the levels established as a "significant" net emissions increase.³⁷⁹

³⁷³ See Oren, *supra* note 306, at 16-17.

³⁷⁴ 40 C.F.R. § 52.21(4) (1992).

³⁷⁵ ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 541.

³⁷⁶ The worst case uncontrolled emissions rate is "based on the dirtiest fuels, and/or the highest emitting materials and operating conditions that the source is or will be permitted to use under federally-enforceable requirements" EPA NSR MANUAL, *supra* note 304, at A.19.

³⁷⁷ 40 C.F.R. § 52.21(17) (1992) defines "federally enforceable" as:

all limitations and conditions which are enforceable by the Administrator, including those requirements developed pursuant to 40 C.F.R. parts 60 and 61, requirements within any State implementation plan, any permit requirements established pursuant to 40 CFR 52.21 [this includes emission rates specified as a federally enforceable permit condition]. . . .

³⁷⁸ See EPA NSR MANUAL, *supra* note 304, at A.1-A.9.

³⁷⁹ *Id.* at A.24-A.25.

The problem outlined above, however, is resolved by including limits and conditions on the use of the boilers within the terms of the state operating permit for the boilers.³⁵¹ These limits and conditions would serve to restrict the boilers' potential to emit below levels set for a major stationary source.³⁵² For a limit or condition to be a legitimate restriction on the potential to emit, that limit or condition must be federally enforceable, which requires practical enforceability.³⁵³ Numerous limits or conditions could impose federally enforceable restrictions on the use of the boilers. These include specifying limits on boiler capacity, restricting operating hours,³⁵⁴ requiring certain air pollution control equipment, or limiting the type of fuel combusted—such as low sulfur coal.³⁵⁴

A second measure could include decommissioning certain boilers and ensuring that the decommissioned boilers are not included within the state operating permit.³⁵⁵ Shutting down certain emission sources on an installation reduces the installation's potential to emit, because many different emission points may be located within a single "stationary source."³⁵⁶ As a result:

it is possible for a plant owner to "net out" of the permit requirement for an increase at one point in the plant by "con-

³⁵¹ *Id.* at A.3-A.9; see also 40 C.F.R. § 52.21 (1992).

³⁵² *Cf.* 40 C.F.R. § 52.21 (1992).

³⁵³ EPA NSR MANUAL, *supra* note 304, at A.3-A.8. Terms and conditions contained in a state operating permit will be considered federally enforceable if they meet the following conditions:

- (1) The State's operating permit program is approved by the EPA and is incorporated into the applicable SIP.
- (2) The operating permit is legally binding on the source under the SIP and the SIP specifically provides that permits not legally binding may be deemed not "federally enforceable."
- (3) All emission limits, controls, and requirements are no less stringent than any counterpart limit in the SIP.
- (4) The limits, controls, and requirements in the operating permit are permanent, quantifiable, and otherwise enforceable; and
- (5) The permits are issued subject to public participation, to include notice and comment.

³⁵⁴ The Army has developed a plan to limit operation of certain PUDA boilers to ensure that installation air emissions do not exceed levels that would require a PSD permit. 1994 Annual Status Report, *supra* note 73, at 12.

³⁵⁵ See EPA NSR MANUAL, *supra* note 304, at A.3-A.9. The state operating permit could be issued individually for each boiler, or collectively. A permit that included all the boilers would create a "bubble" for these air emission sources, effectively limiting their potential to emit, as long as the permit specified that the boilers could collectively emit pollutants up to a certain specified level. In this way, the installation would have the flexibility to shut one or more boilers down or take steps to decrease their emissions, such as changing fuels, in order to meet air emission requirements. This would provide flexibility to the installation to operate a single boiler, or as many as desired, as long as the emission limit was not exceeded.

³⁵⁶ This would be a permanent and enforceable permit condition and therefore, federally enforceable.

³⁵⁷ Oren, *supra* note 306, at 17; see also 40 C.F.R. § 52.21(b)(5).

temporarily" lowering emissions at another point so that there is less than a de minimis increase from the plant as a whole. Similarly, modernization of individual points that do not cause a net increase in emissions of more than de minimis amounts are exempt.³⁸⁷

The measure described above is known as "netting." The Army may use this method to reduce facility emissions and modernize or add other facilities because all emission points within an installation belong to the same industrial grouping.³⁸⁸

F. Section 112—Hazardous Air Pollutants

The NAAQS, PSD, and nonattainment requirements are not the only air pollution standards that may affect demilitarization facilities. The CAAAs provide a new regulatory process to control the emissions of hazardous air pollutants (HAP).³⁸⁹ The CAAAs list 189 substances as hazardous air pollutants, many of which are commonly used in industry.³⁹⁰ The EPA, or the states, may add pollutants to the list that present a threat to human health or the environment.³⁹¹ Conversely, either the EPA or the states may delete pollutants.³⁹² The HAP list contains at least one HAP which is generated in small amounts by chemical demilitarization facilities—hydrochloric acid.³⁹³

Section 112(c) of the CAA directs the EPA to issue a list of categories and subcategories of major sources and area sources that emit the listed pollutants.³⁹⁴ Any source that emits, or has the potential to emit, ten tons per year or more of any listed hazardous pollutant or twenty-five tons or more per year of any combination of hazardous air pollut-

³⁸⁷ Oren, *supra* note 306, at 17 (footnotes omitted).

³⁸⁸ See EPA NSR MANUAL, *supra* note 304, at A.35; 40 C.F.R. §§ 51.165(a)(vi)(A), 51.165(a)(ii) (1992); ERT Handbook, *supra* note 332, at 26. All military installations have the same SIC for all activities within the installation. As a result, such diverse activities as boilers, dry cleaning facilities, and industrial smokestacks could be shut down in order to ensure that the installation is not a major stationary source. If neither the installation or the proposed demilitarization plant is a major stationary source, then a NSR is not necessary. Cf. EPA NSR MANUAL, *supra* note 304, at A.24-A.25.

³⁸⁹ DOD Compliance Guide, *supra* note 305, at 3.

³⁹⁰ See 42 U.S.C.A. § 7412 (1993); Margaret Claiborne, *The New Air Toxics Program*, 7 NATURAL RES. & ENV'T. 21, 22 (1992). The EPA may add pollutants to the list which present a threat of adverse human health effects, to include being carcinogenic, or cause adverse environmental effects. Given the toxic nature of chemical agents, it would not be unlikely for the EPA to add chemical agents (or their chemical components) to the list of HAPs.

³⁹¹ See 42 U.S.C.A. § 7412(b) (1993); Claiborne, *supra* note 390, at 22.

³⁹² 42 U.S.C.A. § 7412(b)(3)(C) (1993).

³⁹³ Interview with Major Lester Pilcher, Chief, Environmental and Monitoring Division (Dec. 13, 1993); Rouse, *supra* note 12, at 83.

³⁹⁴ 42 U.S.C. § 7412(c) (1993); Claiborne, *supra* note 390, at 22.

ants, is a major source, and is subject to permitting requirements.³⁹⁵ An area source is any source that is not a major source.³⁹⁶

Once a source is on the EPA's list of source categories, it is subject to technology based emission standards.³⁹⁷ The CAA established promulgation deadlines for certain source categories.³⁹⁸ Sources of hazardous air pollutants within the listed categories will be subject to technology based emission standards when they are promulgated by the EPA, or on a case-by-case basis, when the applicable standard is not promulgated on schedule.³⁹⁹ These provisions eventually will impact demilitarization facilities, because the EPA is scheduled to promulgate emission standards for the source category of "Hazardous Waste Incineration" by November 15, 2000.⁴⁰⁰

Section 112 also requires that new or existing sources of HAPs reduce air toxic emissions by using the "maximum achievable control technology" (MACT). Under this standard, new sources must meet emission limitations achieved by the best-controlled similar plant.⁴⁰¹ Existing sources, which will include all demilitarization facilities which have begun construction prior to November 15, 2000, have a somewhat less demanding technology standard to satisfy. They will have to achieve the average emission limitation achieved by the best performing twelve percent of the existing sources or the average emission limitation achieved by the best performing five sources in that category.⁴⁰² This may require existing HAP sources to make process modifications, or install emission control technology, or both, to comply with the MACT.⁴⁰³

The CAA requires a permit before a HAP source subject to standards set by the EPA for major or area sources may be constructed or modified.⁴⁰⁴ Additionally, any physical change to a major source or change

³⁹⁵ 42 U.S.C.A. § 7412(a)(1) (1993); USAEHA Report, *supra* note 307, at 9.

³⁹⁶ 42 U.S.C.A. § 7412(a)(2) (1993); Claiborne, *supra* note 390, at 22.

³⁹⁷ See 40 C.F.R. pt. 61 (1992); Claiborne, *supra* note 391, at 21.

³⁹⁸ 42 U.S.C.A. § 7412(c) (1993); 58 Fed. Reg. 63,941 (1993).

³⁹⁹ 42 U.S.C.A. § 7412(j) (1993); 58 Fed. Reg. 63,041 (1993). The EPA is expected to issue 174 National Emission Standards for Hazardous Air Pollutants (NESHAP) over the next five years. See Environmental Law Division Notes, Luster & Bell ARMY LAW., Apr. 1995, at 57.

⁴⁰⁰ 58 Fed. Reg. 63,955 (1993). This source category includes chemical demilitarization facilities. Under current Army regulation, the chemical stockpile generally is not considered to be hazardous waste. This designation will change, however, on the transfer of chemical munitions from the storage locations to the actual demilitarization facility, when an ammunition transfer record is signed indicating receipt of the munition. The receipt of the chemical munitions at the demilitarization facility and execution of the transfer record designates the munitions for destruction. Cf. AR 200-1, *supra* note 154, para. 6-7d, 6-7c.

⁴⁰¹ 42 U.S.C.A. § 7412(d)(3) (1993); Claiborne, *supra* note 390, at 22-23.

⁴⁰² 42 U.S.C.A. § 7412(d)(3) (1993); Claiborne, *supra* note 390, at 22-23.

⁴⁰³ See 42 U.S.C.A. § 7412(d) (1993); DOD Compliance Guide, *supra* note 305, at 3.

⁴⁰⁴ See 42 U.S.C.A. § 7412(i) (1993); 40 C.F.R. § 61.05 (1992); Standards for area sources—which is defined as any source that is not a major source—will be based on gener-

in the method of operation which increases emissions of any HAP by more than a de minimis amount is a modification that requires either a permit or a permit revision.⁴⁰⁵

Section 112 requirements probably will not impact the demilitarization program prior to November 15, 2000, unless the states choose to impose more rigorous requirements.⁴⁰⁶ By November 15, 2000, demilitarization facilities will have to meet MACT standards for existing sources if hydrochloric acid (or other HAPs) emissions exceed the designated level of ten tons per year individually or twenty-five tons per year collectively.

G. Subchapter V—Operating Permit Requirements

Subchapter V of the 1990 CAAs creates a federal operating permit program for stationary sources of air pollution.⁴⁰⁷ Under subchapter V, all states must adopt and implement an air pollution operating permit program. The programs must meet the minimum requirements established in subchapter V and EPA regulations.⁴⁰⁸ By January 1995, forty-five states and fifty-eight local programs had submitted applications for a Title V operating permit program. The EPA approved five state and eight local programs. One state, Virginia, was disapproved.⁴⁰⁹ This permit system will apply to demilitarization facilities as state permit programs are reviewed for subchapter V compliance and approved by the EPA.

The goals of subchapter V include the following:

- (1) Consolidating air pollution control requirements (state and federal) applicable to a source in one document to improve compliance and enforcement;
- (2) Clarifying how each source must comply with applicable requirements; and
- (3) Simplifying the regulation of individual sources of air pollution.⁴¹⁰

The new permit program is designed to cover every stationary source

ally available control technology (GACT). These standards are expected to be less stringent than MACT. Regulations for area sources are expected to be published by the year 2000. Claiborne, *supra* note 390, at 23.

⁴⁰⁵ See 42 U.S.C.A. § 7412(a)(5) (1993); Williamson, *supra* note 305, at 2108.

⁴⁰⁶ States may develop and submit to the EPA for approval hazardous air pollution programs at least as stringent as federal requirements. 42 U.S.C.A. § 7412(l) (1993); ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 573.

⁴⁰⁷ See Williamson, *supra* note 306, at 2088.

⁴⁰⁸ *Id.*

⁴⁰⁹ Environmental Law Division Notes, ARMY LAW., Apr. 1995, at 58-61.

⁴¹⁰ Williamson, *supra* note 305, at 2088-89.

subject to any CAA emission standard.⁴¹¹ A list of the features of this permit program includes the following:

- (1) A permit fee system;
- (2) A fixed term for each permit, not to exceed five years;
- (3) Permit limits and conditions to assure compliance with all CAA requirements, to include the SIPs;
- (4) A schedule of compliance;
- (5) The right of the EPA to prevent a state from issuing an air permit, unless the permit is revised to meet EPA objections; and
- (6) Authority to terminate or modify a permit "for cause."⁴¹²

Processing and issuing any form of environmental permit is not an expeditious process. However, subchapter V requires air permit authorities to either issue or deny a permit within eighteen months after the date of receipt of a completed application.⁴¹³ This provision may accelerate a permit process that often takes two to three years before state or federal regulators issue or deny a permit. While the purpose of this provision is to expedite the permit review process, regulators have the discretion to determine when an application is "complete." Given the complexity and detail required for a permit application, regulators undoubtedly will find some defect that renders a permit application "incomplete," if they are so inclined. As a result, the ostensible benefits from this provision may prove to be illusory.

All state air programs must meet certain requirements. These include: using standard permit application forms; monitoring and reporting requirements; the payment of annual fees by owners and operators; authority to terminate, modify, revoke and reissue permits "for cause"; providing procedures for processing applications, providing public notice and opportunity for public comment (to include public hearings); and state court review.⁴¹⁴

The EPA plays an important role in the review of permit applications. Prior to issuing a permit, a state permit authority must submit a copy of the permit application, the compliance plan, and proposed permit to the EPA.⁴¹⁵ A permit application that may affect the air quality of any contiguous state also must notify that state of the permit application, and allow it to submit written recommendations.⁴¹⁶ The EPA has

⁴¹¹ *Id.*

⁴¹² *Id.* at 2088-2103.

⁴¹³ 42 U.S.C.A. § 7661b (c) (1993).

⁴¹⁴ *Id.* § 7661a; Williamson, *supra* note 305, at 2100.

⁴¹⁵ 42 U.S.C. § 7661d (1993); Williamson, *supra* note 305, at 2103.

⁴¹⁶ 42 U.S.C. § 7661d (1993).

veto authority over any permit application and must object to any permit application that it determines is not in compliance with the CAA or the SIP.⁴¹⁷ A permitting authority may not issue a permit over the EPA's objection. After the EPA's forty-five day review period, any person may submit objections to the permit to the EPA, as long as those objections were raised during the public comment period.⁴¹⁸

The state's decision to issue or deny a permit is subject to judicial review in state court.⁴¹⁹ The EPA's decision not to disapprove a state permit, or to issue or deny a permit, is subject to review in federal court.⁴²⁰ Courts generally defer to agency discretion, and will set aside a decision to issue an air permit only if it is arbitrary, capricious, an abuse of discretion, or not in accordance with the law.⁴²¹

A valid permit serves to centralize all emissions requirements into a single permit document.⁴²² Permits must specify the following:

- (1) Enforceable emission limitations and standards;
- (2) A schedule of compliance;
- (3) Submitting the results of any monitoring no less than every six months; and
- (4) Other applicable provisions, to include SIP requirements.⁴²³

Compliance with the terms of the permit is designed to serve as a "permit shield," "shielding the permit holder from actions for operating without a permit."⁴²⁴ The permit may provide that compliance with its terms shall be deemed to be compliance with other provisions of the Act if the permit includes such provisions, or that such other provisions are not applicable.⁴²⁵ All major source permits with terms of three years or more are required to be reopened to incorporate any new CAA requirements that are applicable within eighteen months of the new requirements.⁴²⁶

H. Conclusion

The requirements of state permit programs, the CAA, and particularly the CAAs, impact the demilitarization program. This impact will

⁴¹⁷ *Id.*

⁴¹⁸ *Id.* § 7661d(b)(2).

⁴¹⁹ *Id.* § 7661a(b)(7).

⁴²⁰ *Id.* § 7661d.(b), (c); Williamson, *supra* note 305, at 2104.

⁴²¹ Citizens for Clean Air and Council for Land Care and Planning v. EPA, 959 F.2d 839 (9th Cir. 1992).

⁴²² Williamson, *supra* note 305, at 2056.

⁴²³ 42 U.S.C.A. § 7661c (1993); Husband, *supra* note 303, at 861, 889.

⁴²⁴ 42 U.S.C.A. § 7661c(f) (1993); Husband, *supra* note 303, at 889.

⁴²⁵ Husband, *supra* note 303.

⁴²⁶ 42 U.S.C.A. § 7661a(b)(9) (1993); Williamson, *supra* note 305, at 2104.

be more keenly felt as states fully implement the CAAAs. The NSR requirements presently apply, and require either a PSD or nonattainment area permit before construction of a demilitarization plant may begin, if the Army and the state determined a plant to be a major stationary source or a major modification to an existing major stationary source. The potential impact of characterizing chemical agents or their constituents as HAPs, or subchapter V operating permit programs, have yet to be fully assessed.

X. Hazardous Waste Laws Affecting the Chemical Demilitarization Program

The RCRA is the primary federal law regulating the generation, transport, storage, treatment, and disposal of solid waste.⁴²⁷ It provides detailed "cradle to grave" control for solid wastes that are classified as "hazardous waste,"⁴²⁸ and applies to all demilitarization facilities—including JACADS—as treatment facilities of hazardous wastes.⁴²⁹

The RCRA contains stringent standards for treatment facilities that use incinerators to destroy hazardous wastes. It requires these facilities to conduct a detailed waste analysis and trial burn for the waste feeds it intends to process to establish steady state conditions and demonstrate sufficient destruction of hazardous constituents in the waste.⁴³⁰

As treatment facilities for hazardous waste, the Army's demilitarization facilities must conduct trial burns to test and ensure that every furnace used to destroy chemical agent will do so within emission standards set by the state.⁴³¹ Each furnace must achieve a destruction and removal efficiency (DRE) rate of at least 99.99% for the principal organic hazardous constituents designated by the EPA for each waste feed, ex-

⁴²⁷ See ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 406.

⁴²⁸ *Id.* at 406-07. See also *Wycoff Co. v. EPA*, 796 F.2d 1197, 1198 (9th Cir. 1986). The RCRA provides "nationwide protection against the dangers of improper hazardous waste disposal."

⁴²⁹ See 40 C.F.R. pt. 262 (1992) (Standards Applicable to Generators of Hazardous Waste); NRC Alternative Technologies Report, *supra* note 22, at 26. A facility is regulated as a treatment facility if the operator uses any method, technique, or process designed to change the physical, chemical or biological character or composition of any hazardous wastes. 40 C.F.R. § 260.10; ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 424.

⁴³⁰ ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 430-31.

⁴³¹ JACADS Environmental Report, *supra* note 37, at 14.

A trial burn consists of a series of at least three test burns. Each test burn lasts for a time period sufficient for the EPA to be satisfied that the furnace can routinely operate within established limits.

During the furnace testing, operating limits such as feed rate, residence time, furnace temperature, and pressure are established. Stack emissions are monitored during trial burns, indicating combustion efficiency and environmental compliance.

cept for the LIC, which must achieve a DRE of 99.9999%.⁴³² A DRE of 99.99% means that 9,999 molecules of a compound are destroyed for every 10,000 molecules that enter the incinerator.⁴³³ The state and the EPA assess the results of the trial burns and establish (in the permit) routine operating conditions for future operations. Demilitarization facilities must perform treatment operations within the ranges specified in the permit.⁴³⁴

In addition to establishing these operating conditions, the state and the EPA require that incinerators have continuous monitoring and automatic controls to shut off the waste feed when operating conditions are exceeded.⁴³⁵ The Army uses two techniques to monitor emissions. The Automatic Continuous Air Monitoring System (ACAMS) is the primary chemical agent monitor that provides near real-time detection of agent releases within the facility. It triggers warning alarms in the facility control room when the agent is detected.⁴³⁶ The other technique is the Depot Area Air Monitoring System (DAAMS), which is used to confirm or disprove ACAMS readings and to monitor air quality around the facility for agent.⁴³⁷ The ACAMS and DAAMS are state of the art systems that provide continuous air monitoring of all emissions.⁴³⁸ The duplicative over-

⁴³² The RCRA permit issued by the State of Utah for the TOCDF (Permit Number UT5210090002, June 30, 1989) [hereinafter Tooele RCRA Permit] specifies that the Liquid Incinerator (LIC) must achieve a destruction and removal efficiency (DRE) of 99.9999% for chemical agent. The remaining incinerators (Metal Parts Furnace (MPF), Deactivation Facility (DFS), and Dunnage Incinerator (DUN)) must achieve a DRE of 99.99%. See pages 128, 137, 147, and 157 of the RCRA permit. Cf. ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 431.

⁴³³ JACADS Environmental Report, *supra* note 37, at 14. Destruction by incineration means that an organic hazardous compound, such as chemical agent, are changed by combustion into simpler molecular forms, which are captured by the pollution abatement system or transformed into salts (brine), so that little or no molecules of the original compound are emitted through the stack. See Kopel, *supra* note 62, at 10:216 n.38.

⁴³⁴ JACADS Environmental Report, *supra* note 37, at 14.

⁴³⁵ Cf. Tooele RCRA Permit, *supra* note 432, at 135, 144, 154-160; ENVIRONMENTAL LAW HANDBOOK, *supra* note 325, at 431.

⁴³⁶ JACADS Environmental Report, *supra* note 37, at 24; United States Army Chemical Materiel Destruction Agency, Safety Report for the Johnston Atoll Chemical Agent Disposal System, Operational Verification Tests 1 & 2, 17-18 (Sept. 3, 1993) [hereinafter JACADS Safety Report]. The ACAMS units are located at specified process areas within the facility and on the exhaust stacks. The ACAMS draws air through a glass tube for a set amount of time. A substance inside the tube traps agent molecules. At the end of the sampling period, the airflow is stopped and the tube is heated, which frees agent molecules. The agent molecules are then drawn into a gas chromatograph which detects agent, and measures the amount of agent present in the sample. If agent is detected at a specified level, automatic shutoffs stop the feed of agent to the operating furnaces. Even if below allowable levels, operators take precautionary actions to determine the cause.

⁴³⁷ See JACADS Environmental Report, *supra* note 37, at 24. Over a period of several hours, the DAAMS draws air into sample collection tubes which must be analyzed in a laboratory using gas chromatography. The DAAMS air monitoring units are located on the incinerator stacks, and around the facility, and are used to confirm the presence of chemical agent.

⁴³⁸ "State-of-the-art commercial emissions monitors cannot continuously measure releases of the most toxic emissions, such as heavy metals and dioxins. Such releases are sampled only occasionally, and lab analysis is quite expensive." Kopel, *supra* note 62.

lay of monitors and their ability to detect amounts of agent much less than that allowed by regulation, provides near real time air monitoring.⁴³⁹

Trial burns were conducted at JACADS for three incinerator systems (LIC, DFS, and MPF) to ascertain compliance with RCRA Part B permit requirements.⁴⁴⁰ These tests revealed that the systems met or exceeded all RCRA permit standards. For instance, the DRE of the principal organic hazardous constituent (in this case, mustard agent (HD)) must be at least 99.9999% (for the LIC). The RCRA trial burns for HD within the liquid incinerator revealed a DRE ranging from >99.999953% to >99.999975%.⁴⁴¹ Trial burns for nerve agents provided similar results.⁴⁴²

Chemists⁴⁴³ analyzed approximately 136 potential pollutants in samples taken from gas emissions during the JACADS trial burns. An inhalation health risk assessment evaluated the carcinogenic and non-carcinogenic health risks and found that they were inconsequential.⁴⁴⁴ The RCRA trial burns indicated the presence of chromium in the LIC slag (the residue left over from the incineration process within the liquid incinerator).⁴⁴⁵ Analysis of the slag detected chromium in sufficient concentrations to make it a hazardous waste. Consequently, the JACADS Operations and Maintenance Contractor (OMC) disposed of the slag in a RCRA-regulated hazardous waste landfill.⁴⁴⁶ Solid wastes produced by the deactivation furnace system contained lead, cadmium, and chromium. As a result, the OMC transported solid waste residues to a permitted landfill for disposal as hazardous wastes.⁴⁴⁷ The OMC, under the direction of the Army, also conducted demonstration burns under the Toxic

⁴³⁹ See JACADS Safety Report, *supra* note 436, at 16-19.

⁴⁴⁰ NRC Alternative Technologies Report, *supra* note 22, at 26.

⁴⁴¹ United Engineers & Constructors Inc., The Results of the Demonstration Test Burn for Thermal Destruction of Agent HD in the Johnston Atoll Chemical Agent Disposal System Liquid Incinerator, 2-1 (Feb. 1993) (prepared for Program Manager for Chemical Demilitarization) [hereinafter LIC Test Burn Results].

⁴⁴² The DRE for VX and GB were greater than 99.999988% and 99.99999% respectively, as compared with the RCRA requirements of 99.99%. NRC Alternative Technologies Report, *supra* note 22, at 26.

⁴⁴³ Chemists working at the JACADS are employed by the Operations and Maintenance Contractor, Raytheon Engineers & Constructors, under the direction of the Program Manager for Chemical Demilitarization.

⁴⁴⁴ JACADS Environmental Report, *supra* note 37, at 15. The United States Army Environmental Hygiene Agency conducted this assessment, which found that the cancer and noncancer effects are substantially below levels of concern set by federal medical and scientific bodies.

⁴⁴⁵ *Id.* at 17. Approximately 15,000 pounds of slag were produced during OVT 1 and OVT 2.

⁴⁴⁶ LIC Test Burn Results, *supra* note 441, at 2-3; see also 40 C.F.R. § 262.20 (1992), which requires the generator who transports or offers for transportation hazardous waste must prepare a manifest.

⁴⁴⁷ LIC Test Burn Results, *supra* note 441, at 18. Nearly 750,000 pounds of residue scrap material and ash were collected, packaged, and transported for disposal during OVT1 and OVT2.

Substances Control Act (TSCA)⁴⁴⁶ to evaluate combustion efficiency, the feed rate, and the amount of PCBs introduced into the Deactivation Furnace, and their DRE.⁴⁴⁹

A similar series of trial burns under the RCRA and TSCA are planned for the TOCDF and will begin as soon as Utah certifies the facility's construction.⁴⁵⁰

The JACADS trial burns and operations are not the only RCRA-related activity taking place in the demilitarization program. Efforts are ongoing to prepare and submit RCRA, CAA, and TSCA permit applications for the remaining CONUS sites. Additionally, a basic policy question confronts the stockpile program—at what point, if ever, do chemical munitions and materiel in the stockpile become a hazardous waste?

The DOD's long-standing position has been that ordnance (either conventional or chemical) does not become a waste until it is designated for destruction and is transferred to a demilitarization facility. This usually occurs when a demilitarization facility receives the ordnance and the last approval authority acknowledges receipt of the ordnance by signing an Ammunition Transfer Record,⁴⁵¹ or its equivalent.⁴⁵² The EPA did not agree with this position, stating:

Once there is an intention to dispose or destroy munitions, their storage as well as transportation would be regulated since they are hazardous waste. Therefore, the storage and transportation of military munitions that are hazardous waste are subject to RCRA prior to demilitarization.⁴⁵³

Should the chemical stockpile be construed as hazardous waste while it is safeguarded in storage igloos under Army control?⁴⁵⁴ Although

⁴⁴⁶ 42 U.S.C.A. §§ 2601-2671 (1992).

⁴⁴⁹ See LIC Test Burn Results, *supra* note 441, at 14, 23. The DRE of polychlorinated biphenyls (PCBs) met TSCA requirements in three of four runs. Additionally, no hydrogen chloride was detected during the OVT2 trial burn. Accordingly, all OVT 1 and OVT2 trial burns were successful.

⁴⁵⁰ Telephone interviews with Timothy Thomas, Project Manager, TOCDF (May 1, 1995); David Jackson, Project Manager (June 23, 1995).

⁴⁵¹ Dep't of Defense, Form 1348-1; Dep't of Army, Form 4505 (Ammunition Transfer Record); or equivalent.

⁴⁵² See AR 200-1, *supra* note 154, para. 6-7d. See also Memorandum from Gary Vest, Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health) to Deputy Assistant Secretary (Environment), Office of the Assistant Secretary of Defense (Production and Logistics) (Aug. 27, 1991).

⁴⁵³ Letter from Jack McGrew, Deputy Assistant Administrator, EPA, to Carl Schafer, Jr., Office of the Assistant Secretary of Defense (Oct. 3, 1985).

⁴⁵⁴ The RCRA regulations define materials as a solid waste if they are abandoned by being disposed of, burned or incinerated, or accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated. 40 C.F.R. § 261.2(b) (1992). Based on this definition, the entire stockpile could be construed as being abandoned, because it is being stored before it is incinerated. This interpretation,

there is a statutory directive, as well as the potential treaty requirement, to destroy the stockpile, it makes little sense to impose RCRA-related requirements on a stockpile that is already subject to intense regulatory control.⁴⁵⁶ Adding RCRA requirements to the storage and transport of chemical munitions would provide no significant additional protections for either the public or the environment. These munitions already are secured, monitored, maintained, and are subject to careful regulatory control.⁴⁵⁶

Congress addressed this issue in the FFCA by directing the EPA to propose, after consulting with the DOD and appropriate state officials, regulations identifying when military munitions (including chemical munitions) become hazardous wastes.⁴⁵⁷ The DOD and the EPA are working together to prepare a new regulation which will identify when military munitions, to include chemical munitions, become subject to regulation as hazardous wastes.⁴⁵⁸

Recovered nonstockpile chemical munitions and materiel are on the other side of the spectrum. Few would argue that munitions dug out of a pit are not "discarded" or "inherently waste-like." Thus, the question becomes whether these munitions and materiel are hazardous under the EPA's definition. Initially, it appears obvious that recovered lethal chemical munitions would be hazardous waste. But the term "hazardous waste" is not a generic term for everything harmful, but is a carefully defined term with specific technical meanings. To define this term, the EPA has provided an extensive list of hazardous wastes from nonspecific sources and from specific sources.⁴⁵⁹ These lists do not include chemical agents or their chemical components, although certain states have listed chemical agents as hazardous wastes.

The only remaining categories of hazardous waste are those solid wastes that exhibit the characteristics of ignitability, reactivity,

however, ignores the context of the RCRA regulation. The chemical stockpile has not been accumulated or stored in anticipation of its eventual destruction. It was stored for purposes of national defense, to include deterrence and possible retaliatory use. It should not, therefore, be construed as abandoned.

⁴⁵⁵ See *id.* § 261.2.

⁴⁵⁶ AR 50-6, *supra* note 94, establishes the chemical personnel reliability program, and specifies strict transport, safety, and security requirements and emergency response procedures for the chemical stockpile. These are designed specifically for the chemical stockpile. In contrast, the RCRA standards for hazardous waste treatment, storage, and disposal facilities are designed as an industry wide standard.

⁴⁵⁷ 42 U.S.C.A. § 6924(y) (1992).

⁴⁵⁸ The EPA is expected to release its initial draft on rules defining RCRA applicability to military munitions. Telephone interview with LTC David Bell, Chief, Compliance Branch, Environmental Law Division (May 9, 1995). See also Regulatory Agenda, Rule Identifying When Military Munitions Become Hazardous Wastes and Management Standards For Such Wastes, 58 Fed. Reg. 56,998, 57045 (1993).

⁴⁵⁹ See 40 C.F.R. §§ 261.91-261.32 (1992).

corrosivity, or toxicity.⁴⁶⁰ Once again, a tendency exists to assume that chemical agents are toxic. A review of the description of the toxic characteristic, however, reveals that chemical agents do not meet the criteria,⁴⁶¹ nor do they exhibit the characteristics of ignitability⁴⁶² or corrosivity.⁴⁶³ Reactivity is the only characteristic that applies.⁴⁶⁴ Reactivity is described, in part, as a representative sample that is normally unstable and readily undergoes violent change without detonating, reacts violently with water, forms potentially explosive mixtures with water, when mixed with water generates toxic gases, is readily capable of detonating if subjected to a strong initiating source, or is readily capable of detonation at standard temperature or pressure.⁴⁶⁵ In 1984, the Army agreed with the EPA that M55 chemical rockets—which carried GB and VX nerve agents—were a reactive hazardous waste, and that the installations where these were stored would seek hazardous waste storage permits for the storage igloos.⁴⁶⁶ This characterization was based on the unstable nature of the rockets, and not the agent contained within the rockets.⁴⁶⁷ As for other stockpile items, present Army policy considers these munitions to be hazardous waste when they are delivered to the munitions holding area and transferred from the storage account to the demilitarization account.⁴⁶⁸ Additionally, as a matter of policy, the Army generally has conceded, that recovered nonstockpile chemical munitions and materiel are reactive hazardous wastes.

Even if chemical munitions and materiel were not considered to be hazardous waste, it does not mean that chemical agents would be shipped on the Nation's highways and railroad system—in a manner similar to many common industrial chemical products (such as phosgene and chlorine). It simply would mean that the RCRA requirements would

⁴⁶⁰ See *id.* § 261.20-24.

⁴⁶¹ See *id.* § 261.24. Chemical engineers in USACMDA have assured that after applying the test methods described in Appendix II, the extract from a representative sample of chemical agent does not contain any of the contaminants listed in the applicable table.

⁴⁶² *Id.* § 261.21.

⁴⁶³ *Id.* § 261.22.

⁴⁶⁴ *Id.* § 261.23.

⁴⁶⁵ See *id.*

⁴⁶⁶ See AR 200-1, *supra* note 154, para. 6-7g. "In special circumstances, military munitions and ordnance could be declared a waste prior to demilitarization." These installations include the BGAD, TEAD, UMDA, PBA, and ANAD, which store M-55 rockets.

⁴⁶⁷ The determination to classify the rockets as a waste was based on the Army's determination that the rockets had no further military strategic significance, were obsolete, and were stored only for disposal. It was classified as hazardous waste because it contained explosives. Army Message, Classification of M55 Chemical Rockets as a Hazardous Waste (10 Sep 1984). See also MITRE Corp., Assessment of the U.S. Chemical Weapons Stockpile: Integrity and Risk Analysis, 2-12 (June 1993) [hereinafter MITRE Stockpile Assessment]. "The M55 rockets are subject to corrosion, explosive sensitivity, leakage, and propellant destabilization as aging effects that may increase storage risks over time." *Id.*

⁴⁶⁸ AR 200-1, *supra* note 154, para. 6-7.

not apply to the storage, security and transport of such items. Instead, the Army's chemical surety regulations would continue to regulate these agents.⁴⁶⁰

XI. State Laws Affecting Chemical Demilitarization

A growing body of state law exists which seeks to directly regulate chemical demilitarization operations conducted in a particular state. Some states, to include Kentucky, Indiana, Maryland, Oregon, and Utah, have determined certain chemical agents to be hazardous wastes.

Kentucky Revised Statute 224.50-130(2) (1992) lists GB, VX, and H as "hazardous wastes for the purposes of regulation of the treatment, storage, and disposal of the wastes under the delegated authority of [the RCRA]."⁴⁷⁰ The statute includes other requirements directed at the chemical demilitarization program.⁴⁷¹ The same statute requires that before state environmental regulators may issue a RCRA permit to construct and operate a demilitarization plant, an operational facility comparable to the proposed facility—such as JACADS or TOCDF—must demonstrate a destruction or neutralization efficiency of 99.9999% for each substance proposed to be treated or destroyed. The facility must demonstrate that this destruction efficiency can be achieved during the design life of the facility under all operating conditions, including malfunctions, upsets, or unplanned shutdowns.⁴⁷² The JACADS trial burns and OVT demonstrated the requisite DRE.

⁴⁶⁰ See AR 50-6, *supra* note 94.

⁴⁷⁰ This list corresponds to the chemical agents stored at BGAD near Richmond, Kentucky.

⁴⁷¹ KY. REV. STAT. ANN. § 224.50-130 (Michie/Bobbs-Merrill 1992). The statute includes a number of other requirements. One provision that highlights the NIMBY ("not in my backyard") syndrome that infects this statute is the prohibition on issuing a permit unless a finding is made—after public notice and public hearings—that no alternative method of treatment or disposal (to include transportation to another site or neutralization) exists that creates less risk of release, or harm to the public in the event of release. In view of the NRC's recommendation against moving the M55 rockets, any effort to move the rockets to another location would be particularly perilous. See NRC 1984 Report, *supra* note 33, at 10.

⁴⁷² KY. REV. STAT. ANN. § 224.50-130(3) (1992). It is uncertain what this statutory language means, and what its effect will be. Demilitarization facilities are designed with negative pressure and automatic cutoffs to prevent the release of chemical agent in the event of a malfunction, upset, or unplanned shutdown. If the purpose of the statute is to ensure that these systems are in place, then the standard is capable of being demonstrated. If the statute, however, is interpreted in such a way as to make it impossible for the Army to receive a RCRA permit for the proposed facility, then the provision will be vulnerable to legal challenge. Under the Supremacy Clause of the United States Constitution (Article VI, clause 2), a state is preempted from passing laws that operate to unreasonably restrict the operation and purpose of federal law. *Hines v. Davidowitz*, 312 U.S. 52, 67 (1941) (a state law is preempted when it "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress." See also *Free v. Bland*, 369 U.S. 663 (1962); *Felder v. Casey*, 487 U.S. 131 (1988). The destruction of the stockpile is mandated by federal statute

Indiana Statutes Annotated 13-7-8.5-3 (1992) lists GA, GB, H, HD, and HT as hazardous wastes.⁴⁷³ This statute prohibits state environmental regulators from issuing a permit to construct or operate a hazardous waste facility unless the application demonstrates that the destruction technology has been used in a comparable facility for a time sufficient to show that the facility has destroyed or treated 99.9999% of the chemical munition processed. The applicant also must demonstrate that monitoring data from the comparable facility shows no risk or acute or chronic health effect or adverse environmental effect.⁴⁷⁴

Maryland recently enacted a law which establishes its policy on the treatment of chemical warfare materiel within its borders.⁴⁷⁵ Effective as of October 1, 1993, this law requires the Army to demonstrate that its proposed facility can meet certain standards before it can use a permit to construct and operate the facility.⁴⁷⁶ Baseline technology can satisfy the Maryland requirements, as it pertains to the DRE and emission standards. All concerned citizen groups and state and local government will review and comment on the Army's proposed plans and permit ap-

and will soon be required by the CWC. While states may regulate demilitarization facilities, they may not use their regulatory authority as an artifice to make it impossible to destroy the stockpile within its boundaries. Otherwise, the states would be free to engage in a never ending spiral of increasing regulatory requirements, designed to send the stockpile to another, more deserving state, for treatment. The effect would be to sink the program in a morass of state statutory and regulatory requirements, and defeat the will of Congress. A challenge to the state laws in federal court, or legislative relief, may be necessary, if the interpretation provided by former member of Congress, Representative McMillen is accurate. He viewed the Kentucky and Indiana statutes as essentially prohibiting any chemical weapons incineration. Conference report on H.R. 2100, National Defense Authorization Act for Fiscal Years 1992 and 1993, 137 CONG. REC. 9868 (1991).

⁴⁷³ This lists goes well beyond what is stored at the NAAP, which only has VX in one-ton containers.

⁴⁷⁴ The OVT and test burn results from the JACADS indicate that the Army will be able to satisfy this requirement.

⁴⁷⁵ 1993 MD. LAWS 612, §§ 7-239.1 to 7-239.4.

⁴⁷⁶ MD. CODE ANN. ENVIRON. § 7-239.3 (1993) requires the permit applicant to demonstrate:

- (1) That the proposed incinerator technology consistently met all applicable federal and state performance standards in a comparable operational facility.
- (2) That emissions and monitoring data from a comparable facility meet state standards.
- (3) The DRE of 99.9999% is achievable for each chemical warfare material to be incinerated at the facility.
- (4) That the applicant will support and fund a plan that demonstrates the capability of removing, sheltering, and protecting persons from the largest area at risk from a worst-case release.
- (5) That the applicant is found to have fully evaluated all reasonable alternative methods for treatment or disposal, to include transport to a less populated disposal site.
- (6) That the governing body of each county and municipal body included in the worst case release has a reasonable opportunity to review and provide comment on the facility permit application and the emergency preparedness plan.

plications, satisfying public comment requirements. The Army, the state, and affected local communities will develop emergency preparedness plans that address the possible release of chemical agent.⁴⁷⁷

Arkansas lawmakers introduced a bill that would list certain chemical agents as hazardous wastes and prohibit the transport of these agents within or through the state, with limited exceptions.⁴⁷⁸ The bill did not pass.

Utah, Maryland, and Oregon have listed certain chemical agents in their administrative codes as hazardous wastes. Utah lists residues from demilitarization, treatment, and testing of nerve, military, and chemical agents, to include GA, GB, H, HD, HT, L, and VX as hazardous wastes.⁴⁷⁹ The RCRA permit issued by Utah for the TOCDF covers the specific requirements for the transport and disposal of scrap metal from the metal parts furnace, as well as ash from the remaining incinerators. Maryland has listed waste mustard (H and HD), as well as waste nerve agents (VX, GA, and GB) as acute hazardous wastes.⁴⁸⁰ Oregon has listed nerve agents, such as GB and VX, as well as mustard gas, as hazardous wastes that are subject to state toxic use reduction and hazardous waste reduction requirements.⁴⁸¹

XII. Alternative Technology Study and NEPA Implications

Section 173 of the 1993 Defense Authorization Act⁴⁸² directed the Army to submit a report to Congress no later than December 31, 1993 on potential alternatives to the use of baseline technology. Congress directed that the report include:

- (1) An analysis of the report of the committee on alternative chemical demilitarization technologies of the National Research Council [NRC] of the National Academy of Sciences;
- (2) Any recommendations that the National Academy of Sciences makes to the Army regarding the report of that Committee, together with the Secretary's evaluation of those recommendations; and

⁴⁷⁷ The Chemical Stockpile Emergency Preparedness Program has been established primarily to enhance emergency preparedness of state and local communities adjacent to the eight chemical stockpile locations. See Comm. on Appropriations, S. REP. NO. 102-408, 102d Cong. (1992); DA PAM. 50-6, *supra* note 94, para. 17-6.

⁴⁷⁸ An Act Relating to the Transportation of Waste Chemical Agents and Munitions, and for Other Purposes, House Bill 1087, 79th General Assembly, Regular Session (1993).

⁴⁷⁹ UTAH CODE ANN. § R315-2-10(e) (1993).

⁴⁸⁰ MD. CODE ANN. tit. 26, § 13.02.17 (1989).

⁴⁸¹ OR. ADMIN. R. 340-135-110, 340-135, app. A (1991).

⁴⁸² 102 Pub. L. No. 454, 106 Stat. 2315 (1993).

(3) A comparison of the baseline technology and incineration process with each alternative technology evaluated in the report . . . [that the NRC] recommends.⁴⁸³

In response to the congressional call for further study, the NRC⁴⁸⁴ agreed to conduct two studies in alternative disposal technologies. The Committee on Alternative Chemical Demilitarization Technologies (CACDT) completed the first study in the summer of 1993.⁴⁸⁵ The second study, entitled "Recommendations for the Disposal of Chemical Agents and Munitions," was released to Congress and the Army in mid-February 1994. This study, conducted by the Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program, conducted a review of available technologies for the disposal of the chemical stockpile, and provided findings and recommendations to the Army.⁴⁸⁶

In the first study, the CACDT identified five goals of the Chemical Stockpile Disposal Program:

- (1) Meet congressionally mandated and international treaty demilitarization requirements;
- (2) Reduce the risk of agent release to nearby communities from either continued storage or demilitarization operations;
- (3) Ensure acceptable concentrations of toxic chemicals in gas waste streams from demilitarization operations;
- (4) Minimize liquid waste disposal problems by minimizing liquid discharges; and
- (5) Minimize solid waste disposal problems by oxidation or converting organic compounds into innocuous forms.⁴⁸⁷

To satisfy the goals set forth above, the CACDT identified two alternative strategies to the baseline program, which focus on reducing or changing the waste stream. The first strategy would use low-temperature and low-pressure liquid phase-detoxification processes—such as chemical hydrolysis—or liquid-phase processes that oxidize chemical agent.⁴⁸⁸ This process, commonly referred to as chemical neutralization,

⁴⁸³ *Id.* § 173(a).

⁴⁸⁴ "The National Academy of Sciences, is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Based on the authority of the charter given to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters." NRC Alternative Technologies Report, *supra* note 22.

⁴⁸⁵ *Id.* at v.

⁴⁸⁶ See Disposal Recommendations, *supra* note 6.

⁴⁸⁷ NRC Alternative Technologies Report, *supra* note 22, at 32.

⁴⁸⁸ Oxidation refers to the detoxification process, in which the molecular bonds of chemical agents (which contain carbon, chlorine, hydrogen, phosphorus, fluorine, sulfur

would convert chemical agent into less toxic compounds. While this process has positive aspects, it also has some serious difficulties. For example, neutralization generates a waste stream that is greater in volume than the stored stockpile of chemical agents.^{48c} Furthermore, the initial detoxification process may not satisfy international treaty requirements,^{49c} and would require additional treatment of the liquid waste stream to render it nonhazardous. While final treatment of this waste stream after initial detoxification could be done at another site, transporting hazardous waste to another site for treatment could be expected to encounter stiff public opposition.⁴⁹ⁱ

In its favor, the strategy of on-site neutralization may allow storage of the treated materiel for subsequent on-site incineration, or transport to another site for final treatment.^{49j} For those living near an existing stockpile site, however, the principle advantage is that it offers the prospect of transporting the stockpile after detoxification to some other site (unspecified) for final treatment. Whether this course of action would satisfy the critics who are adamantly opposed to incineration of the stockpile at any site remains to be seen.^{49k} The NRC recognized that this strategy would require five to twelve years of additional time for research, development, and demonstration of new technologies. It also would delay final disposal of the explosives and contaminated metals that are byproducts of the demilitarization process.^{49l}

The second strategy resembles the present Army strategy in that on-site oxidation (incineration) would be conducted. It varies from the Army's plan, however, by calling for a two-step process. As in the first strategy, the initial step would detoxify the agent through chemical neutralization. The second step involves on-site incineration to complete oxidation.^{49m} This process would convert the waste stream from demilitarization into salts, carbon dioxide, water, and decontaminated metal.⁴⁹ⁿ In addition to this second strategy, the CACDT considered possible modi-

nitrogen, and oxygen) are broken into their chemical components to produce less hazardous material. Complete oxidation (mineralization) of molecules produces carbon dioxide, water, nitrogen, and fluorides, phosphates, and sulfates that can be removed as salts. Combustion is the most common oxidation process. *Id.* at 1, 32, 76.

^{48c} *Id.* at 33; see also Rouse, *supra* note 11, at 35-36. During previous tests conducted by the Army, "approximately five pounds of salt wastes were being created for each pound of GB neutralized, which caused a significant disposal problem." *Id.*

^{49c} The Army's previous experience with chemical neutralization revealed that under certain conditions, the chemical reaction achieved during chemical neutralization of GB was reversible. Rouse, *supra* note 11, at 35.

⁴⁹ⁱ See Disposal Recommendations, *supra* note 6, at 26.

^{49j} NRC Alternative Technologies Report, *supra* note 22, at 197-98.

^{49k} See *id.* at 197.

^{49l} *Id.* at 197-98.

^{49m} *Id.* at 198-200.

⁴⁹ⁿ *Id.* at 33-34.

fications to baseline technology, as well as alternative processes. One alternative would use pure oxygen rather than air in the incinerator to reduce the volume of gas emissions.⁴⁹⁷ The CACDT also believes that replacing the internal firing system with electrical heat would further reduce gas emissions.⁴⁹⁸

To further reduce the risk of potential release of agent, the CACDT discussed implementing a closed system for gas emissions into baseline technology. The baseline system presently vents gas emissions into the atmosphere through a stack after it passes from the incinerator, through the afterburner and pollution abatement system.⁴⁹⁹ A closed system would store all gas emissions under pressure and test its contents to certify that the waste stream is safe for disposal prior to venting the emissions into the atmosphere.⁵⁰⁰ The CACDT suggested that a system of four gas holders could be used to store gas emissions. As one gas tank is filled, another could be analyzed, a third emptied, and a fourth could serve as a spare.⁵⁰¹ Storage and certification provides the public additional assurance that gas emissions from demilitarization operations pose no measurable risk to human health or the environment. This must be balanced against the disadvantages, to include cost, and disruption to the construction and processing schedule. These suggestions would have to be designed and thoroughly tested before they could be implemented at a demilitarization facility. If adopted, these suggestions would delay construction for years. Even if successfully designed and constructed, a closed system also would disrupt daily demilitarization operations to allow the testing and analysis of the gaseous wastes collected in the pressurized containers prior to release.⁵⁰²

Throughout the report, the CACDT focused on the need to reduce the potential for release of agent into the atmosphere.⁵⁰³ This analysis does not state or imply that baseline technology will not work or is deficient. Instead, the purpose of the report is to discuss possible alternative destruction technologies to replace, in part or in whole, or to be used in

⁴⁹⁷ *Id.* at 203.

⁴⁹⁸ *Id.* at 102, 203.

⁴⁹⁹ The JACADS design equips each incinerator with a wet or dry pollution abatement system (PAS). The wet system cools and removes pollutants from the exhaust gases, chemically neutralizes acidic portions of the gases and removes particles. The dry system cools exhaust gases and removes particles. JACADS Environmental Report, *supra* 37, at 6-7. Additionally, the ventilation system for the facility uses negative air flow from high to low pressure. For instance, areas within the facility which have a higher risk of agent exposure, such as the Munitions Demilitarization Building (MDB), have lower air pressure, so that air infiltrates from clean areas into more contaminated areas. The air from this pressure ventilation system is filtered through a charcoal filter system before it is vented into the atmosphere. JACADS Safety Report, *supra* note 436, at 19-21.

⁵⁰⁰ NRC Alternative Technologies Report, *supra* note 22, at 88, 195.

⁵⁰¹ *Id.* at 195.

⁵⁰² *Cf. id.* at 88.

⁵⁰³ *See id.* at 88, 101-08, 194-96.

addition to baseline technology.⁵⁰⁴ There is no attempt to conduct a cost/benefit analysis of these technologies. The CACDT is concerned with what may work—not whether the technology is worth the investment of time and tax dollars. Additionally, the report made no specific recommendations as to whether any of the technologies should supplement or replace baseline technology.⁵⁰⁵ Nevertheless, the CACDT explained that developing any major new technology from the stage of laboratory data development through a demonstration facility would probably take nine to twelve years.⁵⁰⁶ Problems associated with public acceptance or obtaining the necessary environmental permits would cause additional delay.⁵⁰⁷ Alternatively, if a new technology is only a small modification of an existing, commercially available technology, then less time would be required in development.⁵⁰⁸

At the time of the first NRC report, the Army could not predict schedule impact, because no one knew if the NRC would recommend an alternative technology. Nevertheless, the PMCD provided the NRC a cost schedule, and regulatory compliance impact in the event that the NRC did recommend an alternative technology, based on several assumptions.⁵⁰⁹ These assumptions included the following:

- (1) Pilot operations are required, but no significant new construction for a pilot facility is required;
- (2) The CAMDS facility can be modified to perform the required pilot operations;
- (3) The three low-volume facilities will be constructed simultaneously; and
- (4) Only one alternative technology will be pursued in both the laboratory and pilot phases.⁵¹⁰

Based on these assumptions, and provided that all pilot operations go smoothly and all environmental permits are processed expeditiously, the PMCD stated that “the schedules depict APG chemical agent operations being completed in March 2007, NAAP being completed in January 2007; and BGAD in July 2008.”⁵¹¹ This impact is unacceptable, because it would result in the demilitarization program exceeding the deadlines mandated by Congress and the CWC. To make matters worse, the projected schedule impacts are “best case” estimates. The actual

⁵⁰⁴ *Id.* at 2.

⁵⁰⁵ *Id.* See also Disposal Recommendations, *supra* note 6.

⁵⁰⁶ NRC Alternative Technologies Report, *supra* note 22, at 90.

⁵⁰⁷ *Id.*

⁵⁰⁸ *Id.*

⁵⁰⁹ *Id.* at 213-36 (app. C).

⁵¹⁰ *Id.* at 217.

⁵¹¹ *Id.* at 218.

impact on the schedule probably would be much greater, because permit applications cannot be expected to proceed expeditiously. For example, the Army has little influence on how rapidly a state will process a RCRA permit application. In the past, states have taken twenty-four to thirty-six months to process these applications. Additionally, implementing a new technology could constitute significant new information that would require a supplement to the FPEIS. Preparing supplementary documentation, together with complying with public notice and hearing requirements, could add an additional two to three years to the schedule.

The release of the final report on alternative technologies in January 1994 resolved the uncertainty concerning the NRC's recommendations.⁵¹² The report completed the NRC committee's review of available technologies to treat the chemical stockpile, and presented the Army with recommendations to use in developing its own recommendations to Congress.⁵¹³

The NRC committee's basic recommendation was to endorse baseline technology:

The baseline system has been demonstrated as a safe and effective disposal process for the stockpile.⁵¹⁴

In its review of alternative technologies, the committee selected as its primary criterion "the minimization of the cumulative adverse consequences from all relevant risks over the full duration of the disposal program."⁵¹⁵ In evaluating risk, the NRC examined the risks associated with baseline technology, and compared it with continued storage of the stockpile pending development of an alternative technology. The NRC concluded that:

any reduction in disposal risk afforded by an alternative technology will be more than offset by the larger cumulative risk from extended storage. . . . Given this evidence, the disposal program should not be delayed pending development of detailed information on alternative technologies.⁵¹⁶

There was only one alternative technology which the NRC consid-

⁵¹² See Disposal Recommendations, *supra* note 6.

⁵¹³ See NRC Alternative Technologies Report, *supra* note 22, at v.

⁵¹⁴ Disposal Recommendations, *supra* note 6, at 11.

⁵¹⁵ *Id.* at 3.

⁵¹⁶ *Id.* at 6, 7. The NRC concluded that the greatest risk associated with baseline technology stemmed from transporting stockpile munitions and material from the storage areas to the disposal facility for treatment. This risk is not unique to baseline technology, because any treatment technology will require moving stockpile material from the storage area to a treatment facility. Once inside the facility, the risk of agent release into the atmosphere is greatly reduced, because of the agent treatment systems and containment safeguards. The other risk uniquely associated with incineration is the possible adverse health effects deriving from the emission of pollutants from the facility, to include nitrogen diox-

ered promising enough to warrant evaluation and development—chemical neutralization, followed by secondary treatment.⁵¹⁷ According to the NRC committee, neutralization is only suitable to treat agent. Incineration is the only feasible way to treat energetics or to detoxify metal parts.⁵¹⁸ However, the NRC committee noted that neutralization has several serious drawbacks. First, neutralization creates a large volume of hazardous waste that requires treatment.⁵¹⁹ Second, neutralization may not satisfy the CWC's requirements, because for certain agents, the process may not be irreversible.⁵²⁰ Finally, neutralization, followed by transport to another site for secondary treatment is dependent on finding acceptable transportation routes and receiver sites willing and able to treat the material.⁵²¹

The NRC committee did not adopt the proposal of the first report to modify baseline technology by creating a closed system for gas emissions. Instead, it recommended that the Army enhance the baseline system by adding charcoal filter beds to treat all exhaust gases. These filters would scrub all gases emitted from the common stack, thereby adding "additional protection against agent and trace organic emissions, even in the unlikely event of a substantial system upset."⁵²²

In response to Congress's directive, the Army submitted its required report on alternative technologies on April 11, 1994.⁵²³ In the report, the Army noted that the NRC endorsed baseline technology as both safe and effective in destroying the full range of munitions and agents in the stockpile.⁵²⁴ The Army also accepted the NRC's recommendation to use carbon filters to treat all exhaust gases.⁵²⁵

ides and dioxins. *Id.* at 67-69. These risks, and the risks of continued storage, gradually diminish as treatment facilities come on line and permanently destroy the remaining stockpile. In contrast, continued storage of the stockpile without proceeding with baseline treatment subjects communities surrounding the stockpile sites to the dangers of indefinite storage, which will increase over time due to "such phenomena as destabilizing propellants and deteriorating containment." *Id.* at 81. As a result, the NRC concluded that the public would be subjected to significantly less risk by proceeding with baseline technology, rather than postponing treatment in the hope of developing a "better" technology "Since baseline technology has already been proven, and because delays will increase cumulative total risk, the committee believes that the disposal program should proceed expeditiously at a pace in keeping with reasonable and safe facility construction and operating schedules." *Id.* at 11.

⁵¹⁷ *Id.* at 11.

⁵¹⁸ *Id.* at 10, 99. Metal parts, such as one-ton containers, absorb agent. High temperature incineration is the only known and feasible way to decontaminate metal parts. Neutralization is also ineffective in treating explosives.

⁵¹⁹ *See id.* at 105.

⁵²⁰ *Id.* at 10, 52-60, 110-11.

⁵²¹ *Id.* at 10, 56 ("The governor of Utah, for instance, is already on record opposing shipment of neutralized material to Utah for final processing.")

⁵²² *Id.* at 11, 16, 116-18.

⁵²³ Alternative Demilitarization Technology Report, *supra* note 12.

⁵²⁴ *Id.* at 6-4.

⁵²⁵ *Id.* "The Army's preliminary assessment indicates that carbon filters integrated into the Baseline pollution abatement system would provide an additional level of safety

The NRC's recommendation, as implemented by the Army, could have several benefits. First, it would provide additional assurance to the public that the Army is taking every feasible action to protect human safety and the environment.⁵²³ Second, it would reduce other industrial pollutant emissions,⁵²⁷ thereby defusing much of the concern about any possibility of long-term health effects due to low-level air emissions. Finally, it may satisfy Kentucky's requirement for a 99.9999% operating efficiency under all operating conditions, to include malfunctions, upsets, or unplanned shutdowns.⁵²⁸

The NRC committee's final report and recommendations raise the question of whether a supplement to the FPEIS is required. As a general rule, a federal agency must prepare a supplement to an existing environmental impact statement when it makes a substantial change in a proposed action that is relevant to environmental concerns, or if significant new circumstances or information arise that are relevant to environmental concerns and which bear on the proposed action.⁵²⁹ A recommended alternative technology would meet this criteria if it is *new* information that "will affect the quality of the human environment in a significant manner or to a significant extent not already considered."⁵³⁰ Some of the alternative technologies discussed in the NRC's final study—such as cryofracture or chemical neutralization—are not new and were considered when the Army originally selected baseline technology.⁵³¹ Similarly, the installation of beds of charcoal filters on the common stack is not a new technology or new information that would require a supplement to the FPEIS.⁵³² The JACADS already is using activated carbon filters to process ventilated air within the demilitarization facility, and TOCDF has them as well.⁵³³ The NRC's recommendation simply expands the use of carbon filters as an additional safeguard.⁵³⁴

and environmental protection. The Army recommends an evaluation at Tooele and parallel implementation of a carbon filter modification to the Baseline process." *Id.*

⁵²³ *Id.* at 3-13. The Army concluded in this report that implementing carbon filters can occur with little impact on schedule and enhance the Baseline process environmental and safety performance. The estimated cost to the taxpayer is \$260 million.

⁵²⁷ *Id.* at 3-12. "[T]he addition of carbon filtration would result in the virtual elimination of the risk of toxic air emissions." *Id.*

⁵²⁸ See KY. REV. STAT. ANN. § 224.50-130(3) (1992).

⁵²⁹ See 40 C.F.R. § 1502.9 (1992).

⁵³⁰ *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360 (1969).

⁵³¹ Cryofracture is not an alternative technology to incineration, but only to the mechanical disassembly, punch, and drain aspects of baseline technology.

⁵³² See 40 C.F.R. §§ 1501.6, 1502.9(b)(4), 1503 (1992) for requirements associated with preparing a supplement to an environmental impact statement. See also Alternative Demilitarization Technology Report, *supra* note 12, at 3-13: "The addition of carbon filtration to the Baseline incineration process does not represent an alternative technology, but rather a modification to a mature, proven technology for chemical stockpile destruction."

⁵³³ See JACADS Environmental Report, *supra* note 37, at 22.

⁵³⁴ Congress has directed that the Army request funding for the installation of carbon filtration systems at all demilitarization sites. See 140 CONG. REC. H6351-02 (daily ed. July 27, 1994) (statement by Rep. Hefner).

XIII. Program Critics—Can They Stop the Demilitarization Program?

Critics of the Army's demilitarization program generally come from two groups—those who categorically oppose incineration, and those who oppose any treatment of chemical agent in their community. These groups are well organized and adamant in their opposition; so much so, that in one public meeting, a citizens group representative speaking in favor of baseline technology likened himself to "Dr. Kevorkian addressing a right-to-life rally."⁵³⁵

Opponents of the Army's program generally emphasize that incineration is an undesirable treatment process.⁵³⁶ Opponents also express concern for the adverse impacts that they believe the program will have on air quality, human health, and the environment.⁵³⁷ These include the risks of chemical agent release during the transport and processing of agent at the demilitarization facility, and health risks related to emissions and other waste streams generated at the facility.⁵³⁸

Opponents from the stockpile communities seek to compel the Army to find another alternative—usually involving transport of the munitions to some other "remote"⁵³⁹ disposal location.⁵⁴⁰ Some critics propose that the Army drain the chemical agent from the munitions and store it until a "safer" technology is developed. Others propose that the Army transport the stockpile (from their local area) without treatment, and still others promote chemically neutralizing the agent, and then transporting it for additional treatment.⁵⁴¹

All these proposals lead to significant difficulties. The Army examined the transportation option and rejected it because it entailed a greater risk to public health and safety, while requiring "vastly more complex

⁵³⁵ Alternative Technologies Forum, National Academy of Sciences, 152 (June 30, 1993) (verbatim transcript of public hearing on file with author).

⁵³⁶ A frequent critic of incineration in general, and the Army's chemical demilitarization program in particular, is Pat Costner, a chemist with Greenpeace Toxics Campaign, who has stated, "The efficacy of incineration has been grossly overstated and its impact on health and the environment have been grossly understated." *Judge Orders Shutdown of VERTAC Site Until Hearing on Preliminary Injunction*, *Env't Rep. (BNA)* (Feb. 19, 1993).

⁵³⁷ See NRC Alternative Technologies Report, *supra* note 22, at 27-28; see also Alfred Picardi, *Alternative Technologies for the Detoxification of Chemical Weapons: An Information Document*, at vi-viii (1991) (prepared for Greenpeace International) [hereinafter *Greenpeace Detoxification*].

⁵³⁸ NRC Alternative Technologies Report, *supra* note 22. Nevertheless, the health risks associated with continued storage of the stockpile have been demonstrated to be significantly higher than on-site disposal. FPEIS, *supra* note 43, at 2-123; Record of Decision, 53 Fed. Reg. 5816 (1988).

⁵³⁹ "Remote" for opponents living in the East (to include Kentucky, Alabama, Indiana and Maryland) means the West. I would presume that for program critics living in the West, "remote" would mean someplace east of the Mississippi River.

⁵⁴⁰ See Carpenter & Bowermaster, *supra* note 202, at 58.

⁵⁴¹ *Id.*

security, emergency response, and safety requirements.⁵⁴² Draining and storing the stockpile in the hope that a "safer" technology will one day be developed is like promising to balance the federal budget by eliminating waste—long on promise, short on results. More important, this alternative would violate both the congressionally mandated destruction deadline, and the CWC. Finally, engaging in on-site chemical neutralization will subject the local communities to the risk of moving, disassembling, and treating the munitions, before transporting a much greater quantity of hazardous waste to another destination for final treatment. The communities designated to receive these wastes for treatment or storage, as well as those living along the transportation corridors, will be less than enthusiastic about the various transportation alternatives.

XIV. Chemical Release at Johnston Island

On March 23, 1994, a chemical agent was released into the atmosphere from the JACADS facility. This release occurred while the LIC was shut down for routine maintenance. Both the primary or secondary chamber of the LIC were cooled down to permit workers to enter the chambers in protective suits to remove slag (metal residue). During the entry, the burner fuel line was disconnected and the agent feed line into the LIC was disconnected. Thirteen minutes later, the LIC room ACAMS indicated a high level of agent. One minute later, the common stack ACAMS recorded an agent release.⁵⁴³ Five minutes later, the common stack alarmed at 19 ASC, and an ACAMS operator read the actual level as 18 ASC.⁵⁴⁴

The ACAMS located in the Munitions Demilitarization Building which contains the LIC continued to detect agent for several hours while the common stack ACAMS generated alarms for thirty minutes.⁵⁴⁵ The DAAMS located on the perimeter of the JACADS facility did not detect agent at any time.⁵⁴⁶

The Department of Health and Human Services determined that the stack release of GB would not have posed any health threat to the general public or workers, had anyone lived, worked, or otherwise been

⁵⁴² Record of Decision, Chemical Stockpile Disposal Program (Feb. 23, 1988).

⁵⁴³ Dep't of Army, Report of the 23 March 1994 Chemical Agent (GB) Release from the Common Stack (Mar. 1994) [hereinafter JACADS Report].

⁵⁴⁴ *Id.* at 4. The Allowable Stack Concentration (ASC) for GB at the emission point (common stack) is 0.0003mg/m³.

⁵⁴⁵ The Army later determined that 11.6 milligrams (or approximately 20/millionths of a pound) of agent was released during the entire episode. Telephone interview with Marilyn Tischbin, Chief, Public Affairs, USACMDA (June 14, 1994).

⁵⁴⁶ JACADS Report, *supra* note 543, at 16, 22.

in the location of the maximum ground level concentration. The EPA conducted a similar review and reached the same conclusion.⁵⁴⁷

An internal investigation conducted shortly after the event determined that the workers had not purged the agent line feed into the LIC before opening it.⁵⁴⁸ Consequently, when workers opened the agent feed line it leaked residual agent into the LIC. Exhaust fans subsequently sucked agent through the primary and secondary chambers of the LIC, through the Pollution Abatement System, and into the common stack. Combustion of the agent was not possible because the incinerator was shut down at the time to permit entry.

In this instance, installing a carbon filtration system to the common stack would have prevented the release of agent into the atmosphere. Any exhaust from the demilitarization facility during shutdown conditions would have been vented through a series of carbon filters.

While the release of chemical agent at the JACADS is regrettable, it highlights the necessity to expeditiously destroy the chemical stockpile. The longer the Nation waits, the larger is the cumulative risk from extended storage of the stockpile. This risk was recently evidenced at TEAD, where the stockpile includes one-ton containers of mustard agent. In late August, 1993, a large pool of mustard agent under a dripping valve was discovered during a routine inspection of the ton container storage area. Army investigators determined that the valve had failed, allowing approximately 125 gallons of mustard agent to leak onto the ground. The agent and contaminated soil were recovered, chemically treated and stored as hazardous waste.

XV. Conclusion

While members of the public and special interest groups continue to review and debate the merits of baseline technology and various alternative technologies, time is running out for the stockpile. The deadline

⁵⁴⁷ *Id.* at 17, 22. Region IX of the EPA subsequently issued a Notice of Violation against the Army for the agent release which included a \$50,000 fine. Telephone interview with Joseph Stang, Environmental Protection Specialist, USACMDA (May 8, 1995).

⁵⁴⁸ JACADS Report, *supra* note 543, at 20, concludes:

There is both physical evidence and information collected during interviews that indicates no fuel oil was transferred through the fuel oil purge system during the agent line purge attempted on 22 March 1994. The most probable cause for no fuel oil flow through the purge line could be attributed to a valve on the fuel oil purge line not being opened. . . or blockage in the line. . .

The investigation also determined that written standard operating procedures were not followed by the maintenance workers, to include failing to record the flowmeter reading from the fuel oil purge line before and after the purge of the agent feed line was accomplished. This verification step, had it been done, would have alerted the workers that the fuel oil purge system had failed to function properly.

of December 31, 2004 is a statutory imperative, and will soon be underscored by the CWC. Additionally, there is a pragmatic imperative—the stockpile has served its purpose and is no longer needed. The longer it remains, the longer eight communities will be exposed to the hazard of an accidental release. This hazard can be expected to gradually increase with the passage of time.

The risk of storing the stockpile can be expected to increase as the stockpile degrades over time.⁵⁴⁹ This degradation is reflected in corrosion, rust, depletion of agent and propellant stabilizers, all of which increase the chance of an accidental release from the chemical agent storage areas.⁵⁵⁰ However, for the near-term and mid-term—to the end of 2004—the stockpile has been assessed as safe for continued storage.⁵⁵¹

The slow degradation of the stockpile underscores the need to move ahead with treatment of the stockpile. Although incineration has its critics, it is still the preferred treatment technology for most wastes.⁵⁵²

Operations at the JACADS have verified baseline technology. With construction completed at TEAD, destruction of the CONUS stockpile can begin. Although incineration will remain an unpopular method of treatment in certain sectors of the environmental community, it is a proven technology that can safely destroy chemical agents. Rather than risk precious—and increasingly scarce—resources on the hope of some future (and unproven) technology, the Army would best serve the national interest by proceeding with the proven technology. Destroying the stockpile by December 31, 2004 is achievable and is in the national interest. The time for policy debate has passed. It is time to complete the mission.

⁵⁴⁹ See MITRE Stockpile Assessment, *supra* note 467, at 1-9.

⁵⁵⁰ *Id.*

⁵⁵¹ *Id.* at 2-18 to 2-19.

For the near- and mid-term, the chemical weapons stockpile is safe for continued storage. There is no potential event that regularly occurs or has a significant probability of occurring in the near- to mid-term that releases or will release agent to the public in lethal amounts.

For the long term, the safety-in-storage of the stockpile is uncertain.

Id.

⁵⁵² Kopel, *supra* note 62. "The concept of disposal through burning has generally been supported by environmental regulators. [The] EPA encourages regulated burning as a treatment option, and considers incineration to be the best demonstrated available technology (BDAT) for most wastes." *Id.* See also *Draft Strategy for Combustion of Hazardous Waste in Incinerators and Boilers and Furnaces*, EPA ENVTL NEWS, May 1993, at 3, 4. "Combustion is currently a large component of hazardous waste management in the United States. . . . Waste combustion has been viewed as a means to detoxify many hazardous wastes, particularly those containing high levels of organics. [The] EPA's position has been that, if conducted in compliance with regulatory standards and guidance, combustion can be a safe and effective means of disposing of hazardous waste." *Id.*

DNA STATISTICAL EVIDENCE AND THE "CEILING PRINCIPLE": SCIENCE OR SCIENCE FICTION?

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*In law, the man of the future is the man of statistics.
Oliver Wendell Holmes, Jr. (1897)*

I. Introduction

Since 1986, prosecutors and defense attorneys have had a powerful weapon to aid them in determining the identity of the perpetrator of a crime.¹ The forensic use of Deoxyribonucleic Acid (DNA) permits absolute exclusion of a defendant from the group of possible perpetrators, thus preventing the innocent from conviction and possible imprisonment. Alternatively, it can provide powerful circumstantial evidence that the defendant and the perpetrator are one and the same and help ensure that the guilty are brought to justice.

DNA evidence is comprised of two elements: the presence or absence of a "match" between the suspect's DNA and the evidentiary sample found at the crime scene, and the relevance of this match. The admission of this evidence can take three forms: exclusion of all the DNA evidence, admission of the issue of a match alone, or admission of both the match and its relevance.

Most state and federal courts have admitted DNA evidence in one

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¹ Deoxyribonucleic Acid was first used by criminal investigators in England in the celebrated case of Colin Pitchfork in 1985, which was detailed in JOSEPH WAMBAUGH, *THE BLOODING* (1989). Commercial laboratories in the United States first used DNA analysis in 1986. OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, *GENETIC WITNESS: FORENSIC USES OF DNA TESTS* (1990) [hereinafter *GENETIC WITNESS*]. The first reported criminal case was *Andrews v. State*, 533 So. 2d 841 (Fla. Dist. Ct. App. 1988).

form or another. With the demise of the *Frye*² and *Frye*-based³ standards of admissibility (in federal courts and courts-martial), little or no challenge remains to admitting evidence of a *match* between the evidentiary sample and the defendant's DNA in all federal (including military) and most state courts.⁴ This evidence can, and has, passed scrutiny under the *Federal Rules of Evidence (FRE)*.

However, a controversy has arisen over the scientific basis used to admit evidence demonstrating the *relevance* of a match between the DNA of the suspect and the evidentiary sample. This evidence usually is presented as a statistic—the probability of this match occurring at random from someone other than the perpetrator.⁵ This probability usually is extraordinarily small, often as low as one in a million or less. This evidence is damning in the eyes of the jury, and defense attorneys and their experts try hard to prevent its admissibility.

A new method of calculating this statistical evidence was created in response to this controversy. This method, called the "ceiling principle," is unduly conservative and operates to greatly increase the probabilities calculated by most United States DNA laboratories. Under the guise of science and the cloak of respectability provided by its sponsor—the National Academy of Sciences—this method found its way into many recent decisions.

Ostensibly based on science, this method enters the courtroom under the auspices of the rules of evidence governing admissibility of scientific evidence. Yet the method lacks a scientific basis and its admission contradicts the principles underlying the applicable federal rules of evidence. The results of this new method of calculating DNA statistical evidence may create a reasonable doubt as to the identity of the perpetrator.⁶ At the least, they greatly reduce the effectiveness of DNA evidence and increase the likelihood of confusing the factfinder.

² *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

³ See, e.g., *People v. Castro*, 545 N.Y.S.2d 985 (Sup. Ct. 1989) (adding a requirement that the laboratory comply with proper procedures in conducting DNA test before evidence is admissible).

⁴ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786 (1993), *aff'd on remand*, 43 F.3d 1311 (9th Cir. 1995).

⁵ Because the current DNA techniques permit analysis of only a small part of a person's DNA, two individuals can have identical DNA at the sites, or loci, examined, yet differ at other loci. To prevent the jury from believing that a DNA match is conclusive, they must be informed of the possibility (and likelihood) that the defendant and the evidentiary sample match at the loci examined but have different DNA at unexamined loci and that someone other than the defendant also matches the evidentiary sample at the loci examined. See also *infra* notes 60–87 and accompanying text.

⁶ This often is referred to as the "defense attorney's fallacy." It is the jury's tendency to disregard evidence that is unlikely if the defendant is innocent when many others may share the same characteristic. Richard Lempert, *DNA, Science and the Law: Two Cheers for the Ceiling Principle*, 34 *JURIMETRICS J.* 41, 54 (1993). This fallacy exists, for example,

This article contends that statistical evidence calculated using the "ceiling principle": (1) is not based on any scientific theory or body of knowledge; (2) grossly overstates the probability of a random DNA match; and (3) when introduced into evidence alongside or in place of the statistical evidence calculated using the traditional "product rule,"⁷ is likely to confuse or mislead the factfinder, thus creating doubt as to guilt where doubt otherwise would not exist. Part II of this article provides a brief overview of the process of DNA analysis. Part III surveys the history of DNA evidence in American courts. Part IV addresses the controversy surrounding admission of DNA evidence. Part V examines the history behind the "ceiling principle" and its scientific underpinnings, if any. Part VI examines the relationship between the "ceiling principle" and the rules of evidence. Part VII contains the conclusion and recommendations.

II. DNA Analysis

Organisms reproduce by transmitting genetic information from generation to generation via the DNA molecule, which contains genetic codes that determine inherited characteristics.⁸ In humans, DNA is contained in forty-six chromosomes: one pair of sex chromosomes and twenty-two pairs of autosomes.⁹ During reproduction, the father's sperm and the mother's ovum each provide half of an individual's DNA.¹⁰

Geneticists are now able to isolate human genes. Most genes are involved in determining the structure and function of cells. However, some genes have no apparent function.¹¹ These apparently functionless genes exhibit wide variations among individuals and serve as the basis behind DNA analysis.¹²

A. The Composition of DNA

DNA is the basic building block of all living cells. Found primarily in the chromosomes within the nucleus of all human body cells (except red blood cells),¹³ the DNA molecule itself is composed of two strands

when the jury is told that there is a 1 in 50,000 chance that the defendant's DNA and the evidentiary DNA match at random. If the local population was 250,000, the defense may attempt to claim that the evidence incriminates five people.

⁷ The product rule is simply the multiplication of the frequencies of independent events to determine the frequency of their simultaneous occurrence. See *infra* notes 71-87 and accompanying text.

⁸ GENETIC WITNESS, *supra* note 1, at 3.

⁹ *Id.* at 41.

¹⁰ *Id.*

¹¹ *Id.*

¹² *Id.* at 42-43.

¹³ However, DNA is found in white blood cells, so blood stains found at a crime scene and samples taken from suspects may be compared. *Id.* at 4.

intertwined in a spiral or double-helix formation (resembling a zipper).¹⁴

Each strand contains four different nucleotides, or bases, repeated hundreds of thousands of times. These bases are deoxyadenosine monophosphate (A), thymidine monophosphate (T), deoxycytidine monophosphate (C), and deoxyguanosine monophosphate (G). The bases associate with each other in certain ways: T on one strand of DNA will only bond with A on another strand; likewise, C will only bond with G. However, there are no limits to association between the bases on the *same* strand of DNA. Each association between two bases is known as a base pair.¹⁵ Consequently, a sequence of DNA molecule may look like:

```

A T G C C G A T G C A T A   G T C A C G T A G C T
| | | | | | | | | | or | | | | | | | | | |
T A C G G C T A C G T A T   C A G T G C A T C G A

```

Because of these associational properties, if the sequence of one strand of DNA is known, the sequence of the other strand can be determined quite easily.¹⁶

There are over three billion base pairs in each strand of human DNA contained in each of approximately ten trillion cells in the human body.¹⁷ The base pair arrangements within the chromosomes form genes. Genes help determine such characteristics as whether an individual has blue or green eyes. Alternate forms of genes, such as the "blue-eye" and the "green-eye" gene are called alleles. Each human allele contains from one to 2000 kilobase pairs, or Kb.

Most of the DNA in humans is the same from one person to another. An individual's DNA varies, however, at approximately three million sites, or loci.¹⁸ These differences—called "polymorphisms"—occur at discrete loci within the genes along the DNA strand and exhibit a high degree of variation among individuals.¹⁹ Geneticists have discovered that fragments of DNA are repeated many times at these sites, with the variation occurring in the number of times the sequences are repeated.²⁰ The

¹⁴ See *infra* Appendix A (Figure 1 is a diagram of the DNA molecule).

¹⁵ Because of the large number of base pairs in each allele, DNA sample sizes commonly are referred to in Kilobases (Kb), or one thousand base pairs.

¹⁶ F. Samuel Baechtel, *A Primer on the Methods Used in the Typing of DNA*, 15 CRIME LABORATORY DIG. 3 (1988).

¹⁷ *Id.*

¹⁸ *People v. Castro*, 545 N.Y.S.2d 985, 988 (Sup. Ct. 1989).

¹⁹ Experts estimate that at least one base per thousand varies between individuals. D.N. Cooper et al., *An Estimate of Unique DNA Sequence Heterozygosity in the Human Genome*, 69 HUM. GENETICS 201, 205 (1985).

²⁰ For example, in the sequence:

A-C-T-G-A-T-G-A-T-G-A-T-C-G-A-A-T-G-A-T-G-A-T-T

the series G-A-T is repeated three times at one location and twice at another.

variations in number of the base series repeats are referred to as "variable number of tandem repeats," or VNTRs.²¹

An individual has at most two alleles at any one locus—one inherited from the father and one inherited from the mother.²² However, some of these loci have up to one hundred different alleles.²³ These polymorphic loci form the basis of DNA identification.

B. The Theory of DNA

The DNA within a person's cells is identical regardless of the type of cell.²⁴ However, no two people have exactly the same DNA except identical twins.²⁵ These two precepts form the basis of DNA analysis. Because of them, DNA from a suspect's blood may be compared to a semen sample from the crime scene to determine the identity of the perpetrator.

Comparison of DNA samples is much like comparisons of a partial fingerprint. The human DNA is much too large to compare in its entirety.²⁶ Therefore, only a small portion is analyzed for forensic purposes.

If one strand is known, the other can be readily determined due to its complementary bonding properties. This is the heart of DNA analysis. The comparison is performed by separating the helical molecule into its two component strands and breaking the strands down into smaller fragments. Then, a fragment from a strand of the DNA from one source may be compared to a fragment from a strand of the DNA from another source. If the DNA is identical, the complementary fragments will bond; if not, no bonding will occur. Because the fragments bond only with their counterpart fragments, bonding indicates that the two samples themselves match at the points compared.

No match provides conclusive proof that the suspect is not the crimi-

²¹ Alec J. Jeffreys et al., *Individual-Specific "Fingerprints" of Human DNA*, 316 NATURE 76 (1985). An excellent metaphor that explains VNTRs was made in *Virgin Islands v. Penn.*: "[E]ach VNTRs is like a word in the genetic code that is common to everyone. . . . Thus, if each VNTRs is like a word, then the genetic code stutters when it speaks that word. In other words, each person's DNA code is different in how many times it 'stutters' that word." 838 F. Supp. 1054, 1058 (D.V.I. 1993).

²² Both parents can pass on the same gene to their offspring.

²³ GENETIC WITNESS, *supra* note 1, at 42.

²⁴ Except for sperm cells and ova, which each contain exactly half the DNA found in the other cells, the differences between DNA in differing types of cells can only be detected through specific and detailed laboratory testing. These minor differences are not detectable using the DNA analysis methods discussed in this article. *Id.* at 42.

²⁵ COMMITTEE ON DNA TECHNOLOGY IN FORENSIC SCIENCE, NATIONAL RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 3 (1992) [hereinafter NRC REPORT].

²⁶ Indeed, the length of the DNA in the chromosomes of a single cell is approximately 1.5 meters and is comprised of almost twelve billion bases. Roger Kahn, *DNA Chemistry and Genome Organization: An Introduction for the Forensic Scientist*, in PROC. INT'L SYMPO. ON FORENSIC ASPECTS DNA ANALYSIS 11 (1989).

nal (if they were the same person, the samples should match everywhere, including those portions under examination). A DNA match provides powerful, although not conclusive, evidence that the suspect (or his identical twin, if one exists), provided the evidentiary sample. Although the area under examination matches, other areas may not. A DNA inclusion is thus circumstantial, rather than direct evidence of identity.²⁷

C. Process of DNA Analysis

The most common form of DNA analysis is known as Restriction Fragment Length Polymorphism (RFLP) Analysis.²⁸ This analysis breaks down the DNA into different-sized fragments by applying a restriction enzyme at each VNTR locus. Because of the difference in size of these fragments—determined by the number of tandem repeats—the DNA can be used to identify one individual from another.

For the genetic polymorphisms to be examined and compared, they first must be extracted from the DNA strand on which they are located.²⁹ Each polymorphic locus is extracted as an allele. Not every polymorphism is extracted. The laboratories currently extract and examine only a small portion of a person's polymorphic DNA. Because of the wide variation in these polymorphic loci, this is all that is required to obtain probabilities that can exclude all other living people as the donor of the sample.³⁰

The RFLP analysis requires at least 100 nanograms of relatively pure DNA. Some forensic DNA samples contain a lesser quantity or quality and cannot be analyzed by existing RFLP techniques. Another technique, called Polymerase Chain Reaction (PCR) is used to amplify the amount of DNA present in these samples.³¹ Because RFLP analysis is

²⁷ Brief of Amicus Curiae, *People v. Britton*, No. A058925 (Cal. Ct. App. 1993).

²⁸ Kenneth R. Krelling, Comment, *DNA Technology in Forensic Science*, 33 *JURIMETRICS J.* 448, 451 (1993).

²⁹ An examination of each base pair of an individual's DNA would be unduly expensive, highly impractical, and unwarranted, as most of the DNA is identical in all humans. C. Thomas Caskey et al., *DNA: The History and Future Use of Forensic Analysis*, in *PROC. INT'L SYMP. ON FORENSIC ASPECTS DNA ANALYSIS* 3,4 (1989).

³⁰ The world population in 1991 was estimated to be 5,423,000,000, or less than six billion. MARK S. HOFFMAN, *THE WORLD ALMANAC* 817 (1993). Probabilities in DNA evidence have ranged as low as one in 739 billion, which clearly excludes all other people on earth. NRC REPORT, *supra* note 25, at 75.

³¹ Doctor Edward Blake was the first scientist to perform a forensic DNA analysis using the PCR DQ-alpha system in 1986. Edward Blake et al., *Polymerase Chain Reaction (PCR) Amplification and Human Leukocyte Antigen (HLA) DQ-alpha Oligonucleotide Typing on Biological Evidence Samples: Casework Experience*, 37 *J. FORENSIC SCI.* 700 (1992). Polymerase Chain Reaction essentially synthesizes up to a million or more copies of the sample's DNA. Catherine T. Corney, *The Use of DNA Amplification in the Analysis of Forensic Evidence*, 15 *CRIME LABORATORY DIG.* 99 (1988); NRC REPORT, *supra* note 25, at 40-42. Once present in sufficient quantity, the test to detect the DNA's variation is performed the same as in RFLP analysis.

used as the primary means of DNA analysis today, this article will discuss only RFLP analysis.³²

DNA identification lends itself best to violent crimes and sexual assaults, because these crimes are more likely to have samples of DNA left by the assailant. In violent crimes, the assailant often is cut by the victim in a defensive struggle or has traces of the victim's blood on his clothing, possessions, or weapon. In sexual assaults, the assailant usually leaves behind a semen sample as well as blood from a struggle with the victim. Forensic experts can obtain DNA from blood samples (containing white blood cells), semen (containing sperm cells), saliva (containing epithelial cells), and even roots of hair and body tissue.³³

The DNA strands in the sample's cells are over a million base pairs long and contain both polymorphic and monomorphic loci.³⁴ Consequently, the particular polymorphic loci to be examined must be extracted from the DNA strands. This is accomplished by severing the DNA molecule at the ends of the variable number of tandem repeat loci.

Restriction endonucleases (REs) are enzymes which cleave the DNA strand wherever a certain sequence of bases occurs.³⁵ Each RE recognizes and cuts (or digests) a specific sequence of bases.³⁶ The digestion process results in many thousands of fragments, each of varying length (depending on the number of bases between the points of separation).³⁷

Once the DNA polymorphic loci have been severed, they must be physically separated to observe and measure them. At this point, all of

³² A third technique is known as direct sequencing. In this method, PCR technology is used to synthesize complementary strands of DNA taken from mitochondria (a part of the cell outside of the nucleus). Then, the synthesized fragments—the mitochondrial DNA is cleaved by the introduction of derivative bases rather than restrictive enzymes—are separated by electrophoresis. Unlike RFLP analysis, their length is determined by a scanning device which scans a certain portion of the agarose gel. Once all fragments have been scanned, the exact base sequence of the strand is known. However, this method is much more costly and requires more time to perform. Baechtel, *supra* note 16, at 8-9.

³³ John S. Wayne et al., *A Simple and Sensitive Method for Quantifying Human Genomic DNA in Forensic Specimen Extracts*, 7 BIOTECHNIQUES 852 (1989).

³⁴ GENETIC WITNESS, *supra* note 1, at 3-4.

³⁵ *Id.* at 46.

³⁶ *Id.* For example, the RE known as Hae III (used by the FBI) severs the DNA strand between bases G and C wherever the sequence "G-G-C-C" appears. Bruce Budowle et al., *Hae III—A Suitable Restriction Endonuclease for Restriction Fragment Length Polymorphism Analysis of Biological Evidence Samples*, 35 J. FORENSIC SCI. 530, 531 (1990). Thus, for a sample VNTR DNA strand:

T-G-G-C-C-A-T-C-A-T-C-A-T-C-A-T-C-A-T-G-G-C-C-A-T-G-G-C-C-A-G

application of the RE Hae III results in four DNA fragments:

T-G-G, C-C-A-T-C-A-T-C-A-T-C-A-T-G-G, C-C-A-T-G-G, and C-C-A-G.

³⁷ GENETIC WITNESS, *supra* note 1, at 46.

the DNA fragments are mixed together in a laboratory test tube and separated according to length by a process called electrophoresis.³⁸

The laboratory uses a semisolid matrix, or gel, as a sieve.³⁹ The gel contains a series of tiny pores decreasing in size from one end of the gel to the other.⁴⁰ An electric field in the gel attracts the DNA fragments (which are negatively charged) through the gel pores to the positive anode.⁴¹ The smaller the fragment, the easier it moves through the gel; thus, the larger fragments move a lesser distance during the same period of time than the smaller fragments.⁴² After a set period of time, the electric field is removed and the DNA fragments no longer move through the gel. At this point, the gel contains thousands of individual pieces of DNA separated by size.⁴³

The base pairs in the DNA molecule fragments are held together by relatively weak hydrogen bonds. However, the chemical bonds between bases along the *same* strand of DNA are much stronger. When the DNA fragments are immersed in a solution of sodium hydroxide,⁴⁴ the two strands of the helical DNA molecule are split apart, while retaining their structural integrity. This process is known as denaturation.⁴⁵

The RFLP analysis requires the DNA strands be transferred from the gel to a substance that is easier to work with. A nylon membrane is placed in contact with the gel⁴⁶ and a transfer solution, often sodium hydroxide, in conjunction with blotting pads, wicks the DNA strands onto the membrane in the same positions as in the gel. The membrane is then washed to remove any residual gel material and baked to fix the DNA in place.⁴⁷

As the DNA molecule is now "unzipped," complementary DNA sequences (called probes) are introduced so that the DNA hybridizes with

³⁸ *Id.*

³⁹ *Id.* The gel, somewhat the consistency of Jell-O®, is normally made of agarose, but also may be made of acrylamide.

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ Bruce Budowle et al., *An Introduction to the Methods of DNA Analysis Under Investigation in the FBI Laboratory*, 15 CRIME LABORATORY DIG. 8, 12 (1988) [hereinafter Budowle II]; Baechtel, *supra* note 16, at 5.

⁴⁴ Bruce Budowle & F. Samuel Baechtel, *Modifications to Improve the Effectiveness of Restriction Fragment Length Polymorphism Typing*, in APPLIED AND THEORETICAL ELECTROPHORESIS 182 (1990).

⁴⁵ Budowle II, *supra* note 43, at 8. The process is reversible, too. The reverse process is known as hybridization. Kahn, *supra* note 26, at 14.

⁴⁶ GENETIC WITNESS, *supra* note 1, at 46.

⁴⁷ This process is known as Southern blotting, named for its developer, Dr. Edwin M. Southern. See Budowle & Baechtel, *supra* note 44, at 182.

these probes. The probes recognize and bond with DNA from specific loci.⁴⁸ Each probe is identified by the VNTR it targets.⁴⁹

These probes are radioactive, which allows them to expose X-ray film and become visible. The probes are placed in a solution with the nylon membrane, gently agitated, and then washed to remove any excess probe.⁵⁰ The membrane now contains two types of DNA fragments: those that have bonded with the radioactive probe and the remaining unbonded DNA.

The membrane is then placed between two sheets of X-ray film and refrigerated for a number of days to allow the radiation from the probes on the membrane to expose the film. The film is removed and developed as ordinary X-ray film.⁵¹ The membrane is washed with a solution that removes all of the probe and then is analyzed again using a different probe.

The end result of the RFLP analysis is the X-ray film, known as an autoradiogram or an autorad. The film is a copy of the nylon membrane, but the DNA fragments that bonded with the radioactive probe are now visible as dark bands on the autorad. The dark bands form a pattern much like a bar-code used in commercial practice. An autorad is then made for each probe (in some circumstances, for all four probes together on the membrane).⁵²

Now that the samples' DNA⁵³ is visible on the autorad, they can be

⁴⁸ Single-locus probes recognize fragments from only one locus on a specific chromosome, while multi-locus probes recognize fragments from loci on many chromosomes. Single-locus probes are preferable in RFLP analysis because of their high degree of sensitivity. Most forensic laboratories in the United States use three to five single-locus probes in DNA analysis. Single-locus probes produce one or two bands for analysis, depending on whether the individual inherited the same or different alleles from the mother and father. *DNA Identification: Hearings Before the Subcomm. on the Constitution of the Senate Comm. on the Judiciary, 101st Cong., 1st Sess. 92 (1989)* (CELLMARK DIAGNOSTICS, DNA FINGERPRINTING MANUAL) [hereinafter *DNA Identification Hearings*].

⁴⁹ For example, the FBI laboratory uses a probe called D4S139. The "D" is an abbreviation for "DNA;" the "4" represents the fourth chromosome; the "S" is an abbreviation for "segment;" and "139" represents the 139th segment of DNA on the chromosome. *Virgin Islands v. Penn.*, 838 F. Supp. 1054, 1061 (D.V.I. 1993).

⁵⁰ Budowle & Baechtel, *supra* note 44, at 182.

⁵¹ *Id.* at 182-83.

⁵² See *infra* Appendix B (Figure 2 is a schematic of the DNA analysis process using Southern blotting).

⁵³ The DNA samples are not the only samples placed into the gel when the RFLP process is conducted. Each gel has several control lanes containing DNA of known lengths. Additionally, depending on laboratory protocol, several different evidentiary samples can be run on the same gel, because the DNA fragments migrate in straight lines through the gel. Most quality control protocols actually require the suspect's sample and the evidentiary sample to be run in the same gel to eliminate any effect that different gels or solutions may have on the results. BUREAU OF JUSTICE STATISTICS, U.S. DEP'T OF JUSTICE, FORENSIC DNA ANALYSIS: ISSUES 5 n.10 (1991) [hereinafter *FORENSIC DNA ANALYSIS*]. The laboratory will discard the autorad unless all of the quality control measures are satisfied.

compared to determine whether or not the DNA from the suspect matches the DNA from the evidence. Each laboratory has its own criteria for declaring a match and its own procedures for automated analysis of the autorad. In general, the laboratory will declare a match if the DNA bands are within $\pm 2.5\%$ to 5% molecular weight of each other.⁵⁴

The first step in the comparison is to view the DNA bands with the naked eye. If they do not align, the samples do not match,⁵⁵ and the suspect could not have contributed the evidentiary sample. This result is called an exclusion.⁵⁶ If they are aligned, further comparison is performed using an automated analytical procedure.⁵⁷

The automated analysis consists of digitizing the autorad. The computer locates the area of maximum density within each band on the autorad and compares it to that of the control lanes containing known-sized DNA fragments on the autorad. The computer interpolates the size of the evidentiary samples from the size of the control samples.⁵⁸ The result is a size (in Kb) for each band present in the evidentiary samples on the autorad. These sizes are compared using the laboratory's matching criteria to determine whether or not a match exists.⁵⁹

D. DNA Statistics

The existence of a match alone is not conclusive. The possibility

⁵⁴ *Statement of the Working Group on Statistical Standards for DNA Analysis*, 17 CRIME LABORATORY DIG. 53, 56 (1990) [hereinafter *Working Group on Statistical Standards*]. This is to compensate for the variation of up to $\pm 2.5\%$ in size measurement of DNA fragments from the same source. Bruce Budowle et al., *Data for Forensic Matching Criteria for VNTR Profiles*, in PROC. INT'L SYMP. ON HUMAN IDENTIFICATION 104 (1989). However, most matches in the FBI system occur within $\pm 1.5\%$ of each other because, in part, technicians, in the visual examination of the autoradiogram prior to the automated analysis, discard samples beyond that. Interview with Dr. Bruce Budowle, FBI Forensic Science Research and Training Center, in Quantico, Virginia (Feb. 3, 1994).

⁵⁵ Unless the phenomenon of band shifting occurs. Band shifting is where the same size DNA fragments in different lanes migrate a different distance through the agarose gel due to inconsistencies in the gel's composition. See, e.g., Eric S. Lander, *Invited Editorial: Research on DNA Typing Catching Up with Courtroom Application*, 48 AM. J. HUM. GENETICS 819, 820 (1991). Band shifting's recognition and correction are beyond the scope of this article and will not be addressed further.

⁵⁶ This type of result recently freed Kirk Bloodworth from Maryland's death row after being twice convicted in 1985 and 1987 of raping a young girl. In a 1992 test using PCR techniques, Bloodworth's DNA did not match DNA amplified from semen stains on the victim's underwear. At the time of his trials, PCR techniques were not available. Paul W. Valentine, *Man Cleared by DNA Gets Pardon*, WASH. POST, Dec. 23, 1993, at A8.

⁵⁷ An automated method is necessary because closely-spaced bands may appear on the autorad that prevent the eye from accurately determining a match or nonmatch and to provide an objective method of measuring fragment size. Keith L. Monson & Bruce Budowle, *A System for Semi-Automated Analysis of DNA Autoradiograms*, in PROC. INT'L SYMP. ON FORENSIC ASPECTS DNA ANALYSIS 127 (1989).

⁵⁸ See *infra* Appendix C (Figure 3 is an autoradiogram analyzed by an automated system).

⁵⁹ Monson & Budowle, *supra* note 57, at 129-30.

exists that other parts of the DNA differ because only part of the individual's DNA is compared. A match means one of two things—either the suspect contributed the DNA found in the evidentiary sample, or someone else did and this person matches the suspect's DNA, at the points examined, by coincidence. The probability of the latter occurring can be calculated using standard statistical principles.

1. *Statistical Evidence*—Statistical evidence is, by definition, circumstantial evidence.⁶⁰ Statistics can never be used to definitively prove an assertion; rather, they can be used only to demonstrate the frequency of an event's occurrence. The factfinder then can determine the relevance of, and weight to be given to, evidence that the occurrence of an event—such as the defendant having an identifying characteristic that matches the evidentiary sample—is relatively rare.

Statistical evidence generally has fared well in American courts. Most courts, confronted with the issue, have permitted scientists to "present reasonable estimates of population frequencies and to articulate the mathematical calculations needed to arrive at the figure."⁶¹ This type of statistical evidence often is admitted in criminal cases involving ABO blood types and paternity cases.⁶²

The science of statistics is "concerned with the systematic and efficient collection and accurate analysis of data The analysis of data is the attempt to extract useful information from a set of data."⁶³ This analysis applied to DNA cases results in an inference that the suspect and the defendant are the same individual based the relative frequency of a match occurring between their DNA samples at random.⁶⁴

2. *Databases*—Each laboratory analyzing DNA has collected databases of DNA samples.⁶⁵ Laboratories use databases representative of the population to calculate the likelihood of the match occurring at random because it is not possible to test everyone in the United States. Although hotly debated during the advent of forensic DNA analysis, the scientific community now generally agrees that a database consisting of

⁶⁰ See, e.g., *Castaneda v. Partida*, 430 U.S. 482, 513-14 (1977) (Powell, J., dissenting).

⁶¹ EDWARD W. CLEARY ET AL., *EVIDENCE: CASES AND MATERIALS* 309 n.1 (4th ed. 1988).

⁶² E.g., *United States v. Gwaltney*, 790 F.2d 1378 (9th Cir. 1986).

⁶³ PANEL ON STATISTICAL ASSESSMENTS AS EVIDENCE IN THE COURTS, NATIONAL RESEARCH COUNCIL, *THE EVOLVING ROLE OF STATISTICAL ASSESSMENTS AS EVIDENCE IN THE COURTS* 3 (Stephen E. Fienberg, ed. 1989).

⁶⁴ This inference arises because, as discussed previously, see *supra* notes 60-87 and accompanying text, a match between DNA samples is not conclusive of identity. However, an exclusion is conclusive that the suspect and the defendant are not the same individual.

⁶⁵ Because each laboratory uses different restriction enzymes—the FBI uses *Hae* III, while Cellmark uses *Hinf*—and different probes which recognize and cut separate portions of DNA, the laboratories cannot combine their databases. Budowle Interview, *supra* note 54.

as few as 150 individuals will suffice, so long as the individuals are unrelated.⁶⁶ Most of the major laboratories have databases of 300 individuals or more.⁶⁷

Once the laboratory has collected the database, it analyzes all of the database samples using RFLP analysis and lists the resulting DNA sizes. Eight bands are present in a normal forensic test of four single-locus probes and two alleles per locus. Then, the laboratory compares the sizes of the fragments in the DNA match under investigation to those in the database to determine the relative frequency of each individual fragment.

Most laboratories have collected databases for three or more major populations.⁶⁸ This is necessary to counter "assortative mating," whereby people of one race, religion, or ethnicity tend to marry others with a common background. It is likely that the major population groups will exhibit some degree of variance as a group in their genetic makeup,⁶⁹ even while not marrying for specific genes.⁷⁰

3. *The Product Rule*—Scientists make two major assumptions in statistical analysis. First, geneticists assume that the alleles at each locus are randomly selected; that is, no particular allele is associated with a particular locus. This assumption is somewhat restricted by mutation rate, natural selection, and other factors, but most scientists agree that these factors have not been reliably shown to cause detectable deviations.⁷¹ The independence within loci—such that the allele inherited from one parent is not governed by the allele inherited from the other parent—is known as Hardy-Weinberg Equilibrium (HWE).⁷²

Second, scientists assume allele independence across loci. This

⁶⁶ The number refers to individuals, not alleles. Each individual is expected to provide two alleles per locus. Ranajit Chakraborty, *Sample Size Requirements for Addressing the Population Genetic Issues of Forensic Use of DNA Typing*, 64 *HUM. BIOLOGY* 141, 157 (1992).

⁶⁷ Budowle Interview, *supra* note 54; *United States v. Brooks*, No. 92-112-COL(JRE) (M.D. Ga. 1992), *aff'd*, 12 F.3d 219 (11th Cir. 1993).

⁶⁸ The FBI uses Black, Caucasian, and Southwestern and Southeastern Hispanic databases; Cellmark uses Black, Caucasian, and Western Hispanic databases; others use an Asian database. Budowle Interview, *supra* note 54.

⁶⁹ *Virgin Islands v. Penn*, 838 F. Supp. 1054, 1063 (D.V.I. 1993).

⁷⁰ Obviously, some genes are desired or avoided in marriages, but these genes are the ones that determine the physicalities that make the individuals part of a common group. The DNA sought by RFLP analysis, on the other hand, has no known function, is highly polymorphic regardless of assortative mating, and thus would not violate Hardy-Weinberg equilibrium; see *supra* text at note 30.

⁷¹ Nell J. Risch & Bernard Devlin, *On the Probability of Matching DNA Fingerprints*, 255 *SCIENCE* 717, 718 (1992). See also Bruce Budowle & Keith L. Monson, *A Statistical Approach for VNTR Analysis*, in *PROC. INT'L SYM. ON FORENSIC ASPECTS DNA ANALYSIS* 121, 124 (1989).

⁷² G.H. Hardy, *Mendelian Proportions in a Mixed Population*, 28 *SCIENCE* 49, 50 (1908).

assumption means that the presence of an allele at one loci is unrelated to the presence or absence of another allele at another loci. For example, although in general blond hair and blue eyes often are associated, people are unaware of the particular alleles they possess and do not select their mates based on genetic composition. Random mating is the rule, not the exception, for humans. Additionally, RFLP analysis uses loci on separate chromosomes to help ensure independence.⁷³ Accordingly, scientists have found that sufficient independence exists at the VNTR loci for the statistical analysis to succeed.⁷⁴ This independence is called linkage equilibrium (LE).

Human geneticists use the product rule to calculate the probability of several individual events occurring simultaneously. The probability of each event occurring is multiplied by the probabilities of the other events. For example, the probability of obtaining three heads when flipping a coin three times is calculated using the product rule, as the result of each flip is independent of the others. Because the probability of obtaining a head on any particular flip of a coin is $\frac{1}{2}$, the probability of having three heads in a row result on three flips is $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$, or $\frac{1}{8}$.

DNA analysis can use several forms of the product rule. The "pure" product rule multiplies all of the individual frequencies together without any conservative measures added.⁷⁵ The frequency for a heterozygous (meaning that the individual received different alleles from the mother and father) locus would be $2pq$, where p is the frequency of the first allele and q is the frequency of the second allele. The frequency for a homozygous (the individual received the same allele from both parents) would be p^2 for the first allele and q^2 for the second allele. Thus, for an eight-loci sample with two homozygous (one of each allele) and six heterozygous loci, the "pure" product rule results in a frequency of $p^2 \times q^2 \times 12pq$.

The modified product rule used by the commercial testing laboratories and the FBI⁷⁶ adds a conservative measure to account for apparent, rather than actual, homozygotes. The appearance of a single band for a particular probe can be the result of several things: the individual is a true homozygote; the "missing" band was small enough to migrate completely through the gel;⁷⁷ the DNA sample was degraded⁷⁸ or had too few

⁷³ NRC REPORT, *supra* note 25, at 48.

⁷⁴ *Id.* at 80 ("Recent empirical studies concerning VNTR loci detected no deviation from independence within or across loci.") (citation omitted).

⁷⁵ See Brief of Amicus Curiae at 62, *People v. Britton*, No. A058925 (Cal. Ct. App. 1993).

⁷⁶ See, e.g., *Working Group on Statistical Standards*, *supra* note 54, at 54. Membership of the Working Group includes the Federal Bureau of Investigation, Lifecodes Corporation, Cellmark Diagnostics, and Dr. Eric S. Lander.

⁷⁷ Bruce Devlin & Neil Risch, *A Note on Hardy-Weinberg Equilibrium of VNTR Data by Using the Federal Bureau of Investigation's Fixed-Bin Method*, 51 AM. J. HUM. GENETICS 549, 550 (1992).

⁷⁸ NRC REPORT, *supra* note 25, at 58.

repeats and the probe was unable to bind with the "missing" band;⁷⁹ the "missing" band did not migrate completely through the gel but did move past the control limits of the gel and thus was ignored by the laboratory protocol;⁸⁰ the "missing" band is actually present but close enough in size to the other allelic band as to be indistinguishable;⁸¹ or, in cases of mingled samples, the band was not unique to the suspect.⁸²

The laboratory cannot determine which of the above circumstances caused the apparent homozygosity. A homozygous locus is always more rare than a heterozygous locus.⁸³ The modified product rule replaces p^2 and q^2 with $2p$ or $2q$.⁸⁴ Consequently, the modified product rule is conservative in that it increases the frequency for apparent homozygous loci.

Forensic DNA laboratories use an additional conservative measure in calculating the frequencies for the modified product rule. The laboratories create bins, or windows, surrounding the DNA sample.⁸⁵ These bins match the size of the laboratories' match criteria; thus, if a laboratory declares a match for samples if they are within 2.5% of each other in size, the bin used on the database to calculate the allele frequency will include all data-base samples that are within 2.5% of the evidentiary sample. The frequency used thus will be greater than or equal to the actual frequency of the individual band within the database, because the frequency of all bands within the bin are added to arrive at the bin frequency.

The product rule reveals the power of RFLP analysis. Many of the VNTR loci have probabilities under ten percent. If eight bands are used in the analysis, the probability is less than 0.1⁸ or one in 100 million. This statistic is valid even though gained from a database containing samples from only 300-500 individuals. It is this power to identify an individual as the source of the evidentiary sample, as compared to probabilities of

⁷⁹ *Id.*

⁸⁰ Record at 305, United States v. Brooks, No. 92-112-COL(JRE), (M.D. Ga. 1992), *aff'd*, 12 F.3d 219 (11th Cir. 1993).

⁸¹ Devlin & Risch, *supra* note 77, at 550.

⁸² Record at 304, Brooks, No. 92-112-COL(JRE).

⁸³ Let p equal the probability of allele 1 and q equal the probability of allele 2. Because p and q are both less than 1 ($p+q=1$, $p, q \neq 0$), p^2 always will be less than pq .

⁸⁴ Bruce Budowle & Keith L. Monson, *The Approach Used by the FBI for Calculating Ceiling Frequencies*, 19 CRIME LABORATORY DIG. 84, 86 (1992).

⁸⁵ The FBI uses fixed bins, which do not depend on the particular sample. Bruce Budowle & Keith L. Monson, *Perspectives on the Fixed Bin Method and the Floor Approach/Ceiling Principle*, in PROC. 1992 INT'L SYMPO. ON HUM. IDENTIFICATION 391, 392 (1992) [hereinafter *Floor Approach*]. Consequently, a particular evidentiary sample may lie on the border between two bins. In this case, the FBI uses the larger of the two bins' frequencies. Bruce Budowle et al., *Fixed-Bin Analysis for Statistical Evaluation of Continuous Distributions of Allelic Data from VNTR Loci*, 48 AM. J. HUM. GENETICS 841, 846 (1991). Cellmark and Lifecodes use floating bins that center themselves on the evidentiary sample to avoid this possible issue. Brief of Amicus Curiae at 63, People v. Britton, No. A058925 (Cal. Ct. App. 1993).

around one in one hundred for conventional genetic markers,⁸⁶ that has caused some defense attorneys and experts to create an apparent controversy in the judicial acceptance of DNA analysis.⁸⁷

III. DNA as Evidence

DNA evidence initially was considered "novel" and had to clear certain hurdles⁸⁸ before courts admitted it into evidence. However, more experts began to testify regarding the techniques as more parties presented the evidence in court. As these experts pointed out, the techniques used in RFLP analysis were hardly novel; they actually had been used clinically for years. "The complete process—DNA digestion, electrophoresis, membrane transfer, and hybridization . . . [is] routinely used in molecular biology, biochemistry, genetics, and clinical DNA diagnosis; there is no difference in their forensic application."⁸⁹ Most courts no longer treat DNA evidence as novel scientific evidence; however, this does not hold true for DNA statistical evidence.

The evidence generally was admitted with little or no objection by the defense in the first DNA cases.⁹⁰ Some of the judges themselves apparently understood little of the science behind the evidence but were content to let the jury hear the evidence.⁹¹ However, the evidence—especially the statistical probability of a DNA match occurring at random between the defendant and the evidentiary sample—began to undergo significant challenge in 1989.⁹²

⁸⁶ NRC REPORT, *supra* note 25, at 77.

⁸⁷ *Id.* at 76. See also William C. Thompson, *Evaluating the Admissibility of New Genetic Identification Tests: Lessons from the "DNA War,"* 84 J. CRIM. L. 22, 84 & n.287 (1993).

⁸⁸ See *infra* notes 98-150 and accompanying text.

⁸⁹ NRC REPORT, *supra* note 25, at 38. Southern blotting has been in existence since 1975. Edwin M. Southern, *Detection of Specific Sequences Among DNA Fragments Separated by Gel Electrophoresis*, 98 J. MOLECULAR BIOLOGY 503 (1975). See also *DNA Identification Hearings*, *supra* note 49, at 13 (testimony of Professor James E. Starrs) ("All of this is familiar turf to biologists since the same Mendelian principles and the same establishment of population frequencies occurs in the every day genetic markers known as ABO blood grouping.").

⁹⁰ Andre A. Moenssens, *Novel Scientific Evidence in Criminal Cases: Some Words of Caution*, 84 J. CRIM. L. 1 (1993); David H. Kaye, *The Admissibility of DNA Testing*, 13 CARDOZO L. REV. 353, 357 n.17 (1991); Michael N. Schmitt & Laura H. Crocker, *DNA Typing: Novel Scientific Evidence in the Military Courts*, 32 A.F. L. REV. 227, 269 (1990) ("*Castro* . . . represents the first full-fledged attack on DNA identification.").

⁹¹ See, e.g., *DNA Identification Hearings*, *supra* note 48, at 10-12 (testimony of Professor James E. Starrs); Lander, *supra* note 55, at §19; ANDRE A. MOENSSENS ET AL., *SCIENTIFIC EVIDENCE IN CRIMINAL CASES* § 1.03 (3d ed. 1986).

⁹² See, e.g., *United States v. Martinez*, 3 F.3d 1191, 1194 (8th Cir. 1993); *United States v. Yee*, 134 F.R.D. 161 (N.D. Ohio 1991); *People v. Castro*, 345 N.Y.S.2d 985 (Sup. Ct. 1989). See also Kreiling, *supra* note 28, at 457.

A. Evidentiary Rules for Admission of Scientific Evidence

United States courts have used several different rules to determine the admissibility of scientific evidence. The federal system began with case law, which was followed in several circuit courts of appeal (until *Daubert*).⁹³ Other circuits found the case law inconsistent with the enactment of the *FRE* in 1975.⁹⁴ Still others created a combination of the two standards, or modified their application of the single standard which they adopted.⁹⁵ The United States Supreme Court resolved the issue by deciding that the case law was inconsistent with, "absent from and incompatible with the *FRE* [and] should not be applied in federal trials."⁹⁶

A discussion of the case law is still relevant because the Supreme Court adopted its "general acceptance" inquiry as part of the test under *FRE* 702. Additionally, general acceptance is determined to a great extent by examining decisions of other courts; as state courts have been presented with DNA evidence more often than federal courts, state court precedent often is persuasive. The Supreme Court's 1993 decision in *Daubert* is not binding in the state courts. Although some states' evidence codes are based on the *FRE* (and thus will probably incorporate the *Daubert* holding),⁹⁷ many states' codes are not and they probably will continue to require general acceptance as the deciding issue, rather than as merely a factor in deciding admissibility.

1. *The General Acceptance Test*—Since 1923, federal courts have employed a "general acceptance" test to determine whether novel scientific evidence is admissible. This test was first enunciated in *Frye v. United States*:⁹⁸

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.⁹⁹

⁹³ David G. Ego, *Supreme Court Knocks Out Frye Admissibility Test for Scientific Evidence in Federal Arena*, 20 CRIME LABORATORY DIG. 41 (1993).

⁹⁴ *Id.*

⁹⁵ See, e.g., *Castro*, 545 N.Y.S.2d at 985; *People v. Kelly*, 549 P.2d 1240 (Cal. 1976).

⁹⁶ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786, 2794 (1993), *aff'd on remand*, 43 F.3d 1311 (9th Cir. 1995).

⁹⁷ New Mexico's Supreme Court noted that its evidence rules are identical to the *FRE*, and thus abandoned *Frye* in the wake of *Daubert*. *State v. Alberico*, 861 P.2d 192 (N.M. 1993).

⁹⁸ 293 F. 1013 (D.C. Cir. 1923).

⁹⁹ *Id.* at 1014.

The test was adopted by most federal courts (at least until the adoption of the *FRE*) and over thirty state courts (although with some modification).¹⁰⁰

The advantage of *Frye* is that some degree of support by other scientists in the relevant field of expertise is assured. It is presumed that the members of the relevant scientific community will examine the theory being propounded and subject it to testing to determine its validity before courts admit it into evidence. In other words, the scientists will act as a pseudo-jury prior to the court admitting the evidence.¹⁰¹

What *Frye* presumes is that scientists will subject the procedure and techniques to rigorous scrutiny and will attempt to reproduce the test and its claimed results per the scientific method. "It is certainly reasonable to expect science to withhold judgment on a new theory until it has been well tested in the crucible of controlled experimentation and study. Such a procedure would require replication of original experiments, and scrutiny of the results in various scientific journals."¹⁰² Indeed:

To prevent deception or mistake and to allow the possibility of effective response, there must be a demonstrable, objective procedure for reaching the opinion and qualified persons who can either duplicate the result or criticize the means by which it was reached, drawing their own conclusions from the underlying facts.¹⁰³

It is this replication of results that is the heart of science.¹⁰⁴

However, the assumption that general acceptance equates to validity is not always correct. History is replete with discoveries of "scientific principles" that are at first widely accepted, yet later proven false. For

¹⁰⁰ GENETIC WITNESS, *supra* note 1, at 91.

¹⁰¹ As one court stated, the scientists will "form a kind of technical jury, which must first pass on the scientific status of a procedure before the lay jury utilizes it in making its findings of fact." *People v. Barbara*, 255 N.W.2d 171, 194 (Mich. 1977).

¹⁰² *People v. Collins*, 405 N.Y.S.2d 365, 369 (Sup. Ct. 1978).

¹⁰³ *United States v. Baller*, 519 F.2d 463, 466 (4th Cir.), *cert. denied*, 423 U.S. 1019 (1975).

¹⁰⁴ Observation and experimentation are used to find shortcomings, to determine how to make improvements, and "to discover how to eliminate known artificialities, distortions, oversimplifications, and errors in the descriptions, explanations, and predictions of reality that the theory affords." Only after a theory has survived a period of this kind of testing, review, and refinement can it be used without significant questions, and even then, it remains open to renewed doubt. One philosopher has written that this process not only reflects the scientific method, but that "it is the scientific method."

Bert Black, *A Unified Theory of Scientific Evidence*, 56 FORDHAM L. REV. 595, 623 (1988), (citing F. Suppe, *Afterword to THE STRUCTURE OF SCIENTIFIC THEORIES* 706 (F. Suppe ed., 2d ed. 1977); Ziman, *What is Science*, in *INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE* 35, 40 (E.D. Klemke et al. eds. 1980); K. POPPER, *THE LOGIC OF SCIENTIFIC DISCOVERY* 47 (2d ed. 1968)).

example, testimony by Christopher Columbus that the world was round would not be admissible under *Frye* in 1491 because the opposite was generally accepted, even though untrue. Today, most courts reject the "paraffin" test designed to determine whether an individual had residue from a gunshot on his body, although the test was continuously admitted as sound, generally accepted scientific evidence without any real challenge for over twenty-five years.¹⁰⁵

The *Frye* court left much to be desired in creating this test. First, the circuit court failed to provide any working definition of "general acceptance." In its aftermath, *Frye* has created heated discussion over who and how many must accept the principle before the courts may admit it into evidence.

For example, *Frye's* requirement of "general acceptance in the particular field in which it belongs"¹⁰⁶ requires that the field be established. Because the evidence in question is novel, determining which particular scientific field it falls within is often a difficult question. The relevant fields for DNA evidence could be composed of molecular biologists,¹⁰⁷ human geneticists,¹⁰⁸ biologists,¹⁰⁹ statisticians,¹¹⁰ forensic scientists,¹¹¹ chemists,¹¹² serologists,¹¹³ pathologists,¹¹⁴ and technicians,¹¹⁵ among others. Indeed, the selection of the relevant field may turn out to be case dispositive.¹¹⁶

Furthermore, the circuit court gave no definition of general acceptance. Consequently, some courts have looked for evidence that the principle's acceptance among the relevant field(s) is "wide-spread," "prevalent," and "extensive though not universal,"¹¹⁷ while another court has suggested that the test requires agreement by a "substantial section

¹⁰⁵ *United States v. Downing*, 753 F.2d 1224, 1236 n.14 (3d Cir. 1985).

¹⁰⁶ *United States v. Frye*, 293 F. 1013, 1014 (D.C. Cir. 1923).

¹⁰⁷ *E.g.*, Dr. David E. Housman in *Andrews v. State*, 535 So. 2d 841 (Fla. Dist. Ct. App. 1988).

¹⁰⁸ *E.g.*, Dr. Daniel L. Hartl in *United States v. Yee*, 134 F.R.D. 181 (N.D. Ohio 1991); Dr. Kenneth K. Kidd in *People v. Wesley*, 533 N.Y.S.2d 643 (Albany County Ct. 1988).

¹⁰⁹ *E.g.*, Dr. Richard Borowsky in *Wesley*, 533 N.Y.S.2d at 731.

¹¹⁰ *E.g.*, Dr. Ted Emigh and Dr. Bruce S. Weir in *State v. Futrell*, 436 S.E.2d 884 (N.C. Ct. App. 1993).

¹¹¹ *E.g.*, Dr. Allen Giusti in *Andrews*, 533 So. 2d at 849.

¹¹² *E.g.*, Dr. F. Samuel Baechtel in *State v. Jobe*, 486 N.W.2d 407 (Minn. 1992).

¹¹³ *E.g.*, Dr. Edward Blake in *People v. Mack*, 15 Cal. Rptr. 2d 193 (Dist. Ct. App. 1992).

¹¹⁴ *E.g.*, Dr. Brian Hjelle in *People v. Barney*, 10 Cal. Rptr. 2d 731 (Ct. App. 1992).

¹¹⁵ *E.g.*, Ms. Paula Yates of Cellmark in *United States v. Brooks*, No. 92-112-COL(JRE) (M.D. Ga. 1992), *aff'd*, 12 F.3d 219 (11th Cir. 1993).

¹¹⁶ *E.g.*, *United States v. Williams*, 563 F.2d 1194, 1198 (2d Cir. 1975), *cert. denied*, 439 U.S. 1117 (1979); *People v. Williams*, 331 P.2d 251 (Cal. App. Dep't Super. Ct. 1958).

¹¹⁷ *United States v. Zeiger*, 350 F. Supp. 685, 688 (D.D.C.), *rev'd*, 475 F.2d 1280 (D.C. Cir. 1972).

of the scientific community."¹¹⁶ Some have even raised this standard to require a "clear majority" of scientists,¹¹⁷ although all agree that unanimity or consensus is not required.¹²⁰ Additionally, most courts agree that one scientist, no matter how impressive his or her credentials, is insufficient to find general acceptance. "[Courts] cannot accept a technique simply because a Nobel Prize winner takes the stand and testifies, 'I have verified this theory to my satisfaction, and I stake my professional credentials on the theory.'"¹¹⁸

Although the D.C. Circuit's opinion addressed the scientific principle, *Frye* has been expanded to include the technique (and sometimes the particular laboratory's process)¹²² in the requirement of general acceptance. However, failure to demonstrate general acceptance of the specific procedures should not be enough to exclude relevant and reliable evidence. Because many procedures may accomplish the same result and witnesses from commercial laboratories may have a financial or proprietary bias towards their method, it may be that no specific method has obtained "sufficient" general acceptance, even though the theory itself and one or more procedures are valid. On the other hand, failure to follow accepted procedures may make otherwise admissible evidence inadmissible.¹²³

Instead, *Frye* poses a danger that, once one court finds the evidence admissible, the court's decision will carry so much precedential value that the *Frye* test becomes general acceptance within the legal, not scientific, field. Some legal commentators have said that a "beneficial consequence of the *Frye* test is that it may well promote a degree of uniformity of decision" and that:

once a trial court has admitted evidence based upon a new scientific technique, and that decision is affirmed on appeal by a published appellate decision, the precedent so established may control subsequent trials, at least until new evidence is presented reflecting a change in the attitude of the scientific community.¹²⁴

Until a novel scientific theory or procedure loses its novelty and

¹¹⁶ *United States v. Williams*, 443 F. Supp. 269, 273 (S.D.N.Y. 1977), *aff'd*, 583 F.2d 1194 (2d Cir. 1978), *cert. denied*, 493 U.S. 1117 (1979).

¹¹⁷ *People v. Guerra*, 890 P.2d 635, 656 (Cal. 1984).

¹¹⁸ *Yee*, 134 F.R.D. at 165, *citing* *United States v. Kozminski*, 821 F.2d 1186 (6th Cir. 1987) (*en banc*).

¹¹⁹ Edward J. Imwinkelried, *The Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology*, 100 MIL. L. REV. 99, 104 (1983).

¹²⁰ *E.g.*, *People v. Castro*, 645 N.Y.S.2d 985, 987 (Sup. Ct. 1989).

¹²¹ *See id.* at 999.

¹²² CLEARY, *supra* note 61, at 290.

becomes judicially noticed—such as fingerprinting¹²⁵—*Frye* mandates that science, not the courts, control.

Another problem with *Frye*'s holding is that it abdicates the judicial role in determining the admissibility of evidence. As courts have pointed out, the sole inquiry under *Frye* is not the reliability of the technique, but only whether or not the relevant scientific field has generally accepted the principle (and/or the technique).¹²⁶ Accordingly, many courts have modified *Frye* so that the test becomes general acceptance of the reliability of the scientific principle or technique.¹²⁷ This test abdicates the judge's role in determining the admissibility of evidence and reduces the judge, in effect, to "counting heads."¹²⁸

Frye also brings with it a certain degree of judicial evasiveness. When faced with this hard and fast rule, courts must create several methods of avoiding the application of the rule when its outcome would be unsatisfactory. Courts have found many ways to define "novel scientific evidence" so that the evidence in question is not subject to *Frye*,¹²⁹ defined *Frye* so that it applies only to "pseudoscience,"¹³⁰ or equated general acceptance with reliability.¹³¹ *Frye* also is misused to exclude relevant evidence that on its face meets the test.¹³²

¹²⁵ See MOENSSENS ET AL., *supra* note 91, at 439.

¹²⁶ *Yee*, 134 F.R.D. at 196; *People v. Shirley*, 31 Cal. 3d 18, 55 (1982) ("Our duty is not to decide whether [the scientific evidence] is reliable as a matter of fact, but simply whether it is generally accepted.").

¹²⁷ Black, *supra* note 104, at 595. Judge Guy of the United States Court of Appeals for the Sixth Circuit stated that "[t]he . . . inquiry is, of course, the crucial one here; that is, whether the testimony is in 'conformity with a generally accepted explanatory theory.'" *United States v. Kozminski*, 821 F.2d 1186, 1215 (6th Cir. 1987) (*en banc*) (Guy, J. dissenting) (citations omitted).

Implicit in the language is the predicate that the theory be firmly anchored in sound, reliable, and sufficiently accurate scientific principles, and sufficiently established to the point of having achieved general acceptance within the particular field to which it belongs. Stated differently, the scientific explanatory theory must have (a) received at least some exposure within the scientific peerage to which it belongs; (b) received peer evaluation to determine its scientific validity and reliability; and (c) achieved general acceptance within the scientific community to which it belongs.

Kozminski, 821 F.2d at 1201 (Krupansky, J. concurring).

¹²⁸ *E.g.*, *Harper v. State*, 292 S.E.2d 389, 395 (Ga. 1982).

¹²⁹ *E.g.*, *United States v. Hadley*, 918 F.2d 848, 853 (9th Cir. 1990).

¹³⁰ *United States v. Valdez*, 722 F.2d 1196, 1201 n.19 (5th Cir. 1984).

¹³¹ "We deem general acceptance as being nearly synonymous with reliability." *United States v. Franks*, 511 F.2d 25, 33 n.12 (6th Cir.), *cert. denied*, 422 U.S. 1042 (1975).

¹³² *E.g.*, *People v. Davis*, 72 N.W.2d 269 (Mich. 1955) (the court admitted that the polygraph has proven value but noted the possibility of error of 10% to 25%. The evidence established a relationship between lies and blood pressure, respiration, and galvanic skin response. The court found polygraphy an acceptable method, but was dismayed by the possibility of the jury according great weight to the evidence. The court refused to admit the evidence, citing *Frye*).

2. *The Relevancy Test*—Because of the problems involved in interpreting and applying *Frye*, many jurisdictions fashioned a "relevancy" test (with reliability one prong of relevance). They did so because the *Frye* inquiry went not to reliability, but only to general acceptance. With the adoption of the *FRE*,¹³³ FRE 702¹³⁴ focussed the controversy over the standard for admitting scientific evidence.

Federal Rule of Evidence 702 omitted any mention of *Frye*, either in the text or in the analysis.¹³⁵ This omission—and its significance—divided the federal courts into two camps: those which held that FRE 702 superseded *Frye*,¹³⁶ and those which held that *Frye* was "part and parcel"¹³⁷ of FRE 702.¹³⁸ *Daubert* finally settled the controversy.

The same did not hold true in the military judicial system. The drafters of Military Rule of Evidence (MRE) 702 specifically stated that the rule "may be broader and may supersede *Frye v. United States*. . . . The Rule's sole explicit test is whether the evidence in question 'will assist the trier of fact. . . .'"¹³⁹ The military courts adopted the position that MRE 702 effectively superseded *Frye*.¹⁴⁰

Those courts and commentators in the relevancy camp believe that the admissibility of scientific evidence is to be determined like that of all other expert evidence. If the proffered evidence is relevant, reliable, helpful to the factfinder, and not overly prejudicial, the evidence is admissible. These are the requirements of FREs 401-403 and 702.

The United States Court of Appeals for the Third Circuit (Third Circuit) championed the relevancy test in *United States v. Downing*.¹⁴¹ In *Downing*, the Third Circuit expressly rejected *Frye*, adopting instead a

¹³³ Pub. L. No. 93-595, 88 Stat. 1926-48 (1975).

¹³⁴ FED. R. EVID. 702. "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." Military Rule of Evidence 702 is identical. MANUAL FOR COURTS-MARTIAL, United States, MIL. R. EVID. 702 (1984) [hereinafter MCM].

¹³⁵ FED. R. EVID. 702 analysis.

¹³⁶ See, e.g., J. WEINSTEIN & M. BERGER, WEINSTEIN'S EVIDENCE 702-16 (omission of mention of *Frye* was "tantamount to an abandonment of the general acceptance standard.").

¹³⁷ Schmitt & Crocker, *supra* note 90, at 231.

¹³⁸ It is not clear whether Rules 702 and 703 are intended to codify something like the *Frye* test or whether they establish a less demanding standard for scientific evidence. . . . It would be odd if the Advisory Committee and the Congress intended to overrule the vast majority of cases excluding such evidence as lie detectors without explicitly stating so.

STEPHEN A. SALTZBURG & KENNETH R. REDDEN, FEDERAL RULES OF EVIDENCE MANUAL 633 (4th ed. 1986).

¹³⁹ MCM, *supra* note 134, MIL. R. EVID. 702 analysis.

¹⁴⁰ See *infra* text accompanying notes 168-70.

¹⁴¹ 753 F.2d 1224 (3d Cir. 1985).

general relevancy test. The court concluded that the "Federal Rules of Evidence neither incorporate nor repudiate"¹⁴² *Frye*. Instead, "a particular degree of acceptance . . . within the scientific community is neither a necessary nor a sufficient condition for admissibility; it is, however, one factor that a . . . court normally should consider . . ."¹⁴³

Downing defined "novel scientific evidence" as "evidence whose scientific fundamentals are not suitable candidates for judicial notice . . ."¹⁴⁴ For this evidence, the court must inquire as to the soundness of the scientific process or technique; its possibility of overwhelming, confusing, or misleading the jury; and its connection to the particular disputed issue on which it is offered.¹⁴⁵ According to the Third Circuit, once "a technique has found favor with a significant number of other courts, a . . . court may exercise its discretion to admit the evidence through judicial notice."¹⁴⁶

Where the technique has not been the subject of extensive litigation, the Third Circuit suggested examining several factors enumerated by Judge Weinstein and Professor Berger. These factors include the "novelty" of the technique, the existence of a body of specialized literature, the nonjudicial uses of the technique, the frequency and types of errors, and the credentials of the expert witnesses.¹⁴⁷ The court then must balance the degree of assistance the evidence will offer against the dangers of confusing or misleading the factfinder. Finally, the court must ensure the probative value of the evidence is not substantially outweighed by prejudice to the accused.¹⁴⁸

Under *Downing*, the trial court properly assumes the role of deciding on the admissibility of scientific evidence rather than the scientists in the field.¹⁴⁹ The court hears evidence (usually on a motion *in limine*) and decides the question of admissibility based on a preponderance of the evidence under FRE 104(a). Although the Third Circuit denied it, *Downing* essentially defined FRE 702 as requiring helpfulness, which it

¹⁴² *Id.* at 1235.

¹⁴³ *Id.* at 1237.

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.* at 1241.

¹⁴⁷ *Id.* at 1239 (citing WEINSTEIN & BERGER, *supra* note 136, at 702-19 nn.10, 11).

¹⁴⁸ "[E]ven if the proffered evidence satisfies Rule 702, the . . . court may nonetheless invoke Rule 403 to exclude the evidence if the court finds its probative value to be substantially outweighed by other dangers, e.g., confusion of the issue or waste of time." *Id.* at 1242-43.

¹⁴⁹ *Id.* at 1240 n.21. See also *United States v. Gipson*, 24 M.J. 246, 251 (C.M.A. 1987) ("Ordinarily . . . the answer must lie in the judge's own experience, his general knowledge, and his understanding of human conduct and motivation." In other words, the judge has considerable room to exercise judgment.") (citation omitted).

defined as a combination of FREs 401-403.¹⁵⁰ This is the identical procedure used for all types of evidence.

3. *The Military Experience*—The military courts, like most federal courts, initially adopted the *Frye* test as the controlling standard of admissibility for novel scientific evidence.¹⁵¹ *Frye* remained as the standard for over thirty years. However, most of the military courts of review expressed some concern or discontent with this standard.

The Navy-Marine Corps Court of Military Review (NMCMR) first mentioned MRE 702 as a different standard from *Frye* in *United States v. Jefferson*.¹⁵² The NMCMR took note that MRE 702 was a lesser standard than *Frye*. However, the NMCMR did not have to apply the new standard because it found that the challenged evidence was generally accepted by the relevant scientific community.¹⁵³

The Army Court of Military Review (ACMR) was the next to comment on the issue in *United States v. Bothwell*.¹⁵⁴ *Bothwell* involved the admissibility of psychological stress evaluation (PSE) evidence, by which changes in a person's voice modulation were said to indicate deception. The ACMR apparently was applying a precursor of the relevancy test, although it stated that *Frye* was the controlling standard and had been so for almost thirty years. The ACMR stated that evidence must be relevant to be admissible, and "relevance is, in part, a function of the reliability of the underlying technique."¹⁵⁵ This was a departure from the strict "general acceptance" test of *Frye*. The ACMR noted that PSE's reliability was in question because it was still in the "experimental" rather than "demonstrable" stage.¹⁵⁶ The ACMR stated that the trial court's refusal to admit the PSE evidence was error, but held the error to be harmless.¹⁵⁷

The United States Court of Military Appeals (COMA) also departed from *Frye* in *United States v. Mustafa*.¹⁵⁸ In *Mustafa*, the COMA considered the admissibility of blood-spatter analysis evidence. The COMA found that "[t]here is a body of specialized knowledge which would permit a

¹⁵⁰ *Downing* retreated from this slightly by defining "helpfulness" as requiring scientific reliability "beyond that required to meet a standard of bare logical relevance." *Downing*, 753 F.2d at 1235.

¹⁵¹ *United States v. Ford*, 16 C.M.R. 185, 187 (C.M.A. 1954).

¹⁵² 17 M.J. 728 (N.M.C.M.R. 1983).

¹⁵³ *Id.* at 731.

¹⁵⁴ 17 M.J. 684 (A.C.M.R. 1983).

¹⁵⁵ *Id.* at 686.

¹⁵⁶ *Id.* at 688.

¹⁵⁷ *Id.* at 687-88.

¹⁵⁸ 22 M.J. 165 (C.M.A.), cert. denied, 479 U.S. 953 (1986). Interestingly, *Mustafa* could have resolved the issue seven years before *Daubert*, as Justices White and Brennan would have granted *certiorari* to resolve the issue of whether the Military Rules of Evidence and *Federal Rules of Evidence* superseded *Frye*. *Mustafa*, 479 U.S. at 953.

properly trained person to draw conclusions as to the source of the blood,"¹⁵⁹ eliminating the need to determine whether this evidence was or was not generally accepted (as the defense objection claimed). The COMA stated that "[t]o be admitted, expert testimony need only be helpful, i.e., relevant."¹⁶⁰ The COMA did not require general acceptance of this admittedly novel technique.¹⁶¹ In light of the debate in the federal courts regarding *Frye*/FRE 702, the COMA's emphasis on "helpful" and "relevant" was a strong step towards abandoning *Frye*.

The Army and Air Force Courts of Military Review were the next to signal the impending demise of *Frye* in the military. In *United States v. Carter*, the ACMR stated as follows:

The test for admissibility under MRE 702 is whether the expert's testimony is helpful to the trier of fact. There is no requirement that the expert's testimony is absolutely necessary or that the testimony be based on scientific principles that are generally accepted in the scientific community. We have some doubts, therefore, of the continued applicability of the *Frye* test as concerns this issue.¹⁶²

In *United States v. Gillette*,¹⁶³ the AFCMR considered the issue of "faceprint" evidence (similar to fingerprints). The AFCMR held that a witness would be able to testify about a "faceprint" found on a plastic bag because his "specialized knowledge in criminal investigation techniques would be of assistance to the factfinders."¹⁶⁴ Interestingly, the AFCMR did not "decide if a 'faceprint' has sufficient scientific acceptance to be admissible in the same manner as finger and palm prints or as handwriting or voice analysis which are admitted as conclusive proof of identity."¹⁶⁵ The AFCMR departed from *Frye*, apparently on the basis that, since a "faceprint" would not provide conclusive evidence, it need not meet the requirement of general acceptance. It apparently read MRE 702 as applying to less than conclusive evidence, while the *Frye* standard was reserved for what the courts considered "conclusive evidence."

¹⁵⁹ *Id.* at 168.

¹⁶⁰ *Id.*

¹⁶¹ In *Mustafa*, the court was not faced with a typical "duel of experts" regarding the evidence. The witness, a CID agent, had no degrees in the field and had not written any papers, but had merely undergone a five-day training course and participated in other unspecified training. The court could have held that, although the science itself was generally accepted, the witness was not qualified. However, under the liberal construction of MRE 702, the court upheld the trial judge's finding that the witness was competent and allowed the evidence. *Id.* at 167-68.

¹⁶² 22 M.J. 771, 774 (A.C.M.R. 1986), *aff'd*, 26 M.J. 428 (C.M.A. 1988) (citations omitted).

¹⁶³ 22 M.J. 840 (A.F.C.M.R. 1986), *aff'd*, 25 M.J. 243 (C.M.A. 1987), *cert. denied*, 484 U.S. 1011 (1988).

¹⁶⁴ *Id.* at 842.

¹⁶⁵ *Id.*

The COMA resolved the issue a year later in *United States v. Gipson*.¹⁶⁶ In *Gipson*, the COMA addressed the question of admissibility of polygraph evidence. Both the prosecution and defense wished to introduce the results of polygraph tests. The trial judge denied the defense (and the prosecution) the opportunity to lay a foundation of general acceptance of polygraphy under *Frye*. The judge excluded both sides' proffered evidence, citing a lack of general acceptance and concern that polygraphic evidence may deprive the factfinder of its duty of determining witness credibility.¹⁶⁷

The COMA essentially adopted *Downing* for the military, citing the case no less than nine times and quoting from extensively.¹⁶⁸ The COMA looked to previous cases in which it had interpreted the MREs as relaxing the standard of admissibility of expert testimony in general and found the rejection of *Frye* to be "in line with that policy."¹⁶⁹ The COMA found that MREs 401-403 and 702 are the applicable standard for admissibility of expert testimony regarding scientific evidence that a court could not take judicial notice of and that the military rules creating this standard were properly within the authority of the President to promulgate.¹⁷⁰

Like the Third Circuit in *Downing*, the COMA did not dispense entirely with *Frye's* requirement for general acceptance. The COMA held that general acceptance is but one of the indicia of scientific reliability of the proffered evidence required under MRE 702, rather than making such acceptance dispositive. The COMA stated that the absence of general acceptance may be outweighed by other factors (similar to those in *Downing*).¹⁷¹

4. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*—The United States Supreme Court finally resolved the split among the various circuit courts (and the military) in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*¹⁷² The parents of Jason Daubert and Eric Schuller sued Merrell Dow, alleging that Bendectin, a drug made by the defendant, caused the children's birth defects. At trial, Merrell Dow introduced an affidavit from an expert who had reviewed more than thirty published studies of the drug and found no evidence linking Bendectin to birth defects. He concluded that the drug posed no risk to fetuses. Plaintiffs countered with testimony from other experts who had recalculated data from the same

¹⁶⁶ 24 M.J. 246 (C.M.A. 1967).

¹⁶⁷ *Id.* at 247.

¹⁶⁸ *E.g.*, *id.* at 249-52.

¹⁶⁹ *Id.* at 251 (citing *United States v. Mustafa*, 22 M.J. 165, 167-68 (C.M.A.), cert. denied, 479 U.S. 953 (1986); *United States v. Snipes*, 18 M.J. 172, 178 (C.M.A. 1984)).

¹⁷⁰ *Id.*

¹⁷¹ *Id.* at 252 (citing the factors enumerated in *United States v. Downing*, 753 F.2d 1224, 1238-39 (3d Cir. 1985)).

¹⁷² 113 S. Ct. 2786 (1992) *aff'd on remand*, 1995 U.S. App. LEXIS 12 (9th Cir. 1995).

studies as Merrell Dow's expert and claimed a causal link between Bendectin and the childrens' deformities. The trial court termed the plaintiffs' studies unpublished and nonpeer-reviewed recalculations of previously published and reviewed studies, held them inadmissible under *Frye*, and granted summary judgment for Merrell Dow.¹⁷³ The United States Court of Appeals for the Ninth Circuit (Ninth Circuit) affirmed.¹⁷⁴ The Supreme Court granted *certiorari* with the express purpose of resolving whether *Frye* or the FREs controlled admissibility of scientific evidence.¹⁷⁵

The Court noted that the FREs were legislatively created and thus interpreted them as it would a normal statute. First, the Court found no requirement for general acceptance in the plain language of FRE 702. Neither did the legislative history mention *Frye* or its standard. Instead, the history of the FREs evinced a "liberal thrust" and a "general approach of relaxing the traditional barriers to 'opinion' standard."¹⁷⁶ Thus, the Court held that the general acceptance standard was "austere" and "absent from and incompatible with the Federal Rules of Evidence."¹⁷⁷

The Court reiterated that the trial judge has a "gate-keeping" function, by which he is to ensure that evidence admitted under FRE 702 has a basis in science.¹⁷⁸ Before admitting proffered scientific expert testimony, the court must find that the testimony constitutes scientific knowledge that will assist the trier of fact to understand or determine a fact in issue. This finding is a preliminary question to be resolved pursuant to FRE 104(a).¹⁷⁹

The Court stressed that the evidence be scientifically sound: "In order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation. . . . In short, the requirement that an expert's testimony pertain to 'scientific knowledge' establishes a standard of evidentiary reliability."¹⁸⁰ The Court explained that its use of the

¹⁷³ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 727 F. Supp. 570, 575 (S.D. Cal. 1989).

¹⁷⁴ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 951 F.2d 1128 (9th Cir. 1991).

¹⁷⁵ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 320 (1992).

¹⁷⁶ *Daubert*, 113 S. Ct. at 2794 (quoting *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 169 (1988)).

¹⁷⁷ *Id.*

¹⁷⁸ *Id.* at 2795 n.7.

¹⁷⁹ FED. R. EVID. 104(a) states: "Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court. . . ." Under FRE 104(a), the rules of evidence are not applicable except with respect to privileges. The proponent of the evidence has the burden of establishing its admissibility by a preponderance of the evidence. See *Bourjaily v. United States*, 483 U.S. 171, 175-76 (1987).

¹⁸⁰ *Daubert*, 113 S. Ct. at 2795.

term "reliability" encompassed both validity of the principle and reliability of its results.¹⁸¹

The Court also listed the factors to be considered in determining whether the evidence was sufficiently grounded in science.¹⁸² Trial judges should look to whether the principle can be tested and the results replicated. Additionally, peer review and publication are important considerations, as are the error rates of the procedure. Finally, general acceptance is important, although this determination does not require identification of a particular scientific community.¹⁸³ Most importantly, the Court noted that "[t]he focus, of course, must be solely on principles and methodology, not on the conclusions that they generate."¹⁸⁴

The Court concluded by reminding trial judges that they must balance the scientific evidence against the danger of misleading the jury, unfair prejudice, or confusing the issues. The judge must perform the FRE 403 balancing test, just as is necessary for nonexpert testimony. However, because "[e]xpert evidence can be both powerful and quite misleading . . . the judge exercises more control over experts than over lay witnesses."¹⁸⁵

Thus, the Court held that scientific evidence is no different from any other under the FREs. So long as an examination of the technique reveals a reliable basis in science and the witness meets the minimum qualifications as an expert, the witness may testify if the testimony would be helpful and relevant to a contested issue and is not misleading, overly confusing, or substantially more prejudicial than probative. This is the standard that must be applied in federal cases regarding DNA, at least until DNA evidence is judicially noticed.¹⁸⁶ If the NRC Committee's recommendations (discussed *infra*) are followed, trial courts may and should take judicial notice of all of the DNA evidence except the statistical evidence.

B. DNA's Acceptance in the Courts

DNA has fared well under all of the standards (*Frye*, *Downing*, and

¹⁸¹ *Id.* at 2795 n.9.

¹⁸² *Id.* at 2796-97.

¹⁸³ *Id.* Because the Court's list is not exclusive, presumably the *Downing* factors of the witness's credentials, the technique's novelty, and the technique's nonjudicial uses are also valid criteria.

¹⁸⁴ *Id.* at 2797.

¹⁸⁵ *Id.* at 2798 (quoting *Weinstein, Rule 702 of the Federal Rules of Evidence is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 632 (1991)).

¹⁸⁶ This rule also will apply in courts-martial. It is important to note that, to date, two circuit courts have judicially noted the RFLP technique: the United States Court of Appeals for the Second Circuit (Second Circuit), in *United States v. Jakobetz*, 955 F.2d 786, 799-800 (2d Cir.), cert. denied, 113 S. Ct. 104 (1992) (before *Daubert*); and the United States Court of Appeals for the Eighth Circuit (Eighth Circuit), in *United States v. Martinez*, 3 F.3d 1191, 1197 (8th Cir. 1993) (after *Daubert*).

their hybrids). As of March 2, 1992, DNA evidence has been collected in over 14,700 criminal investigations and admitted in over 610 criminal trials, while being rejected in only twelve cases.¹⁸⁷ Since then, the great majority of federal and state decisions have admitted the evidence.¹⁸⁸ DNA has not yet played a significant factor in courts-martial.¹⁸⁹

Where courts have excluded the evidence, more often than not it is the statistical probability of a random match between the DNA of the defendant and the evidentiary sample that has caused the court's concern.¹⁹⁰ Although statistical evidence regarding the frequency of genetic characteristics in connection with serological tests generally faces little opposition,¹⁹¹ the DNA statistical evidence has been excluded on numerous bases. Some states have statutes that discourage or prohibit the introduction of all statistical evidence.¹⁹² Other courts found that, although the theoretical basis for DNA was generally accepted, the method by

¹⁸⁷ John T. Sylvester, *Recent Developments in DNA Admissibility*, in PROC. THIRD INT'L SYMP. ON HUMAN IDENTIFICATION 61, 67 (1992).

¹⁸⁸ *Martinez*, 3 F.3d at 1196. Since mid-1992, Arizona (State v. Bible, 858 P.2d 1162 (Ariz. 1993)); Arkansas (Swanson v. State, 823 S.W.2d 812 (Ark. 1992)); Colorado (People v. Lindsey, 1993 WL 2650 (Colo. Ct. App. 1993)); Hawaii (State v. Montalbo, 825 P.2d 1274 (Haw. 1992)); Illinois (People v. Mehlberg, 618 N.E.2d 1168 (Ill. App. Ct. 1993)); Kentucky (Harris v. Commonwealth, 846 S.W.2d 678 (Ky. 1993)); Louisiana (State v. Quatrevingt, 617 So. 2d 484 (La. Ct. App. 1992)); Maryland (Jackson v. State, 608 A.2d 782 (Md. Ct. Spec. App.), cert. denied, 614 A.2d 84 (Md. 1992)); Michigan (People v. Adams, 489 N.W.2d 192 (Mich. Ct. App. 1992)); Oregon (State v. Futch, 860 P.2d 264 (Or. 1993)); Tennessee (State v. Harris, 1992 WL 127441 (Tenn. Crim. App. 1992)); Texas (Kelly v. State, 824 S.W.2d 568 (Tex. Crim. App. 1992)); Washington (State v. Kalakosky, 852 P.2d 1064 (Wash. 1993)); and Wyoming (Springfield v. State, 860 P.2d 435 (Wyo. 1993)) have all upheld admission of DNA evidence.

¹⁸⁹ The prosecution intended on offering DNA evidence in United States v. Scott, 24 M.J. 186 (C.M.A. 1987). The COMA remanded the case as the result of a claim of ineffective assistance of counsel. The prosecution sent samples of vaginal swabbings to Cellmark Laboratories for testing, but the tests were inconclusive due to the age of the samples. Cetus Corporation then tested the samples using PCR. Initial results indicated that DNA from semen in the swabbings was consistent with that of the accused, but the accused was acquitted prior to further testing. Long, *The DNA "Fingerprint": A Guide to Admissibility*, ARMY LAW., Oct. 1988, at 36, 44. In United States v. Lake, CM 8800570 (A.C.M.R. 1989), the defense stipulated to DNA evidence from Cellmark. Thus, the issue was not appealed. Long, *supra*, at 44. DNA also was admitted in United States v. Johnson, 1993 CMR LEXIS 313 (A.F.C.M.R.), United States v. Hayes, 37 M.J. 769 (A.C.M.R. 1993), and United States v. Zaccheus, 31 M.J. 766 (A.C.M.R. 1990), but was not an issue on appeal in any of these cases. DNA was used to prove paternity in United States v. Williams, 1989 CMR LEXIS 727 (A.F.C.M.R.), and likewise was not an issue on appeal. Only one case involving DNA has reached the COMA. However, in United States v. Youngberg, No. 94-0237/AR, no statistical evidence was offered. Telephone interview with Major Michael Egan, Defense Appellate Division, United States Army Legal Services Agency (Feb. 9, 1995).

¹⁹⁰ See, e.g., State v. Alt, 504 N.W.2d 38 (Minn. 1993) (modified statistics admissible); United States v. Porter, 618 A.2d 629 (D.C. 1992) (remand to trial court to determine admissibility of modified statistics under *Frye*); State v. Vandebogart, 616 A.2d 483 (N.H. 1992) (statistical evidence not admissible under *Frye*); Caldwell v. State, 393 S.E.2d 436 (Ga. 1990) (modified statistics admissible).

¹⁹¹ E.g., Commonwealth v. Gomes, 526 N.E.2d 1270 (Mass. 1988).

¹⁹² State v. Jobe, 486 N.W.2d 407 (Minn. 1992) (rejected statistics based on prior, non-DNA precedent holding statistical evidence too prejudicial to be admissible).

which the statistics were calculated was not.¹⁹³ One court excluded the statistics because of due process concerns.¹⁹⁴ Of those courts that excluded the statistical evidence, many held that evidence of a DNA match was irrelevant or overly prejudicial without some method of informing the jury what a match meant.¹⁹⁵

IV. The Controversy

Until 1989 to 1990, DNA evidence generally was noncontroversial. Although novel—and thus subjected to the evidentiary tests described above—an overwhelming majority of the courts found DNA evidence to be generally accepted. Some early attacks occurred regarding the possibility of band shifting, lack of national standards, differing criteria for declaring a match, and questionable laboratory techniques (use of ethidium bromide gels, loading mass, etc.), but these attacks generally were short lived and unsuccessful.¹⁹⁶ It was not until *United States v. Yee*¹⁹⁷ that DNA was assailed in force.

A. *The Case of United States v. Yee*

In *Yee*, three members of the Hell's Angels motorcycle gang executed an individual in Ohio, mistaking him for a member of a rival gang whom the three believed responsible for shooting their fellow gang member. John Bonds, Mark Verdi, and Wayne Yee were charged with the shooting. At trial, the government offered evidence that DNA found in blood on the seat of Yee's car matched Bonds's DNA. The defendants objected, and a federal magistrate held a six-week *Frye* hearing in which twelve expert witnesses testified and over 200 exhibits were introduced regarding DNA RFLP analysis.¹⁹⁸

At the conclusion of the hearing, the magistrate found¹⁹⁹ that the pertinent scientific community contained molecular biologists and population geneticists.²⁰⁰ The magistrate rejected the defense's contention that

¹⁹³ See *State v. Cauthron*, 846 P.2d 502 (Wash. 1993).

¹⁹⁴ *Nelson v. State*, 628 A.2d 62 (Del. 1993) (statistics excluded because indigent defendant had no expert to counter the evidence at trial).

¹⁹⁵ See *Commonwealth v. Curmin*, 565 N.E.2d 440, 443 (Mass. 1991) (DNA match inadmissible "without telling the jury anything about the likelihood of that match occurring.").

¹⁹⁶ FORENSIC DNA ANALYSIS, *supra* note 53, at 21 ("With few exceptions, critics cite concerns about only one issue that goes to the underlying science of DNA testing . . .").

¹⁹⁷ 134 F.R.D. 161 (N.D. Ohio 1991), *aff'd sub nom.* *United States v. Bonds*, 12 F.3d 540 (6th Cir. 1993).

¹⁹⁸ *Yee*, 134 F.R.D. at 164; *Bonds*, 12 F.3d at 551.

¹⁹⁹ The district court adopted the magistrate's findings.

²⁰⁰ *Yee*, 134 F.R.D. at 164-65.

a consensus was required, and listed several factors that could aid the factfinder in determining general acceptance. The magistrate stated:

In summary, I have not encountered, and the parties have not cited, a case applying the *Frye* standard rejecting the admissibility of evidence where a set of experts, such as in this case, have testified that the procedure was generally accepted. Where such experts have testified, the evidence has been admitted despite firmly held countervailing views of the opponent's experts.²⁰¹

The magistrate found that the relevant scientific community had generally accepted the RFLP technique; thus, the DNA evidence, including the statistical probability of a match occurring at random, was admissible. The defendants subsequently were convicted, and their convictions upheld on appeal.

The magistrate heard from various defense witnesses challenging all aspects of the FBI's laboratory protocol, including the use of ethidium bromide in the electrophoresis gel, the possibility of bacterial contamination, and the amount of restriction endonuclease. The prosecution witnesses testified that the protocol was proper and provided correct conservative results. The magistrate also considered the Congressional Office of Technology Assessment's Report, which stated that forensic DNA testing was "reliable and valid." The report also found that "[q]uestions about the validity of DNA typing—either the knowledge base supporting technologies that detect genetic differences or the underlying principles of applying the techniques *per se*—are red herrings that do the courts and the public a disservice."²⁰² The magistrate found these challenges insufficient to require exclusion of the evidence.

At the magistrate's hearing, the prosecution called four witnesses relative to the issue of population genetics and statistical evidence: Dr. Patrick Conneally of the Indiana University School of Medicine, Dr. Stephen P. Daiger of the University of Texas Health Science Center, Dr. C. Thomas Caskey of the Baylor College of Medicine, and Dr. Kenneth K. Kidd of Yale University School of Medicine. The defense called Dr. Richard C. Lewontin of Harvard University, and Dr. Daniel L. Hartl of the Washington University School of Medicine. The court called Dr. Eric S. Lander of the Massachusetts Institute of Technology. These witnesses' testimony and reports prepared by Dr. Lewontin and Dr. Hartl²⁰³ formed

²⁰¹ *Id.* at 165.

²⁰² GENETIC WITNESS, *supra* note 1, at 8.

²⁰³ Richard C. Lewontin, *Population Genetic Problems in the Forensic Use of DNA Profiles* (1990) [hereinafter Lewontin, *Yes Report*]; Daniel L. Hartl, *Expert Report* (1990) [hereinafter Hartl, *Yes Report*]. Both of these reports are nonpeer reviewed and were not presented to the government until the day the author testified. Brief of Amicus Curiae in Support of Respondent, *People v. Britton*, No. A058925 (Cal. Ct. App. 1993). However, the

the basis of the defense attack on DNA in *Yee* and have been submitted to and relied on in almost every case that has excluded DNA evidence since *Yee*.²⁰¹

B. The Problem: Population Subgrouping

Dr. Lewontin and Dr. Hartl testified (and their reports echoed their testimony) that the statistical evidence of the probability that Bond's DNA and the DNA found in the blood in the back seat of *Yee's* car matched randomly should not be admitted into evidence because they claimed that the method by which the probability was calculated had not been generally accepted by the relevant scientific community.²⁰² The FBI calculated the probability as one in 35,000.²⁰³

Dr. Lewontin testified that he believed that, because the frequency of blood types varies among European nationalities, there may be a similar variation in the genes analyzed by RFLP analysis in Americans who, according to Dr. Lewontin, are generally descended from "relatively recent[ly] arriv[ed]" immigrants. He believed that this variation has not been sufficiently diluted because of a "lack of interethnic group mating."²⁰⁷ Dr. Lander and Dr. Hartl agreed with Dr. Lewontin.

Population subgrouping would be a problem in DNA analysis because the probabilities calculated from a general database could be based on underrepresented or overrepresented subgroups. If, for example, a database was composed of Caucasians in general, but the database had an overrepresentation of "Reds" (a fictional subgrouping of individuals who have red hair), the probability calculated using that database of an individual selected at random having the gene that causes red hair would be greater than the actual probability of the population as a whole. On the other hand, if "Reds" were absent from the database but present in the population, the probability calculated from the database would be smaller than the actual probability from the population.

This is the crux of the DNA opponents' argument. They believe that:

reports are now peer reviewed. Dr. Bruce Budowle and John Stafford have written and published responses critical of the reports. Bruce Budowle & John Stafford, *Response to Expert Report by D.L. Hartl, Submitted in the Case of United States v. Yee*, 18 CRIME LABORATORY DIG. 101 (1991); Bruce Budowle & John Stafford, *Response to "Population Genetic Problems in the Forensic Use of DNA Profiles" by R.C. Lewontin, Submitted in the Case of United States v. Yee*, 18 CRIME LABORATORY DIG. 109 (1991).

²⁰¹ See *People v. Pizarro*, 12 Cal. Rptr. 2d 436 (Cal. App. 1992); *State v. Despain*, No. 15589 (Ariz. Cir. Ct. 1991); *United States v. Porter*, 618 A.2d 629 (D.C. 1992).

²⁰² *Yee*, 134 F.R.D. at 181-82.

²⁰³ Interestingly, at trial an FBI serologist testified *without objection* that the probability of someone randomly matching the blood using standard ABO blood analysis and the *product rule using general population databases* was less than one in 100. Brief for Appellee at 40, *United States v. Bonds*, 12 F.3d 540 (6th Cir. 1993).

²⁰⁷ *Yee*, 134 F.R.D. at 181.

(1) it is possible that population subgrouping exists within the databases used by DNA laboratories; (2) this population subgrouping causes some subgroups to be either overrepresented or underrepresented in the databases; (3) that because of this, any probability of a random match occurring calculated by use of the databases would be skewed; (4) the degree of effect (if any) of population substructure on the statistics cannot be determined;²⁰⁸ and (5) there is no conservative step or method that could compensate for the effects of population subgrouping.²⁰⁹

Although the magistrate ruled against the defense experts in *Yee* and allowed the DNA statistics into evidence, Dr. Lewontin, Dr. Hartl, and Dr. Lander continued to testify and author reports, letters, and articles which suggested that the statistical evidence was not grounded in science.²¹⁰ Using this theory, the defense was successful in excluding the DNA statistics in several cases.²¹¹ Because of these results and the claim by the defense that the statistics were not generally accepted under *Frye*, the National Academy of Science's (NAS) National Research Council (NRC) undertook a study of the science surrounding DNA evidence in general and the statistics involved in DNA identification.²¹²

C. The National Research Council

The NRC is an agency of the NAS, "a private, non-profit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare." Congress granted the NAS a charter mandating it to "advise the federal government on scientific and

²⁰⁸ "One cannot compensate for a bias without knowing how large it is." Lander, *supra* note 55, at 821. Interestingly, Lewontin and Hartl state that the probabilities calculated using the product rule can be off by as much as two or more orders of magnitude (or a power of 100). Richard Lewontin & Daniel Hartl, *Population Genetics in Forensic DNA Typing*, 254 *SCIENCE* 1745, 1749 (1991). How they arrived at this figure is confusing, however, because they state in the same article that "the magnitude and direction of the error depends upon the particular VNTR locus, the bands observed, and the reference database." *Id.* at 1746. From what, then, is the probability off by a power of 100? Because the authors never examined the VNTR data made available to them, how did they determine the "accurate" number? Brief of Amicus Curiae, *People v. Britton*, No. A058925 (Cal. Ct. App. 1993).

²⁰⁹ *Yee*, 134 F.R.D. at 182-83. However, both Dr. Lewontin and Dr. Hartl have now accepted use of some form of the product rule as proper and scientifically accepted. Krane et al., *Genetic Differences at Four DNA Typing Loci in Finnish, Italian, and Mixed Caucasian Populations*, in 89 *PROC. NAT'L ACAD. SCI. U.S.A.* 10,583 (Nov. 1992)(Hartl); Daniel L. Hartl & Richard C. Lewontin, *Letter to the Editor*, 260 *SCIENCE* 473-74 (1993).

²¹⁰ See Lewontin & Hartl, *supra* note 208.

²¹¹ *E.g.*, *Commonwealth v. Curmin*, 565 N.E.2d 440 (Mass. 1991) (court found, based on testimony by a defense expert, that, due in part to the possibility of population subgrouping, the method of calculating the statistical probability of a random match between the defendant's DNA and the DNA of a semen stain found at the crime scene was not generally accepted.).

²¹² Kreiling, *supra* note 28, at 450.

technical matters.²¹³ On requests by the FBI, lawyers, and scientists, the NRC began in January, 1990 a study of the forensic aspects of DNA technology. The FBI and the National Institute of Justice, among others, funded this study.

The NRC established a committee to conduct the study, composed of individuals with diverse backgrounds, including, among others, two of the witnesses in *Yee*, Dr. Eric S. Lander²¹⁴ and Dr. C. Thomas Caskey.²¹⁵ The Committee met several times over a two-year period, and heard testimony from various individuals in April 1990. The Committee issued its report on April 14, 1992.²¹⁶

1. *The NRC Report*—The NRC report generally validated the utility and reliability of DNA evidence. The report's major conclusion "confirm[ed] the general reliability of using DNA typing evidence in criminal cases." The report stated that "DNA samples are capable of providing 'strong evidence' for pointing to the perpetrator of a crime or clearing an innocent suspect."²¹⁷ The report recommended that courts confronted with DNA evidence judicially notice the underlying theory of identification by DNA RFLP analysis.²¹⁸ The report recommended that courts constrain their inquiries under both *Frye* and *Daubert* to whether the laboratory procedure in the instant case was proper and whether the statistics offered were "appropriately conservative."²¹⁹

However, the major impact of the report involves the use of DNA statistical evidence. The Committee devoted an entire chapter to the statistical basis of DNA analysis.²²⁰ Its underlying assumptions and recommendations regarding the use and validity of statistical evidence form the basis of the controversy surrounding the NRC's report.

²¹³ NRC REPORT, *supra* note 25, at vi.

²¹⁴ Although the magistrate in *Yee* accepted Dr. Lander as an expert (the only areas of expertise the magistrate found relevant were molecular biology and population genetics, see *Yee*, 134 F.R.D. at 164-65), Lander's training is *not* in population genetics, but rather in mathematics. NRC REPORT, *supra* note 25, at 175. Indeed, the Committee has come under fire for its composition from Dr. Neil Risch ("The major problem is that there was no population geneticist on that panel."). Dr. Victor McKusick, Committee Chairman, admits that "[w]e probably could have done with more representation in that respect." Peter Aldhous, *Geneticists Attack NRC Report as Scientifically Flawed*, 259 SCIENCE 755 (1993).

²¹⁵ Dr. Caskey resigned from the Committee on December 21, 1991, prior to the adoption of any conclusions and the publication of its report. NRC REPORT, *supra* note 25, at iii.

²¹⁶ The report was to be issued at a later date. However, *The New York Times* obtained a prepublication copy of the report and printed an article about the report on April 14, 1992. *The New York Times* article (which was reprinted in the *Baltimore Sun*), misstated the major conclusions of the report, forcing the NRC to schedule an impromptu briefing that morning. Dr. McKusick, Dr. Haig Kazazian, and Paul Ferrara and Dr. Eric Lander (by telephone) spoke at this briefing. *Id.* at x.

²¹⁷ National Research Council, National Academy of Sciences, Press Release (Apr. 14, 1992).

²¹⁸ NRC REPORT, *supra* note 25, at 133.

²¹⁹ *Id.* at 134.

²²⁰ *Id.* ch. 3 (entitled, *DNA Typing: Statistical Basis for Interpretation*).

2. *Chapter Three of the NRC Report*—In Chapter Three, the NRC first states that “say[ing] that two patterns match, without providing any scientifically valid estimate (or, at least, an upper bound) of the frequency with which such matches might occur by chance, is meaningless.”²²¹ This statement appears, at first glance, to make sense; however, a closer examination reveals that it does not. Clearly, that the suspect has a characteristic which matches that of the perpetrator is both legally and logically relevant to the issue of identity unless the characteristic is universal. Because, in our judicial system, the suspect is presumed innocent on a plea of not guilty, it is relevant and helpful to the factfinder to know that the accused shares a common trait with the perpetrator. The weight of the match depends on its rarity.

However, the report is most controversial in its discussion of the problem of population substructure. The Committee first notes the existence of what it determines to be “[s]ubstantial controversy concerning the methods of estimating the population frequencies of specific DNA typing patterns.” The NRC cites to works by Dr. Lewontin, Dr. Lander, and Dr. Hartl and responses to them, the nonpeer reviewed invited editorial of Dr. Lander, responses to it, and the Lewontin/Hartl and Chakraborty/Kidd articles in *Science*.²²² The report also states that this controversy goes not to the weight of the evidence, but rather to its admissibility because it calls into question the scientific validity of the particular method used.

This paragraph of the report is extremely important. By describing the efforts of Lander, Lewontin, and Hartl as a “substantial controversy,” the NRC rejected the characterization of their efforts by the judiciary (as in *Yee*) and, in jurisdictions governed by *Frye*, foreclosed the admissibility of the statistical evidence by ensuring that general acceptance cannot be found.²²³ Interestingly, *Science* magazine, in which two of the major articles appeared,²²⁴ introduced the articles as “Richard Lewontin and Dan Hartl hav[ing] taken on the forensic science establishment.”²²⁵ The magazine also noted that its editor found errors in the papers’ data and conclusions.²²⁶

²²¹ *Id.* at 74.

²²² *Id.* This is essentially the same “substantial” controversy referred to in most cases rejecting DNA statistical evidence.

²²³ This has proven to be true. See, e.g., *United States v. Porter*, 618 A.2d 629 (D.C. 1992); *People v. Barney*, 10 Cal. Rptr. 2d 731 (1992).

²²⁴ Lewontin & Hartl, *supra* note 208; Ranajit Chakraborty & Kenneth Kidd, *The Utility of DNA Typing in Forensic Work*, 254 *SCIENCE* 1735 (1991).

²²⁵ Leslie Roberts, *Was SCIENCE Fair to its Authors?*, 254 *SCIENCE* 1722 (1991).

²²⁶ When *Science* editor Dan Koshland reviewed the article, he found that the data did not support the authors’ conclusions. He telephoned Dr. Lewontin to ask him to revise the paper. Lewontin’s response was that “if there was any attempt to hold up the paper or withdraw it, it would be met with the biggest stink he had ever heard.” *Id.*

The report echoes its theme a few pages later.²²⁷ The report's discussion of population substructure recites the same articles and letters by Lewontin, Hartl, and Lander as "considerable debate" about the possibility of significant substructure. The report then repeats their criticisms in detail, while affording only a sentence to the views of the DNA supporters.²²⁸

The NRC report stated that:

[r]ecent empirical studies concerning VNTR loci detected *no deviation from independence within or across loci*. Moreover, pairwise comparisons of all five-locus DNA profiles in the FBI database showed no exact matches; the closest match was a single three-locus match among 7.6 million pairwise comparisons. These studies are interpreted as indicating that multiplication of gene frequencies across loci does not lead to major inaccuracies in the calculation of genotype frequency—at least not for the specific polymorphic loci examined.²²⁹

These statements clearly refute the position of Lewontin, Lander, and Hartl. The NRC failed to cite a single study showing no independence of VNTRs within or across loci; rather, it cited studies that show the alleles are independent. The Committee actually stated that "no evidence of population substructure is demonstrable with the markers tested so far."²³⁰ This independence validates the use of the product rule in calculating the possibility of a random DNA match.

Amazingly, the NRC chose to reject this information and rely on an outdated and incorrect study by Dr. Lewontin.²³¹ The Committee *assumed* the existence of population substructure and developed a recommended method to account for any effect it may have in calculating probability estimates. This is the aspect of the NRC report which has had the greatest impact on admissibility of DNA statistical evidence.

The Committee in its report, stated that it "has chosen to *assume for the sake of discussion* that population subculture may exist."²³² The Committee rationalizes first that it is possible and appropriate to use conservative numbers because, according to the Committee, "the statistical power lost this way can often be recovered through typing of additional loci."²³³ This excuse is circular; the Committee wants to lessen the

²²⁷ NRC REPORT, *supra* note 25, at 79.

²²⁸ *Id.* at 80.

²²⁹ *Id.* (emphasis added).

²³⁰ *Id.* at 13-14.

²³¹ Richard C. Lewontin, *The Apportionment of Human Diversity*, 6 EVOLUTIONARY BIOLOGY 381-98 (1972) [hereinafter *Apportionment*].

²³² NRC REPORT, *supra* note 25, at 80.

²³³ *Id.*

numbers arrived at by the use of DNA analysis, but can correct this by using additional probes, whose statistical power must *also* be diluted. Additionally, this recommendation fails to address the issue of an evidentiary sample that, due to degradation or sample size, will not respond to four or more probes.²³⁴

Rather than arrive at the correct number, the number calculated by this means will actually be further reduced for each additional probe used. However, the number will approach the maximum with which the Committee can be comfortable. Left unanswered by the report is the final number of probes required before this limit is reached.

The report also states that its recommendations are based on the necessity of applying to present and future forms of DNA analysis and different loci. The Committee again mentions that, for loci currently tested, empirical studies show independence between and across loci.²³⁵ However, the Committee's concern over possible future methodologies and its determination to address an issue not properly before it was unnecessary. Moreover, its unstated assumption that future loci used may not be independent is unsupported. Regardless, the suggested solution should be reserved for any future loci that demonstrate population substructure, not for those loci used and for which there is no evidence of population substructure.²³⁶

The report states that the only way to determine the effect, if any, of population substructuring is to measure it empirically (evidently discounting the studies that the report itself references earlier). The NRC claims that population subgrouping cannot be readily detected by conventional means or theoretical considerations.²³⁷ The Committee uses an admittedly extreme and hypothetical example to show that the ability of the test for Hardy-Weinberg equilibrium is relatively weak in detecting substructure.²³⁸ Nor can the differences between racial groups be used as an upper bound for the allele frequencies because, according to a study by Dr. Lewontin in 1972, "the genetic diversity between subgroups within races is greater than the genetic variation between races."²³⁹

Unlike Dr. Lander and Dr. Lewontin, the NRC believes that it "is feasible and important to estimate the degree of variability among populations to evaluate the impact of population substructure on genotype frequencies estimated with the multiplication rule."²⁴⁰ The report recom-

²³⁴ Budowle Interview, *supra* note 54.

²³⁵ NRC REPORT, *supra* note 25, at 81-82.

²³⁶ *Id.* at 13-14.

²³⁷ *Id.* at 81.

²³⁸ *Id.*

²³⁹ *Id.* at 82 (citing *Apportionment*, *supra* note 231). Lewontin repeated this contention in Lewontin & Hartl, *supra* note 208, at 1747.

²⁴⁰ NRC REPORT, *supra* note 25, at 90.

mends direct sampling of allele frequencies in multiple ethnic subgroups.²⁴¹ This sampling, according to the Committee, is the only way to detect population subgrouping.

However, the Committee fails, however, to define which subgroups to sample or how these subgroups are to be defined (other than by stating, "e.g., ethnic subgroups"²⁴² and "genetically relatively homogeneous").²⁴³ Ultimately, the Committee chose to leave the "selection, collection, and analysis of such samples [to be] overseen by" yet another committee which the NRC recommends be created.²⁴⁴

Interestingly, the NRC recommends that some of the sample populations include "English, Germans, Italians, Russians, Navahos, Puerto Ricans, Chinese, Japanese, Vietnamese, and West Africans."²⁴⁵ The Committee did not state how it determined that these groups are representative of population groups in the United States. Additionally, no evidence exists that these groups are homogenous and are not comprised of subgroups.

After collection, the samples will be measured to determine the frequency for each allele found. The Committee believes that 200 alleles (two from each of 100 individuals drawn at random from the population) is a sufficiently large database to determine whether some allelic frequencies are significantly greater than in the general population.²⁴⁶ If such a significant deviation is found, it becomes the "ceiling" frequency for that allele for all defendants. If the examiners find no significant deviation, the greater of the largest frequency found or five percent becomes the "ceiling" frequency.²⁴⁷

²⁴¹ *Id.* at 81.

²⁴² *Id.* at 82.

²⁴³ *Id.* at 90.

²⁴⁴ *Id.*

²⁴⁵ *Id.* at 84.

²⁴⁶ *Id.* Others—such as the American Association of Blood Banks—take the position that 200 individuals are required to generate a valid statistical analysis of the group's frequencies. Note, *DNA Fingerprinting and the Need for a National Data Base*, 17 *FORENSIC URB* L.J. 323, 331, 349 (1989). Furthermore, Dr. Devlin and Dr. Risch use data from studies by Dr. Lewontin and Dr. Hartl to demonstrate that the "sample sizes [suggested by the NRC] are inadequate for population genetic inference from VNTRS. . . ." B. Devlin & Neil Risch, *NRC Report on DNA Typing*, 260 *SCIENCE* 1057, 1058 (1993). They term the sample size "[t]he critical flaw in the study design. . . ." B. Devlin et al., *Statistical Evaluation of DNA Fingerprinting: A Critique of the NRC's Report*, 259 *SCIENCE* 748, 749 (1993) (emphasis added).

²⁴⁷ NRC REPORT, *supra* note 25, at 83. The NRC actually recommends either a flat percentage or the 95% upper confidence limit for the allele frequency. The 95% upper confidence limit is calculated by the formula:

$$p + 1.96\sqrt{p(1-p)/n}$$

where p is the allele frequency and N is the number of samples in the database. This article will use the term "allele frequency" to represent the greater of the actual allele frequency or the 95% upper confidence limit when discussing the "ceiling principle."

The Committee selected five percent because it felt that "allele frequency estimates that were substantially lower would not provide sufficiently reliable predictors for other, unsampled subgroups."²⁴⁸ The Committee believed that "[e]ven if one sees allele frequencies of one percent in several ethnic populations, it is not safe to conclude that the frequency might not be five-fold higher in some subgroups."²⁴⁹ Again, the Committee provides no data, other than its own policy statement, to support this assumption.

The report recommends two methods of presenting to the court the probability of a match between the suspect's DNA and the sample DNA occurring at random: direct sampling of a database and a method it terms the "ceiling principle."²⁵⁰ The "ceiling principle" is nothing more than the product method using the "ceiling" frequencies calculated above.²⁵¹ However, until the collection and analysis of population subgroups recommended occurs, the Committee recommends using a modification of the "ceiling principle."²⁵²

Direct sampling occurs when the testing laboratory examines its database to determine whether or not any samples within the database match the multilocus genotype of the suspect/evidentiary sample. The jury would be told that the sample did not match any of the samples in the database.²⁵³ The jury also would be told the number of samples contained in the database, denoting its rarity.²⁵⁴

However, with few databases consisting of over 1000 samples,²⁵⁵ this method would provide a maximum rarity of 1/1000.

Stated another way, "it is 99% likely that the true frequency is less than one in 218."²⁵⁶ This figure is deceptively misleading when one realizes that "if everyone in the world had the same two parents, who were heterozygous for different alleles at four independent loci, the frequency

²⁴⁸ *Id.* at 84.

²⁴⁹ *Id.*

²⁵⁰ This is clearly the influence of Dr. Lander and Dr. Lewontin, who recommended the use of a "ceiling principle." These "ceilings" would be the highest frequency observed within the subpopulation databases of the relevant major racial groups similar to that collected by the Centre d'Etude du Polymorphisme Humain (to which the NRC cites (*see* NRC REPORT, *supra* note 25, at 91)). The product rule then could be used to calculate a maximum probability, that would be valid even if the defendant's own ethnic composition is not represented in the databases. Eric S. Lander, *Letter to the Editor*, AM. J. HUM. GENETICS 899, 902 (1991); *see also* Lewontin & Hartl, *supra* note 208, at 1749.

²⁵¹ NRC REPORT, *supra* note 25, at 82.

²⁵² *Id.* at 91.

²⁵³ *Id.*

²⁵⁴ *Id.*

²⁵⁵ *See supra* text accompanying notes 65-70.

²⁵⁶ Bruce S. Weir, *Population Genetics in the Forensic DNA Debate*, in PROC. NAT'L ACAD. SCI. U.S. 11,654, 11,655 (1992).

of any particular four-locus profile would be one in 256."²⁵⁷ The Committee admits that "such estimates do not take advantage of the full potential of the genetic approach."²⁵⁸

Even using the NRC's modified ceiling principle, the maximum rarity would be one in 6.25 million.²⁵⁹ If population substructure did exist within the database and did cause an effect on the frequencies of the individual loci, then the database would not be truly representative of the relevant population and thus may result in the same problems that Dr. Lander and Dr. Lewontin claim the product rule causes. Thus, the direct sampling method adds minimum evidence to the question of identity.

The expert then should inform the jury of the probability of someone else randomly matching the suspect's DNA and the evidentiary DNA sample calculated via a form of the "ceiling principle." While sampling fifteen to twenty genetically relatively homogeneous populations, the expert should calculate the probability using the "modified ceiling principle."²⁶⁰ The "ceiling principle" is the recommended method to use after completion of the above studies, provided no evidence of any significant population subgrouping appears.²⁶¹

At this point, a discussion of the term "ceiling principle" is necessary. "Ceiling" is an improper description of the method, as it implies a maximum value or limitation. The method actually requires use of a *minimum* value (the greater of the frequency calculated empirically or five percent).

The word "principle" has a specific meaning in science. A "principle" is a "a rule or law concerning the functioning of natural phenomena or mechanical processes."²⁶² Because no scientific basis exists for replacing the empirically-derived frequency with either five or ten percent, the NRC's recommended method hardly qualifies as a principle.²⁶³

The "ceiling principle" is designed to correct for the assumed existence (and substantial effect, which also must be assumed) of population substructure. The NRC was concerned not only with population substructure in existing databases but also that the particular suspect may belong to a population not covered by these databases.²⁶⁴ Consequently,

²⁵⁷ *Id.* The chance of any one allele occurring would be $\frac{1}{16}$. The probability for eight such loci would be $\frac{1}{256}$, or 1 in 256.

²⁵⁸ NRC REPORT, *supra* note 25, at 76.

²⁵⁹ Sylvester, *supra* note 187, at 69.

²⁶⁰ NRC REPORT, *supra* note 25, at 91-92.

²⁶¹ *Id.* at 92.

²⁶² THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (3d ed. 1992).

²⁶³ "Floor Approach" is a more accurate description. *Floor Approach*, *supra* note 85, at 398.

²⁶⁴ NRC REPORT, *supra* note 25, at 92.

the Committee recommends essentially the creation of a "super frequency," which is the greatest frequency with which the particular allele appears across *all* populations and subgroups. The end result may be that, for loci one through eight, the greatest frequency may appear in the English, German, Western African, Navajo, Chinese, Puerto Rican, Italian, and Japanese populations, respectively.²⁶⁵ The "ceiling principle" uses these frequencies, rather than the frequencies from any single population. Should any of them be less than five percent, the figure of five percent is substituted for the actual figure.

Finally, until the studies of these "relatively homogeneous" populations are complete, the "ceiling principle" is modified to raise the threshold frequency from a minimum of five percent to a minimum of ten percent.²⁶⁶ Ten percent is, according to the Committee, a "pragmatic approach to recognize the uncertainties in current population sampling."²⁶⁷ This figure is "designed to address a remaining concern that populations might be substructured in unknown ways with unknown effect and reflects the greater uncertainty in using allele frequency estimates as predictors for unsampled subpopulations."²⁶⁸ The product rule is applied to the frequencies determined empirically from the existing databases for Blacks, Caucasians, and Hispanics, substituting ten percent for those individual frequencies found to be less than ten percent. This calculation gives the resulting frequency to be reported to the court.

3. *The Remainder of the NRC Report*—Chapter Six, entitled "Use of DNA Information in the Legal Systems," discusses the *Frye* standard for admissibility²⁶⁹ and lists assumptions whose validity is questioned when the evidence is offered:

- (1) [E]xcept for identical twins, each person's DNA is unique;
- (2) the technique used allows one to determine whether two DNA samples show the same patterns at particular loci;
- (3) the statistical methods used and the available population databanks allow one to assess the probability that two DNA samples from different persons would by chance have the same patterns at the loci studied; and
- (4) the laboratory's procedures and analyses in the case in question were performed in accordance with accepted standards and provide reliable estimates of the probability of a match.²⁷⁰

²⁶⁵ These are the NRC's recommended populations. See *supra* note 245.

²⁶⁶ NRC REPORT, *supra* note 25, at 92.

²⁶⁷ *Id.*

²⁶⁸ *Id.*

²⁶⁹ See *supra* notes 98-132 and accompanying text.

²⁷⁰ NRC REPORT, *supra* note 25, at 133.

The Committee notes that the first assumption is so firmly established in human genetics that courts may judicially notice it.²⁷¹ The Committee makes the same recommendation regarding Restriction Fragment Length Polymorphism analysis using the Southern Blotting Procedure.²⁷² The third assumption also is reliable enough to allow the analysis into evidence so long as it is "appropriately conservative."²⁷³ The Committee stresses that the solution is "not to bar DNA evidence, but to ensure" that only conservative figures are used.²⁷⁴ The fourth assumption is a case-by-case issue.²⁷⁵

The remainder of Chapter Six is a recitation of court decisions, both federal and state, that have addressed the admissibility of DNA evidence.²⁷⁶ There is a discussion of the growing trend among states to legislate the admission of DNA evidence, effectively removing the question from the courts.²⁷⁷ The rest of the NRC Report concerns itself with: a discussion of standards for laboratories conducting DNA analysis;²⁷⁸ DNA databanks and privacy interests;²⁷⁹ and the social, economic, and moral/ethical implications of DNA.²⁸⁰

V. The "Science" Underlying the "Ceiling Principle"

The NRC issued its report in an attempt to resolve the apparent controversy over the scientific reliability of the DNA evidence (primarily statistical evidence) offered in courts by both the prosecution and the defense.²⁸¹ However, the report has accomplished just the opposite; there is now more of a controversy over the report and its significance than there was over the evidence.²⁸² As the United States Court of Appeals for the Sixth Circuit (Sixth Circuit) stated in *Bonds*, "[t]here is no dispute that the NRC Report exists, but there is considerable dispute over the significance of its contents."²⁸³

²⁷¹ *Id.*

²⁷² *Id.* at 133-34.

²⁷³ *Id.* at 134.

²⁷⁴ *Id.*

²⁷⁵ *Id.*

²⁷⁶ *Id.* at 135-41.

²⁷⁷ *Id.* at 141-42.

²⁷⁸ *Id.*, ch. 4.

²⁷⁹ *Id.*, ch. 5.

²⁸⁰ *Id.*, ch. 7.

²⁸¹ Dr. Victor A. McKusick, Statement at the National Research Council Press Conference (Apr. 14, 1992) (copy on file with author).

²⁸² "It 'appears that the level of debate has only increased as a result of the NRC Report.'" Thompson, *supra* note 87, at 64 (citing Laurence Mueller, *The Use of DNA Typing in Forensic Science*, in ACCOUNTABILITY RESEARCH 2 (1993)).

²⁸³ *United States v. Bonds*, 12 F.3d 540, 553 (6th Cir. 1993).

This controversy has caused some courts to exclude all DNA evidence.²⁵⁴ Eric Fisher, director of the NRC's board on biology in Washington, D.C., stated, "Clearly there is continuing controversy in the area, in fact, a growing controversy." However, Fisher indicated that the NRC never intended for its report to become the backdrop to a court opinion ruling DNA inadmissible. Fisher stated that, "I think you could safely say that what happened in [*People v. Barney*] was not an intended effect because the Committee very pointedly said that DNA was an important forensic tool and should continue to be used."²⁵⁵

No one seriously argues with the proposition that some degree of population substructure is present in humans.²⁵⁶ All human population categories are composed of subgroups; there are no truly homogeneous populations. However, merely because some population substructure is present does not mean that it has such an effect as to alter the forensic reliability of DNA frequency statistical evidence.

The "ceiling principle," clearly the most controversial part of the NRC Report,²⁵⁷ was designed to correct for the assumed presence and effects of population substructure in determining the statistical probability that the match between the suspect's DNA and the evidentiary DNA occurred at random. Once calculated, this probability should then be introduced into evidence to demonstrate that, due to rarity of the DNA pattern, it is likely that the accused left the evidentiary sample.²⁵⁸ This calculation²⁵⁹ is to be offered as scientific evidence under FRE 702.

²⁵⁴ *Commonwealth v. Daggett*, 622 N.E.2d 272 (Mass. 1993); *People v. Barney*, 10 Cal. Rptr. 2d 731 (Ct. App. 1992). In *Daggett*, the prosecution offered no numerical data; instead, Cellmark's expert testified only that a match was "highly unlikely." The Massachusetts Supreme Court not only would have excluded statistical evidence, but found admission of the nonnumerical testimony error because of controversy over population substructure. *Daggett*, 622 N.E.2d at 275.

²⁵⁵ Richard Barbieri, *Jury Still Out on DNA Evidence; Scientists' Ongoing Debate Over Genetic Evidence Has Left Courts at Odds on its Admissibility*, RECORDER, Nov. 29, 1993, at 1.

²⁵⁶ "It is universally accepted that substructure exists within major population groups." Bruce Budowle & Keith L. Monson, *The Forensic Significance of Various Reference Population Databases for Estimating the Rarity of Variable Number of Tandem Repeat (VNTR) Loci Profiles*, in *DNA FINGERPRINTING: STATE OF THE SCIENCE* 177, 178 (S.D.J. Pena et al., eds. 1993).

²⁵⁷ See Aldhous, *supra* note 214, at 755.

²⁵⁸ DNA thus far has almost always been corroborative of evidence of blood type, eyewitness identification, or other evidence on the issue of identity. For example, in *People v. Barney*, 10 Cal. Rptr. 2d 731 (Ct. App. 1992), the victim found the defendant's wallet that he had left at the scene, which contained a photograph and the defendant's name. In *People v. Howard*, 10 Cal. Rptr. 2d 731 (Ct. App. 1992), the companion case to *Barney*, the defendant's blood type was extremely rare, found in only 1.2 of 1000 Blacks and nonexistent in Caucasians. Rockne P. Harmon, *Legal Criticisms of DNA Typing: Where's the Beef?*, 84 J. CRIM. L. 176, 178 (1993) [hereinafter *Where's the Beef?*]. In *United States v. Brooks*, No. 92-112-COL(JRE) (M.D. Ga. 1992), *aff'd*, 12 F. 3d 219 (11th Cir. 1993), the defendant's blood type was found in only 7 out of 1000 Blacks.

²⁵⁹ Another problem with the "ceiling principle" is that it fails to specify any one calculation. The Committee was unclear on which populations would be sampled, whether the calculation eliminated the need for binning, and whether the "ceiling principle" calculation

A. The Committee's Justification

The problem with the "ceiling principle" is that there is no scientific basis underlying it. The NRC Report offered only an *assumption* both that population substructure exists *and*, albeit implicitly,²⁹⁰ that its effect is so substantial as to render the use of the product rule unscientific and unworthy of admission into evidence. The Committee made this assumption in the face of strong evidence to the contrary.²⁹¹

To qualify as scientific evidence, the proffered information must have a basis in science.²⁹² "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry."²⁹³ The Supreme Court called the ability to reproduce the results of the experimentation as "a key question" in determining admissibility of scientific evidence in federal courts.²⁹⁴

The Committee generated a hypothesis when it assumed that population substructure does have significant effects on use of the product rule in forensic DNA analysis. However, the Committee failed to test its hypothesis prior to adoption and publication of its "ceiling principle." While calling for someone²⁹⁵ to sample fifteen to twenty allegedly genetically homogeneous populations, the Committee could not cite a single study in support of its assumption. Instead, the Committee cited only the work of Dr. Bruce Weir, Dr. Neil Risch, and Dr. Bernard Devlin disproving the assumption.²⁹⁶ This procedure is not in accordance with accepted scientific method.

would complement or replace calculations derived from the modified product rule currently in use. Kreiling, *supra* note 28, at 481-82; see also Thompson, *supra* note 87, at 80-81. This uncertainty has dramatic results. In *State v. Anderson*, 853 P.2d 135 (N.M. Ct. App.), cert. granted, 848 P.2d 531 (N.M. 1993), the FBI, using the "ceiling principle," found the probability of a random match to range from one in 1.26 million (using floating bins and four probes) to one in 877 (using fixed bins and three probes). Dr. Laurence Mueller, a defense expert, found the probability to be one in eighty-four. Thompson, *supra* note 87, at 81 n.275.

²⁹⁰ The Committee only assumed that population substructure existed, not that it had any effect on the statistics. NRC REPORT, *supra* note 25, at 80 ("Although mindful of the controversy, the committee has chosen to assume for the sake of discussion that population substructure may exist and provide a method for estimating population frequencies in a matter that adequately accounts for it.")

²⁹¹ *Id.*

²⁹² *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786, 2796 (1993), *aff'd on remand*, 43 F.3d 1311 (9th Cir. 1995); see also MOENSSENS, *supra* note 91, at 7-8.

²⁹³ *Daubert*, 113 S. Ct. at 2796.

²⁹⁴ *Id.*

²⁹⁵ The Committee wanted an organization—to be called the National Committee on Forensic DNA Typing—created to oversee this analysis. NRC REPORT, *supra* note 25, at 90. No such committee presently exists, nor are there plans to create it. Weir, *supra* note 256, at 11,657.

²⁹⁶ NRC REPORT, *supra* note 25, at 80 (citing Bruce Weir, *Independence of VNTR Alleles Defined as Fixed Bins*, 130 GENETICS 873 (1992)); Risch & Devlin, *supra* note 71, at 717.

The only support given by the Committee for its assumption is a paper written by Dr. Richard Lewontin over twenty years ago.²⁹⁷ Dr. Lewontin stated that "[c]ontrary to common belief based on difference in skin color and hair form, studies have shown that the genetic diversity between subgroups within races is greater than the genetic variation between races."²⁹⁸ The weight of the evidence gathered since Lewontin's report was published argues against Lewontin's (and the Committee's) assertion regarding differences in genetic diversity between and among races.²⁹⁹ Lewontin himself has abandoned that position since the publication of the NRC Report. He and Dr. Hartl now "reiterate the conclusion that there is *approximately as much* genetic variation among ethnic groups within major races as there is among the races."³⁰⁰

This "controversy" about population substructure actually is "qualitatively the same issue that has confronted the forensic serologist for years."³⁰¹ Yet courts have routinely accepted testimony regarding probability estimates of protein combinations in serology using databases drawn only on racial lines (like the DNA databases).³⁰² Dr. Hartl admit-

²⁹⁷ NRC REPORT, *supra* note 25, at 82 (citing *Apportionment*, *supra* note 231, at 381).

²⁹⁸ *Id.* Lewontin claims that variation between individuals within populations is responsible for 85.4% of the genetic variation, with 8.3% attributable to variations between populations and 6.3% attributable to variations between ethnic groups. B. Devlin & Neil Risch, *Ethnic Differentiation at VNTR Loci, with Special Reference to Forensic Applications*, 51 AM. J. HUM. GENETICS 534, 546 (1992) [hereinafter *Ethnic Differentiation*].

²⁹⁹ Aldhous, *supra* note 214, at 755. Using the restriction enzyme Hae III, Devlin and Risch analyzed the data and determined that, if the Hispanic group was broken up into South-eastern and Southwestern databases, as most forensic laboratories do, there is very little variation between populations—2.6% for locus D17S79 and 2.9% for D2S44, calling Lewontin's conclusions into question. *Ethnic Differentiation*, *supra* note 298, at 546.

³⁰⁰ Lewontin & Hartl, *supra* note 208, at 474 (emphasis added). Interestingly, a close examination of what they actually say is revealing. Lewontin stated in *Yee* that "there is one-third more genetic variation on the average for these . . . genes among [ethnic groups within races] than there is on the average between [races]." Lewontin, *Yee* Report, *supra* note 203. Lewontin and Hartl restated this observation in their *Science* article. Lewontin & Hartl, *supra* note 208, at 1747. When confronted with the volume of data demonstrating more variation between major population groups than among subgroups, Hartl and Lewontin calculated the ratio to be one-third more racial than ethnic, *the opposite direction* from their previous pronouncements. Bruce Budowle & Keith L. Monson, *A Perspective on the Polemic on DNA Statistical Inferences in Forensics* 8-9, Publication No. 93-13, Laboratory Division, FBI (1993). For them, the same degree of variation that, in 1990 was strong evidence for concern, is in 1993 reduced to "approximately as much" when it failed to support their argument. Daniel L. Hartl & Richard C. Lewontin, *Response to Devlin et al.*, 260 SCIENCE 473 (1993). Dr. Roychoudhury and Dr. Nei analyzed population data from industrialized societies (Lewontin's study consisted of small, isolated populations not representative of the United States), and found that differences among races were twenty times as great as differences among ethnic groups. Budowle & Monson, *A Perspective on the Polemic on DNA Statistical Inferences in Forensics*, *supra* at 9.

³⁰¹ Appellee's Brief at 45, *United States v. Bonds*, 12 F.3d 540 (6th Cir. 1993).

³⁰² *Id.* Indeed, in *Commonwealth v. Gomes*, 526 N.E.2d 1270 (Mass. 1990), one defense expert testified that

gene frequencies may vary among locations and ethnic or racial groups . . . [S]imply multiplying the gene frequencies failed to take into account certain variable factors, such as the possibility that some traits *may not be indepen-*

ted in *Yee* that the issues were the same, but, in his opinion, the quantitative difference in estimates justify differential treatment in court.³⁰³ The Supreme Court holds otherwise: "[D]ifferences among experts [that are] quantitative, not qualitative . . . go to the weight of the evidence and not the admissibility of such testimony. . . ."³⁰⁴

B. The Subsequent Research

Scientific research published subsequent to the NRC Report continues to disprove the Committee's assumption.³⁰⁵ Dr. Ranajit Chakraborty conducted a study in which he determined that the DNA databases do not show evidence of significant population substructuring.³⁰⁶ Many defense experts assert that the presence of a large number of homozygotic samples within forensic databases is caused by population structure.³⁰⁷ Dr. Chakraborty's study reveals that the number of apparent homozygotes is too great to be caused by population substructure and explains that they are the result of imperfections in the RFLP methodology.³⁰⁸ He also demonstrated that, should such substructure be present within the American population, the RFLP procedures currently used by the commercial and FBI forensic laboratories already have conservative measures built in to negate any possible effect from population substructure.³⁰⁹

Dr. George Herrin reexamined in 1993 the study conducted by Drs. Devlin and Rich which the Committee cited in its report. Dr. Herrin's study confirmed that multilocus matches in forensic databases were extremely rare.³¹⁰ More importantly, he showed that "the frequency of such

dently inherited, possible differences in gene frequencies due to differing socioeconomic status, and the lack of genetic purity in American racial groups.

Id. at 1280 (emphasis added). The court admitted the evidence

³⁰³ Appellee's Brief at 45, *Bonds*, 12 F.3d at 540 (citing Record at 259-61 in *United States v. Yee*, 134 F.R.D. 161 (N.D. Ohio 1991)).

³⁰⁴ *Barefoot v. Estelle*, 463 U.S. 680, 902 (1983).

³⁰⁵ Bruce Budowle et al., *The Assessment of Frequency Estimates of Hae III-Generated VNTR Profiles in Various Reference Data-bases*, J. FORENSIC SCI. 15 (1994). See also John Brookfield, *Law and Probabilities*, 355 NATURE 207 (1992). No peer reviewed articles—since publication of the NRC Report—demonstrate any significant effect of population substructure on the statistical calculations. Brief of Amicus Curiae in Support of Respondent at 54, *People v. Britton*, No. A058925 (Cal. Ct. App. 1993).

³⁰⁶ Ranajit Chakraborty et al., *Effects of Population Subdivision and Allele Frequency Differences on Interpretation of DNA Typing Data for Human Identification*, in PROC. 1992 INT'L SYMP. ON HUM. IDENTIFICATION 205 (1992).

³⁰⁷ *Id.* at 209.

³⁰⁸ *Id.* at 209-10.

³⁰⁹ These measures include the use of bins, taking the larger frequency of the two bins when a sample falls on the border of two bins, collapsing fixed bins so that each bin contains at least five alleles, and the use of the value $2p$ rather than p^2 in the product rule. *Id.* at 210.

³¹⁰ George Herrin, *Probability of Matching RFLP Patterns from Unrelated Individuals*, 52 AM. J. HUM. GENETICS 491 (1993). Herrin's study used databases from eight different laboratories in the Southeastern United States.

matches does not significantly exceed the number that would be expected if the alleles are statistically independent. . . .³¹¹ This last result is an important indicator of the absence of substructure among the databases.

Finally, the FBI undertook a study of several population groups worldwide³¹² and recently published a four-volume set of reference data.³¹³ This data does not support the Committee's assumption of significant population substructure. The study concluded instead that "[b]ased on the data contained in this compendium, differences in allele frequencies at a particular locus do *not* have forensically significant effects on VNTR profile frequency estimates when subgroup reference databases from within a major population group are compared."³¹⁴ The United States District Court for the Virgin Islands recently relied on this report in admitting DNA statistics into evidence.³¹⁵

C. The "Ceiling Principle" At Work

Applying the "ceiling principle" to a hypothetical case illustrates the lack of scientific basis. Assume that a rape occurred in an average American large town or city (population 100,000 to 250,000). The suspect, a resident of the town, is Caucasian. Under the "ceiling principle," the eight alleles of the suspect's DNA pattern are found most often in the reference databases as follows:

Locus 1: Eskimo - 4.6%	Locus 2: Japanese - 11.2%
Locus 3: Oglala Sioux - 13.8%	Locus 4: !Kung Bushmen - 7%
Locus 5: Puerto Rican - 9.7%	Locus 6: Korean - 12.8%
Locus 7: Italian - 12.2%	Locus 8: Maori - 15.5%

According to the "ceiling principle," these are the allelic frequencies to be multiplied, even though the suspect belongs to none of the reference databases.³¹⁶ Moreover, those frequencies less than ten per-

³¹¹ Thompson, *supra* note 87, at 75-76.

³¹² The data is not new; rather, it is a collection of data already available to geneticists, the Committee, and Dr. Lander, Dr. Hartl, and Dr. Lewontin. Every former member of the Committee received a copy. Letter from Rockne P. Harmon, Senior Deputy District Attorney, Alameda County, California District Attorney's Office, to the Honorable Justices of the California Court of Appeal, First Appellate District, Division Three 6-7 (Apr. 9, 1993) [hereinafter Harmon Letter]. The data was compiled by February, 1992, two months prior to the release of the NRC Report. However, the NRC failed to consider the data in its recommendations. Budowle Interview, *supra* note 54.

³¹³ FEDERAL BUREAU OF INVESTIGATION, VNTR POPULATION DATA: A WORLDWIDE STUDY 1993 [hereinafter FBI WORLDWIDE STUDY].

³¹⁴ *Id.* at 6. Even "[u]sing a Norwegian database in place of, for example, a Spanish database will not likely result in forensically significant differences in the estimates of DNA profile frequencies." *Id.* This study effectively strips the NRC's "ceiling principle" of whatever scientific basis—if any—it had.

³¹⁵ Virgin Islands v. Penn, 838 F. Supp. 1054, 1070-73 (D.V.I. 1993).

³¹⁶ "The ceiling principle yields the same frequency for a genotype, regardless of the suspect's ethnic background, because the reported frequency represents a maximum for any possible ethnic heritage. Accordingly, the ethnic background of an individual suspect

cent (Eskimo, Kung Bushmen, and Puerto Rican) must be replaced by ten percent prior to multiplication.³¹⁷ Science provides no basis for using allele frequencies within databases of individuals whose connection to the crime scene is nonexistent.

Additionally, science strives to progress and learn more through the scientific method. However, regardless of the outcome of the search for the effect of population substructure, the science of forensic DNA analysis will be "frozen" at the minimum levels established by the NRC.³¹⁸ Should some small population be found with extremely high frequencies for particular alleles, those frequencies will become the minimum used in the "ceiling principle" regardless of the isolation or minimal size of that population.³¹⁹ This "freezing" is contrary to scientific principles.³²⁰

D. The Scientists Speak

Perhaps the lack of scientific basis behind the "ceiling principle" is best stated by the scientists themselves. The major complaint of the "critics from all perspectives is that the ceiling principle is not a principle of science."³²¹ Professor Elizabeth Thompson, at the University of Washington, Chair of Department of Statistics, described the "ceiling principle" as a "data-driven, interest-ridden, voodoo, pseudo-statistical, *ad hoc* methodology to which no statistician (or scientist) should be a party."³²² Dr. Richard Lewontin has also stated that "[i]n my view, the 'modified ceiling principle' has *no rational basis* and has been chosen by *entirely arbitrary means*."³²³ Lewontin also has added, "It's just totally irrational [the way that the Committee selected ten percent] out of the air [as the minimum frequency used in the] 'modified ceiling principle'".³²⁴

Population geneticist Newton Morton believes that the Committee "ignore[s] any attempt to describe the substructuring and tr[ies] to alter the gene frequencies in a way that many of us regard as illogical."³²⁵ He

should be ignored in estimating the likelihood of a random match." NRC REPORT, *supra* note 25, at 85 (emphasis added).

³¹⁷ *Id.* at 92.

³¹⁸ For example, for a particular allele, the minimum frequency used will be either five or ten percent, depending on whether the modified or unmodified "ceiling principle" is used. Or, if a population is found which has a greater frequency, that frequency will become the minimum used. Thus, in the hypothetical discussed *supra*, the frequency used for allele 8 will always be at least 15.5%, as that is the frequency found in the Maori population.

³¹⁹ *Floor Approach*, *supra* note 55, at 399.

³²⁰ *Id.*

³²¹ Thompson, *supra* note 57, at 50.

³²² *Id.* at 88 n.272 (citing *State v. DeFroe*, No. 92-1-03699-8 (Wash. Super. Ct. 1993)).

³²³ *Id.*

³²⁴ Aldhous, *supra* note 214, at 755.

³²⁵ *Id.*

calls the result "absurdly conservative."³²⁶ A discussion at the Second International Symposium on the Forensic Aspects of DNA Analysis³²⁷—which included Dr. Oscar Zaborsky (the Committee's Study Director for the DNA Technology in Forensic Science project)—made clear that "the ceiling principle has no basis in science."³²⁸

Another Committee member, Richard Lempert, calls it a "'second best' solution;"³²⁹ one that "does not provide a good scientific estimate of the probability. . . ."³³⁰ Lempert states that the product rule's calculations are "closer by several orders of magnitude . . . than . . . the number . . . which the ceiling principle generates."³³¹ Lempert also admits that recent studies disprove the NRC's assumption of substantial population substructure, and agrees that "the concern the ceiling principle most directly addresses, the possibility that the frequency of a defendant's alleles in the defendant's ethnic group narrowly defined is substantially higher than it is in a general population data base, is most often irrelevant."

Lempert admits that the "ceiling principle" is based in great part on a "value" judgment of the Committee members that probabilities offered should be conservative. Lempert indicates that there is "no scientific basis for this value. . . ."³³² "Science alone," Lempert states, "cannot provide a yardstick with which to measure the Committee's recommendations."³³³ Finally, Dr. Neil Risch summed up the feeling of most of the scientific community: "If I were asked if there is any scientific justification to the ceiling principle, I'd have to say no."³³⁴

Throughout the debate, the scientific underpinnings of DNA statistical evidence have rarely been in serious dispute. Instead, it is a judgment dispute, which is properly decided by courts, not scientists. As Lempert admits, the "ceiling principle" is based on values, rather than science. *Science* magazine characterized the debate as "not about right and wrong but about different standards of proof. . . ." and quoted one geneticist as saying that it is "a religious argument."³³⁵

³²⁶ Newton Morton, *Genetic Structure of Forensic Populations*, in 89 PROC. NAT'L ACAD. SCI. U.S. 2556 (1992).

³²⁷ This symposium included invitees from around the world. Approximately 300 individuals attended. The FBI—host of the symposium—sent invitations to each member of the Committee on DNA Technology in Forensic Science. Dr. Lander, Dr. Hartl, and Dr. Lewontin all declined to participate. Harmon Letter, *supra* note 312, at 6.

³²⁸ *Id.* at 7.

³²⁹ Lempert, *supra* note 6, at 51.

³³⁰ *Id.* at 45.

³³¹ *Id.*

³³² *Id.* at 47.

³³³ *Id.*

³³⁴ *Id.*

³³⁵ Roberts, *supra* note 225, at 1721.

Dr. Bruce Budowle, a leading proponent of DNA statistical evidence, and Dr. Eric Lander, a leading opponent, recently coauthored an article attempting to demonstrate that the "controversy" is "rooted in a misunderstanding of the NRC Report and is, in any case, of no practical consequence to the courts."³³⁶ In the article, the authors agree that the "ceiling principle" produces an "unabashedly conservative [result which] . . . gave the benefit of every conceivable doubt to the defendant. . . . Some of the statistical power was sacrificed to neutralize all possible worries about population substructure."³³⁷ While an admirable attempt to resolve the issue of admissibility under *Frye* of statistics calculated via the ceiling principle, this article fails to enunciate any scientific support for the assumptions on which the ceiling principle is based, and thus adds nothing to the issue of admissibility under *Daubert*.³³⁸

The final word may yet belong to the NRC. The Council has agreed to conduct another study of the issue of population substructure and the "ceiling principle."³³⁹ The study will be conducted by an "entirely new committee."³⁴⁰ However, the committee has yet to be named or completely funded, and probably will not be.³⁴¹

VI. DNA Under *Daubert*

Federal (and Military) Rules of Evidence 702 and 401-403 are the bases for admitting expert testimony on DNA as scientific evidence. These rules have displaced *Frye* as the relevant admissibility standard in federal courts (to include courts-martial). How will the NRC's recommended "ceiling principle" fare under these rules?

A. Federal Rules of Evidence 401/402—Relevance

Evidence must be relevant to a fact in issue in order to be admissible. Federal Rule of Evidence 401 defines relevancy as having "any tendency" to make the existence of a material fact more probable or less probable than it would be without the evidence."³⁴² The "ceiling prin-

³³⁶ Eric S. Lander & Bruce Budowle, *DNA Fingerprinting Dispute Laid to Rest*, 27 NATURE 735 (Oct. 27, 1994).

³³⁷ *Id.* at 736.

³³⁸ The article's discussion of the objections raised against the ceiling principle actually seems to indicate that these objections have merit. *Id.* at 737.

³³⁹ Peter J. Neufeld, *Have You No Sense of Decency?*, 84 J. CRIM. L. 189, 197 (1993).

³⁴⁰ *Id.*

³⁴¹ Budowle Interview, *supra* note 54. Apparently, the new committee was funded in spite of Dr. Budowle's belief that it would not be, as his article states that the committee has "only just begun meeting and will probably not issue a report before late 1995." Lander & Budowle, *supra* note 336, at 738.

³⁴² SALTZBURG & REDDEN, *supra* note 138, at 109.

principle" must somehow relate to a fact at issue to satisfy Rule 401's requirement. Rule 402 declares that evidence "which is not relevant is not admissible."³⁴³

Debate has occurred concerning the question to which DNA evidence relates at a trial.³⁴⁴ Critics have stated that the issue is the likelihood that someone of the same ethnicity and race as the suspect would match the sample.³⁴⁵ One court has even excluded DNA evidence entirely because the defendant "belongs to an ethnic group whose genotype frequencies may occur more frequently than the FBI's estimate."³⁴⁶

This assertion is misleading. In American criminal jurisprudence, a defendant who pleads not guilty is presumed innocent, and that presumption is valid until proven otherwise beyond a reasonable doubt.³⁴⁷ Thus, the population of *possible suspects*, not the defendant, is the relevant population. Unless some evidence defines the suspect as a member of a particular ethnic group or subpopulation, the current Black, Caucasian, and Hispanic, and Asian databases are the legally relevant databases.

The NRC Committee recognized this when it stated that "[s]ome legal commentators have pointed out that frequencies should be based on the population of possible perpetrators, rather than on the population to which a particular suspect belongs. Although this argument is formally correct, practicalities often preclude use of that approach."³⁴⁸ The

³⁴³ FED. R. EVID. 402.

³⁴⁴ See, e.g., Bruce S. Weir, *Forensic Population Genetics and the National Research Council (NRC)*, 52 AM. J. HUM. GENETICS 437 (1993) [hereinafter *Forensic Population Genetics*]; Bernard Robinson & Tony Vignaux, *Why the NRC Report on DNA is Wrong*, NEW L.J., Nov. 20, 1992, at 1619; NRC REPORT, *supra* note 25, at 85; Ian W. Evett & Bruce S. Weir, *Flawed Reasoning in Court*, 4 CHANCE: NEW DIRECTIONS FOR STAT. & COMPUTING 19 (1991).

³⁴⁵ E.g., Richard C. Lewontin, *The Dream of the Human Genome*, N.Y. REV., May 28, 1992, at 38 ("The identity of that reference group depends in complex ways on the circumstances of the case."). Dr. Hartl apparently has some difficulty focusing on the question. In *Yee*, Hartl said that the laboratory should state the likelihood of someone of the defendant's ethnic group, and not of the general population, matching the evidentiary sample. Record at 283-84, *United States v. Yee*, 134 F.R.D. 161 (N.D. Ohio 1991). In December, 1991, he and Lewontin went so far as to advocate that "each particular individual may require a different reference group . . ." Weir, *supra* note 256, at 1748. Hartl later stated, however, that "we are talking about the chance that there is *someone else in the world* who matches." Tim Beardsley, *Pointing Fingers: DNA Identification Is Coiled into Question*, SCI. AM., Mar. 1992, at 26, 27.

³⁴⁶ *State v. Passino*, No. 185-1-90 (Vt. Dist. Ct. 1991). The defendant was part Italian, part French, and part Abenaki Indian, and the FBI could not produce a comparable database. The crime occurred near a state highway in a county with some Abenaki population, and Dr. Lewontin admitted that an argument could be made that "the entire population of western Vermont and eastern New York is the appropriate reference groups." Richard C. Lewontin, *Which Population?*, 52 AM. J. HUM. GENETICS 205 (1993).

³⁴⁷ *Estelle v. Williams*, 425 U.S. 501, 503 (1976).

³⁴⁸ NRC REPORT, *supra* note 25, at 85. The point has not been confined solely to legal commentators; scientists have also raised the issue. See J. Buckleton et al., *Who is "Random Man?"* 31 J. FORENSIC SCI. SOC'Y 463 (1991); THE USE OF STATISTICS IN FORENSIC SCIENCE (C. G. Altink & D. A. Stoney, eds., 1991).

Committee failed to list these practicalities.³⁴⁹

However, "the ethnicity of the class of people who are potential contributors can rarely be defined. . . ."³⁵⁰ When some identification of the suspect is made, forensic scientists agree that "it is usually possible only to classify an individual into one of the major racial groups, at best."³⁵¹ Thus, unless there is other evidence which places the class of suspects *only* in a precise ethnic, as opposed to racial, group *and* the defendant is a part of that group, the defendant's particular ethnic background is irrelevant.³⁵²

Likewise, the probabilities calculated by the "ceiling principle" are completely irrelevant. The "ceiling principle" uses the highest frequency from among several subpopulations (and then may substitute an artificial frequency of five or ten percent).³⁵³ Thus, the "ceiling principle's" suspect may be Black for one allele, Caucasian for another, Hispanic for a third, Japanese for a fourth, and Kiowa Indian for another! These figures have *no* relevance to the issue of whether the defendant in a particular case contributed the evidentiary sample (unless the defendant is part Black, Caucasian, Hispanic, Japanese, and Kiowa Indian.) Thus, calculations using the "ceiling principle" fail to meet the requirements of Rule 401 and courts should exclude them under Rule 402.

B. Federal Rule of Evidence 702—Scientific Basis

The Supreme Court focused on the reliability of proffered scientific expertise.³⁵⁴ *Daubert* holds that a trial judge:

[f]aced with a proffer of expert scientific testimony . . . must

³⁴⁹ However, "practicalities" argue *in favor* of the current general population database approach. How is the prosecutor to learn of the defendant's particular ethnic makeup when the defendant invokes his right to silence? Where are the forensic laboratories to find individuals with "pure" ethnic backgrounds to form subpopulation databases? In the case of a murder victim's DNA analyzed from bloodstains found on the defendant's property, how is the prosecutor to determine the deceased victim's ethnic heritage? All of these practicalities favor use of the existing general databases.

³⁵⁰ *Floor Approach*, *supra* note 85, at 391.

³⁵¹ B. Devlin et al., *Technical Comments*, 253 *SCIENCE* 1039 (1991).

³⁵² Even Lewontin has concluded that

It is clear that our perception of relatively large differences between human races and subgroups, as compared to the variation within these groups, is indeed a biased perception and that, based on randomly [sic] chosen genetic differences, human races and populations are remarkably similar to each other, with the largest part by far of human variation being accounted for by the differences between individuals. Human racial classification is of no social value and is positively destructive of social and human relations. *Since such racial classification is now seen to be of virtually no genetic or taxonomic significance either, no justification can be offered for its continuance.*

Apportionment, *supra* note 231, at 397. This quote argues not only against subgroup databases, but conceivably against racial databases as well.

³⁵³ See *supra* text at notes 265-66.

³⁵⁴ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 118 S. Ct. 2786, 2795 (1998), *aff'd on remand*, 43 F.3d 1311 (9th Cir. 1995).

determine at the outset, pursuant to [FRE] 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.³⁶⁵

Contrary to some commentators' wishes,³⁶⁶ the Court did not limit the application of this preliminary assessment to evidence offered by the government. Instead, the Court's holding applies equally to evidence offered by the defense. Thus, the courts must subject the "ceiling principle" to this test.³⁶⁷

The Court stated that "in order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method."³⁶⁸ Consequently, the NRC Committee's *assumption*, contradicted by voluminous evidence,³⁶⁹ fails to qualify under the *Daubert* definition of scientific knowledge and should be excluded from evidence. However, the remainder of this section will "assume for the sake of discussion"³⁶⁰ that the "ceiling principle" is not excluded by this requirement.

C. Federal Rule of Evidence 702—Reliability

The Court cited several factors to use in determining the reliability of scientific evidence. The key question, the Court felt, was whether or not the theory or technique had been tested and was capable of replication.³⁶¹ The considerable body of research performed after publication of the NRC Report proves that the report's assumption of any significant effect of population substructure on allele frequency calculations is false.³⁶² No study to date has validated the "ceiling principle" through tests.³⁶³

³⁶⁵ *Id.* at 2796.

³⁶⁶ Professor Giannelli would set the burden of proof, that a scientific principle is valid, at a preponderance of the evidence for criminal defendants and beyond a reasonable doubt for the prosecution. Paul Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, A Half Century Later*, 80 COLUM. L. REV. 1197, 1249-50 (1980).

³⁶⁷ This is true because, in the usual scenario, the prosecution offers expert testimony of the probability of a random match calculated using the product rule. The defense, if unable to exclude all DNA statistical evidence, counters with its own calculations using the "ceiling principle." See, e.g., *United States v. Brooks*, No. 92-112-COL(JRE) (M.D. Ga. 1992), *aff'd*, 12 F. 3d 219 (11th Cir 1993).

³⁶⁸ *Daubert*, 113 S. Ct. at 2795.

³⁶⁹ See *supra* notes 305-15 and accompanying text.

³⁶⁰ The NRC Committee also made this assumption. NRC REPORT, *supra* note 25, at 80.

³⁶¹ *Daubert*, 113 S. Ct. at 2796.

³⁶² Specifically, see FBI WORLDWIDE STUDY, *supra* note 313. See also *supra* notes 305-15 and accompanying text.

³⁶³ See, e.g. Lempert, *supra* note 6, at 45-46; FBI WORLDWIDE STUDY, *supra* note 313.

The next factor cited by the Court is the degree to which the theory has been subjected to peer review and publication. "Submission to the scrutiny of the scientific community is a component of 'good science.'"³⁶⁴ Again, the peer reviewed literature strongly criticizes the "ceiling principle" for lack of scientific merit.³⁶⁵

Another consideration is the known or potential error rate and, presumably, the types of errors caused. There have been studies of the "ceiling principle" which demonstrate the possibility of error. Dr. Joel Cohen, a long-time opponent of DNA evidence, has demonstrated that the presence of linkage disequilibrium and Hardy Weinberg disequilibrium (two of the indicators of population substructure, the assumption on which the "ceiling principle" is based) can cause the "ceiling principle" to *underestimate* a profile frequency.³⁶⁶

However, Dr. Cohen actually felt that this study considered an "unrealistic theoretical population . . . with perfect linkage between loci."³⁶⁷ Accordingly, he undertook another study to determine whether the "ceiling principle" was reliable on more realistic populations. His later study found that the "ceiling principle *can* fail to be conservative for an individual genotype."³⁶⁸ Thus, the "ceiling principle" is subject to errors detrimental to the defendant, and these errors argue against its reliability under *Daubert*.

Finally, the Court looks to the general acceptance of the technique or theory. As the controversy which sparked the NRC's report demonstrates, there is a large body of scientists who deny that population substructuring has a significant effect on allele frequencies. Greater controversy over the NRC Committee's assumption has resulted since the NRC's report was published.³⁶⁹ Clearly, the hoped-for general acceptance of the "ceiling principle"³⁷⁰ has not materialized.

D. Rule 403—Prejudicial, Misleading, Confusing, and Cumulative Evidence

Rule 403 is designed to exclude some otherwise relevant evidence whose "probative value is substantially outweighed by the danger of un-

³⁶⁴ *Daubert*, 113 S. Ct. at 2797.

³⁶⁵ See Aldous, *supra* note 214, at 755.

³⁶⁶ Forensic Population Genetics, *supra* note 344, at 439, (citing Joel E. Cohen, *The Ceiling Principle Is Not Always Conservative in Assigning Genotype Frequencies for Forensic DNA Testing*, 51 AM. J. HUM. GENETICS 1165 (1992)).

³⁶⁷ Jennifer R. Slimowitz & Joel E. Cohen, *Violations of the Ceiling Principle: Exact Conditions and Statistical Evidence*, 53 AM. J. HUM. GENETICS 314, 316 (1993).

³⁶⁸ *Id.* at 317.

³⁶⁹ See *supra* text at notes 282-83.

³⁷⁰ Dr. Eric Lander stated, "I only worry that renewed controversy about wanting higher odds will confuse the courts into doubting that there is general acceptance that the ceiling principle provides a conservative estimate." Aldous, *supra* note 214, at 756.

fair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence."³⁷¹ Although the word "substantially" creates a presumption of admissibility, it is slight.³⁷² Finally, Rule 403 does not provide the judge any discretion where the evidence is barred by another evidentiary rule, such as FREs 401 and 702. Rule 403 only permits judges to exclude *otherwise admissible* evidence.³⁷³

Evidence derived from the "ceiling principle" is prejudicial to the defendant when it results in allele frequencies that make the defendant's DNA profile seem rarer than it really is. This type of error is possible.³⁷⁴ The judge may find that this possibility of error, unless shown to be non-existent in the particular case, is sufficiently prejudicial to bar admission of the "ceiling principle." However, because the "ceiling principle" calculations are usually offered by the defense (who believes them to be more conservative than the modified product rule figures),³⁷⁵ the judge probably will not exclude the evidence based on undue prejudice.

The "ceiling principle" evidence is confusing and may mislead the jury. "Courts and commentators have traditionally viewed mathematical probability estimates with extreme caution because of its need for foundational support and its need for sufficient explanation to the factfinder."³⁷⁶ Again, the foundational support for the "ceiling principle" is lacking. Evidence derived from the "ceiling principle" requires the jury to understand why two very different statistics are being offered, and forces jurors to confront the underlying complex population genetics issues in great detail. Some courts have excluded DNA statistics on this basis.³⁷⁷

The evidence also may be a waste of time because it is irrelevant. Because the allele frequencies used may come from populations to which neither the defendant nor the pool of possible suspects belong, it has no relevance to the issue of identity. Replacing the DNA evidence with other evidence illustrates this point. For example, in *Yee*,³⁷⁸ an eyewitness stated

³⁷¹ FED. R. EVID. 403.

³⁷² SALTZBURG & REDDEN, *supra* note 136, at 138.

³⁷³ *Id.* at 141.

³⁷⁴ Slimowitz & Cohen, *supra* note 367, at 316.

³⁷⁵ Obviously, the defendant wants the court to suppress all evidence of a DNA inclusion. The defense often attempts to offer statistics calculated using the "ceiling principle" to rebut the government's use of statistics calculated by the modified product rule. See *United States v. Bonds*, 12 F.3d 540, 552 (6th Cir. 1993) (1 in 35,000 by modified product rule, 1 in 17 by "ceiling principle"); *Record* at 112, *United States v. Brooks*, No. 92-112-COL(JRE) (M.D. Ga. 1992), *aff'd*, 12 F. 3d 219 (11th Cir. 1993) (1 in 734,000 by modified product rule, 1 in 12,000 by "ceiling principle").

³⁷⁶ *Davis v. State*, 476 N.E.2d 127, 134 (Ind. Ct. App. 1985).

³⁷⁷ *State v. Wheeler*, No. C89-0901 (Or. Super. Ct. 1990).

³⁷⁸ *United States v. Yee*, 134 F.R.D. 161 (N.D. Ohio 1991).

that the assailant had black hair. Black hair is most prevalent in Chinese. Using the ceiling principle, the jury must attempt to weigh the significance of black hair to the issue of identity with only the knowledge that almost all Chinese have black hair, rather than the likelihood of encountering a black-haired person in the population at random.

Finally, the "ceiling principle" is cumulative evidence of identity. Regardless of the method used to calculate the frequency of a match, a multilocus match is extremely rare.³⁷⁹ The "ceiling principle" does not greatly increase the frequency in many cases.³⁸⁰ Where it does, the frequencies are still extremely low. Thus, its admission does not often provide significant new information.³⁸¹

E. The Fifth/Sixth Amendment Due Process Issue

Both the Due Process clause of the Fifth Amendment and the Compulsory Process clause of the Sixth Amendment combine to allow an accused the right to present evidence on his or her own behalf.³⁸² The military incorporates this guarantee in R.C.M. 703's entitlement of each party to equal production of evidence.³⁸³ Occasionally, this right can be used by the accused to overcome some rules of evidence.³⁸⁴ However, this right is by no means unlimited.³⁸⁵

In the case of DNA statistical evidence, the accused cannot raise

³⁷⁹ Weir, *supra* note 256, at 11,656; *Ethnic Differentiation*, *supra* note 298, at 546; Devlin & Risch, *supra* note 77, at 549.

³⁸⁰ In *People v. Barney*, 10 Cal. Rptr. 2d 731 (Ct. App. 1992), for example, the frequency calculated using the modified product rule was one in seven million. Using the "ceiling principle," the result was one in six million. *Where's the Beef?*, *supra* note 288, at 181 n.47.

³⁸¹ At first glance, the assertion that the "ceiling principle" is both misleading and cumulative seems contradictory. A closer examination reveals that it is the *basis* of calculating the "ceiling principle"—that allele frequencies from several different and unrelated databases or the minimum five or ten percent are used—that is misleading, while the *result*—that a match between the defendant's DNA and the evidentiary sample is rare—is merely cumulative.

³⁸² See *Rock v. Arkansas*, 483 U.S. 44, 56 (1986) (defendants cannot be denied *per se* the right to present evidence obtained through hypnotic memory refreshment).

³⁸³ However, the rule limits the entitlement to "evidence which is *relevant and necessary*." M.C.M., *supra* note 134, R.C.M. 703(f)(1) (emphasis added).

³⁸⁴ *E.g.*, the "rape shield's" exception for presentation of victim's past sexual behavior where "constitutionally required to be admitted . . ." FED. R. EVID. 412(b)(1); the hearsay exception for evidence not otherwise covered by an exception but with "equivalent circumstantial guarantees of trustworthiness . . ." FED. R. EVID. 803(24); *cf.* *Chambers v. Mississippi*, 410 U.S. 284, 302 (1973) ("Few rights are more fundamental than that of an accused to present witnesses in his own defense." "Rules of procedure and evidence are 'liberally construed in favor of permitting an accused the right to be heard *fully* in his defense.'" *United States v. Combs*, 35 M.J. 820, 827 (A.F.C.M.R. 1992) (quoting *United States v. Coffin*, 25 M.J. 32, 34 (C.M.A. 1987)).

³⁸⁵ "We believe that 'the Sixth Amendment right to confrontation and the Fifth Amendment right to due process of law require only that the accused be permitted to introduce all *relevant and admissible* evidence.'" *United States v. Hollimon*, 12 M.J. 791 (A.C.M.R. 1992) (quoting *United States v. Kasto*, 584 F.2d 268, 272 (8th Cir. 1978)).

the argument that he may be constitutionally permitted to introduce evidence calculated via the "ceiling principle" in his defense. Although the accused often is given wide latitude in evidentiary matters that the prosecution is not,³⁸⁶ the Constitution does not require that the accused be allowed to introduce irrelevant, unscientifically based, and cumulative evidence.³⁸⁷ Thus, DNA statistical evidence calculated via the "ceiling principle," because it does not have any reliable scientific basis, is irrelevant, and may be cumulative and misleading, should not be admitted under a claim that, although technically excluded by the FRE, it must be admitted either under the Fifth Amendment, the Sixth Amendment, or any other constitutional provision.

VII. Conclusion.

The National Research Council's "ceiling principle" is an unnecessary and unsound method of calculating the frequency of a DNA profile in a population. The NRC ignored scientific studies which demonstrated that there was no significant effect on the allele frequencies due to population substructure. Further studies have shown that the NRC's assumption to the contrary was unwise and untenable. Because of its lack of scientific basis, there is no general acceptance of the "ceiling principle" by the relevant scientific community.

The Supreme Court interpreted FRE 702 as rejecting the *Frye* test of general acceptance.³⁸⁸ Instead, the Court held that reliability is the key to admissibility of scientific evidence. The "ceiling principle" is not reli-

³⁸⁶ For example, Judge Wiss of the COMA believes that, while polygraph evidence offered by the prosecution may be excluded under MREs 401-403 and 702, the same evidence offered by the accused will not be barred by these rules due to the Fifth and Sixth Amendments. Of course, Judge Wiss requires as a predicate to admission that the accused satisfy "his foundation burden of demonstrating relevance, reliability, helpfulness to the factfinder, and relatively minor risk of confusion . . ." *United States v. Rodriguez*, 37 M.J. 448, 451 n.2 (C.M.A. 1993); *United States v. Williams*, 39 M.J. 555 (A.C.M.R. 1994) (holding that MRE 707(a) notwithstanding, an accused has the right to present foundational evidence regarding the admissibility of polygraph evidence); *but see United States v. Scheffer*, 1995 CMR LEXIS 4 (A.F.C.M.R. 1995) (holding that promulgation of MRE 707(a)'s total ban is constitutionally permissible).

³⁸⁷ *See, e.g., United States v. Valenzuela-Bernal*, 458 U.S. 858, 867-68 (1982) (the defendant must "at least make some plausible showing of how [the evidence] would have been both material and favorable to his defense. [This requirement of materiality pervades other] cases in what might loosely be called the area of constitutionally guaranteed access to evidence. . . ."); *Doe v. United States*, 868 F.2d 43 (4th Cir. 1981); *United States v. Dorsey*, 18 M.J. 1 (CMA 1983). For example, the military places an "absolute" ban on polygraph evidence. Even though an argument can be made that a polygraph has some indicia of reliability, the accused may not introduce polygraph results. MCM, *supra* note 134, MIL. R. EVID. 707(a).

³⁸⁸ Aldhous, *supra* note 214, at 755 (Committee members interviewed "generally defended the ceiling principle on the grounds that it was designed to reduce the controversy over the admissibility of DNA evidence in court. . . .").

able as it devolves from an unsupported and incorrect assumption. Therefore, it is inadmissible under FRE 702.

The "ceiling principle" is also irrelevant to the issue of identity in the case. The "ceiling principle" requires use of several databases regardless of their connection to the facts of the case. As the hypothetical case discussed demonstrates,³⁸⁹ the "ceiling principle" may require use of populations who have no connection to the crime scene, the suspect, or the defendant. Unless the proponent of the evidence demonstrates a connection, however tenuous, between the databases actually used and the facts of the case, the "ceiling principle" is irrelevant and should be excluded under FRE 401.

Finally, the "ceiling principle" may be prejudicial to the defendant by not producing a conservative number and may confuse the jury with its debate over population substructure. It is also cumulative evidence. Therefore, it fails the FRE 403 balancing test and should be excluded.

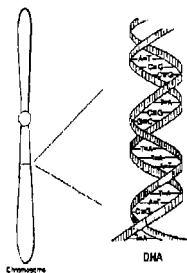
The "ceiling principle" was a well-intentioned, but ill-fated attempt to circumvent *Frye's* requirement of scientific basis by drastically reducing the empirically-derived statistical evidence and substituting instead a "standard of practice so conservative as to ensure that there would be no serious scientific argument that the evidence could be said to overstate the case against a defendant."³⁹⁰ However, what is generally accepted is that the evidence is conservative, *not* that it is scientifically valid. This concern is a value judgment for the courts, not the scientists, to make.

There is almost general acceptance that the "ceiling principle" is scientifically *invalid*. Thus, the "ceiling principle" should not be admissible in jurisdictions that follow *Frye*. Consequently, because it fails to meet the requirements of the FRE and MRE, the "ceiling principle" should be held inadmissible in federal trial courts and military courts-martial.

³⁸⁹ See *supra* notes 315-16 and accompanying text.

³⁹⁰ Thompson, *supra* note 87, at 80.

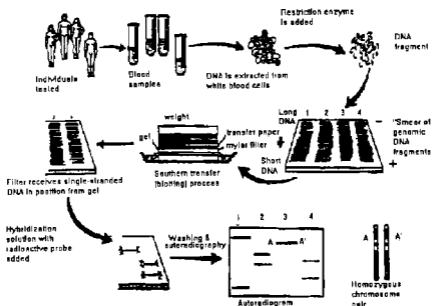
APPENDIX A



Representation of the double-helical DNA molecule (expanded from a chromosome).

Source: DNA TECHNOLOGY IN FORENSIC SCIENCE (1992). Reprinted with permission from the National Research Council, National Academy of Sciences.

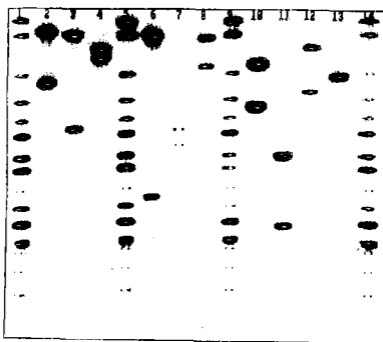
APPENDIX B



Schematic of DNA analysis using Southern Blotting. The autorad reveals a single-locus, multi-allelic analysis of four samples. Sample 3 is homozygous (A-A').

Source: DNA TECHNOLOGY IN FORENSIC SCIENCE (1992). Reprinted with permission from the National Research Council, National Academy of Sciences.

APPENDIX C



DNA Autoradiogram using automated analysis. The dark spots are DNA samples bound with radioactive probe; the light bands are the center of mass as determined by the computer.

Source: OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, GENETIC WITNESS: FORENSIC OF DNA TESTS (1990).

UNCLE SAM GOES TO MARKET: FEDERAL AGENCY DISPOSAL OF EMISSION REDUCTION CREDITS UNDER THE FEDERAL PROPERTY MANAGEMENT REGULATIONS

MAJOR VINCENT JOSEPH RAFFERTY, JR.*

I. Introduction

The realignment and closure of federal facilities—especially Department of Defense installations—have presented federal agencies with a unique opportunity: to create and dispose of air emission reduction credits (ERCs). Additionally, current commitments by Congress and the Environmental Protection Agency (EPA) to expand the use of market-based pollution control programs have raised issues regarding federal agencies' disposal of ERCs and similar pollution rights and allowances.

This article discusses the disposal of ERCs by federal agencies under existing federal property laws and regulations.

II. Emission Reduction Credits

Emission reduction credits have been called the "common currency of all [emissions] trading activity."¹ First introduced on April 7, 1982—when the EPA published its proposed Emissions Trading Policy Statement²—ERCs may be created by reducing emissions from either stationary, area, or mobile sources.³ State-established ERC programs provide polluters with market incentives to reduce air emissions from particular

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¹ Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits, 51 Fed. Reg. 43,814, 43,831 (1986) (final policy statement) [hereinafter Emissions Trading Policy Statement].

² Arnold W. Reitze, Jr., *A Century of Air Pollution Control Law: What's Worked; What's Failed; What Might Work*, 21 ENVTL. L. 1549, 1624 (1991) (citing Emissions Trading Policy Statement, 47 Fed. Reg. 15,076 (1982)).

³ Emissions Trading Policy Statement, *supra* note 1, at 43,831.

sources. Once ERCs are created, state emissions trading programs allow the ERCs to be used at other sources, banked for future use, or sold to third parties.⁴ The emissions trading activities which use ERCs include bubbles, netting, offsets, and banking.⁵

Proposed in 1982, and issued in its final form in 1986, the EPA's Emissions Trading Policy Statement governs the creation of ERCs and their use in emissions trading programs.⁶ Consistent with this policy statement, each state has the discretion to establish programs for the creation, banking, transfer, and use of ERCs.⁷ States may establish EPA-approved generic emissions trading regulations and EPA-approved ERC banks, or may elect to submit emissions trades as individual SIP revisions on a case-by-case basis.⁸

To qualify as ERCs and be eligible for use in emissions trading activities, emissions reductions must be surplus, enforceable, permanent, and quantifiable.⁹ Surplus emissions reductions are those reductions that are below a source's state established emissions baseline and that are not legally required.¹⁰ The enforceability requirement dictates that each transaction which raises any emission limit upward be state approved and federally enforceable.¹¹ Permanent emissions reductions are those that are assured "by requiring federally enforceable changes in source permits or applicable state regulations to reflect a reduced level of allowable emissions."¹² The final requirement is that emissions reduc-

⁴ *Id.*

⁵ For a description of these terms see *infra* notes 14-31 and accompanying text.

⁶ Emissions Trading Policy Statement, *supra* note 1.

⁷ The Emissions Trading Policy Statement notes:

Emissions trading is largely voluntary: no source is required to trade, and no state is required by EPA to approve a particular trade or to adopt a generic rule. Trading merely offers states and stationary sources alternative ways to meet regulatory requirements. For example, states are free to adopt generic rules or continue to implement trades as individual SIP revisions.

Id. The authority for states to implement such market-based programs is contained in sections 110(a)(2)(A) and 172(c) of the Clean Air Act (CAA); 42 U.S.C.A. §§ 7410(a)(2)(A), 7502(c) (West 1993). Likewise, under § 182(g) of the CAA, economic incentive programs may be required if nonattainment milestones are missed. *Id.* § 7511a(g).

⁸ Emissions Trading Policy Statement, *supra* note 1, at 43,825, 43,831, 43,834, 43,836.

⁹ *Id.* at 43,831.

¹⁰ *Id.* at 43,832. Surplus emissions are "not legally required" if they are not required by current regulations in the SIP, not already relied on for SIP planning purposes, and not being used by the source to meet other regulatory requirements. *Id.*

¹¹ *Id.* at 43,832. Emissions limits may be made federally enforceable through SIP revisions, EPA-approved generic bubble rules, new source preconstruction permits issued by states under EPA-approved SIP regulations, and construction permits issued by the EPA or delegated states. *Id.* There is an interesting twist for ERCs deposited in a state's EPA-approved ERC bank; those ERCs must be made enforceable by the state. *Id.* at 43,816, 43,825. Because merely depositing an ERC in a bank will not result in an emission increase elsewhere, banked ERCs need not be made federally enforceable until used. *Id.* at 43,834 n.21.

¹² *Id.* at 43,832.

tions be quantifiable in terms of characterizing the reduction for future use and estimating the amount of the reduction.¹²

The four methods of emissions trading include bubbles, netting, offsets, and banking.¹⁴ Bubbles are used with existing sources; netting is used for modifications of existing sources which result in increased emissions at least one discharge point; offsets are used with major new sources; and banking permits ERCs to be sold or saved for future use.¹⁵ Each method requires the creation of surplus emissions reductions below the baseline of one source and the compensatory use of the emissions at another source.¹⁶

Bubbles permit existing plants or groups of plants to increase emissions at one or more emission sources in exchange for surplus, compensating decreases in emissions at some other emission sources.¹⁷ The "bubble" is

an imaginary boundary device placed over a polluting plant or other facility with many individual sources of air pollution emissions. Instead of regulating emissions from each smoke-stack, pipe, or fugitive emission source, only the total pollution of the plant is regulated—as if it was coming from a single imaginary outlet in the bubble.¹⁸

¹² *Id.* Various methods of quantification are permitted, however the same method of calculating emissions should be used to quantify emission levels before and after the reduction. *Id.* Once a reduction which is surplus, enforceable, permanent, and quantifiable has been certified as an ERC, its use must be in accordance with the general guidelines for ERC use established by EPA in the Emissions Trading Policy Statement. These guidelines, established to ensure all ERC uses are consistent with CAA ambient attainment and maintenance considerations, state the following: (1) emissions trades must involve the same criteria pollutant; (2) all uses of ERCs must satisfy applicable ambient tests; (3) bubbles must not increase hazardous pollutants; (4) ERCs from existing sources cannot be used to meet technology-based requirements applicable to new sources; (5) states may approve bubbles in primary nonattainment areas which require, but lack, approved demonstrations of attainment; (6) sources need not be subject to binding compliance schedules based on current SIP requirements before applying for bubbles exceeding those requirements; (7) states may extend certain compliance schedules; (8) states may approve bubbles involving open dust sources of particulate emissions; (9) the Regional Administrator must review lead trades; (10) trades involving ERCs from mobile source measures must be implemented by case-by-case SIP revisions; (11) interstate trades may be approved if they meet the substantive requirements of the more stringent state; and (12) bubbles must not impede enforcement. *Id.* at 43,833-34.

¹⁴ *Id.* While netting and offsets are part of the EPA's emissions trading program, they are governed by the EPA and state regulations for new source review. *Id.* at 43,815. The EPA supports emissions trading because it "can provide more flexibility to meet environmental requirements, and may therefore be used to reduce control costs and encourage faster compliance." *Id.* at 43,830.

¹⁵ Reitze, *supra* note 2, at 1626 (citing EPA, Emissions Trading Policy Statement, 51 Fed. Reg. 43,814 (1986)).

¹⁶ Richard D. Morgenstern, *The Market-Based Approach at EPA*, EPA J., May-June 1992, at 27; Emissions Trading Policy Statement, *supra* note 1, at 43,830.

¹⁷ Emissions Trading Policy Statement, *supra* note 1, at 43,830.

¹⁸ Reitze, *supra* note 2, at 1622.

The benefit of a bubble is that it allows firms to reduce compliance costs. Firms may increase their emissions where control costs are high, in exchange for surplus reductions where costs are low, so long as each trade is enforceable and results in air quality equivalent to the original requirements.¹⁹

Netting deals with modifications of existing major sources and may exempt these sources from specific preconstruction permit requirements under New Source Review.²⁰ To qualify for these exemptions, there must be no net emissions increase within the major source, or any increase must fall below significance levels.²¹ The result of "netting out" is that the modification is not considered "major" and is not subject to the preconstruction permit requirements for major modifications.²² Netting permits increased emissions from one stack or another part of a plant to be offset by decreased emissions from some other emissions point if no net increase in emissions results.²³

Offsets allow a firm to construct a major new emissions source—or expand an existing one—when the source otherwise would cause or contribute to air quality problems.²⁴ Under the offset program, firms are required to secure sufficient surplus emissions reductions from other sources in the vicinity to compensate for any new emissions that they will add.²⁵ Offsets are specifically required in nonattainment areas for major new stationary sources and major modifications,²⁶ and also may be required in attainment areas to prevent increment exceedances, projected ambient violations, or visibility impacts associated with new source growth.²⁷

Banking allows firms to store ERCs for future use—in bubbles, offsets, or netting, or to sell or transfer to other firms.²⁸ States may establish emissions reduction banks and governing regulations as part of their

¹⁹ Morgenstern, *supra* note 16, at 27.

²⁰ Emissions Trading Policy Statement, *supra* note 1, at 43,830.

²¹ *Id.*

²² *Id.*

²³ Reitze, *supra* note 2, at 1624, 1628.

²⁴ Morgenstern, *supra* note 16, at 27.

²⁵ *Id.*

²⁶ Barry S. Elman, *Emissions Trading and Economic Incentives Under the New Clean Air Act*, in *COMPLYING WITH THE NEW CLEAN AIR ACT 365* (Michael A. Brown ed., 1990). These sources are subject to preconstruction permit requirements that the sources obtain sufficient surplus emission reductions to more than offset their emissions. This mandate is intended to permit industrial growth in nonattainment areas without interfering with attainment and maintenance of national ambient air quality standards. Emissions Trading Policy Statement, *supra* note 1, at 43,830. These nonattainment offset requirements are implemented through state adopted SIP regulations. *Id.*

²⁷ Elman, *supra* note 26, at 385; Emissions Trading Policy Statement, *supra* note 1, at 43,830-31.

²⁸ Emissions Trading Policy Statement, *supra* note 1, at 43,831.

SIPs.²⁹ These EPA-approvable banks must be established before a state can qualify emissions reductions as ERCs consistent with the Emissions Trading Policy Statement.³⁰

A firm cannot automatically create ERCs just by reducing their emissions. Where state and local air quality management districts have established EPA-approved ERC programs,³¹ firms must comply with the local regulatory requirements and procedures to obtain ERCs.

II. Federal Agencies and ERC Disposal

The procedures that federal agencies use to dispose of emission rights present timely and interesting issues. Two principle factors driving these issues are the realignment and closure of federal facilities and the increased use of market-based programs in pollution control laws.

The closure and realignment of federal facilities, particularly at Department of Defense (DOD) installations, enables federal agencies to create and dispose of ERCs. Many entities in the same air basins as the federal installations are interested in obtaining these rights. Interested groups include other federal installations, community organizations seeking to reuse and redevelop the closing facilities, and businesses in need of air credits. If transferred to other federal agencies, ERCs would give agencies the needed flexibility to effectively accomplish their mission while complying with the requirements of the CAA and applicable state

²⁹ *Id.* (citing 40 C.F.R. pt. 51, app. S (EPA's revised Offset Ruling)).

³⁰ *Id.* An informal banking system has developed at the state level. This system involves private, unpublicized deals made between state regulators and industry concerning credits for emissions reductions that the state allows to be used internally to meet CAA requirements. Reitze, *supra* note 2, at 1628 (citing Robert W. Hahn and Gordon Hester, *Where Did All the Markets Go? An Analysis of EPA's Emissions Trading Program*, 6 *YALE J. ON REG.* 109, 130, 132 (1989)).

³¹ In 1986, the EPA had approved banking rules for only five states or local agencies, while eight other agencies had adopted banking rules awaiting EPA approval. One of the active programs is located in Louisville, Kentucky. Reitze, *supra* note 2, at 1627. Another ERC program is located in California. *see Note, The Emissions Trading Policy: Smoke on the Horizon for Takings Clause Claimants*, 18 *HASTINGS CONST. L.Q.* 667, 678 (1991) (citing CAL. HEALTH & SAFETY CODE §§ 40709-40711 (Deering 1986)). Massachusetts adopted an emissions banking and trading program in September 1993 and began granting credits on 1 January 1994. Scott Allen, *Massachusetts Firms May Now Trade Clean Air Credits*, *BOSTON GLOBE*, Sept. 29, 1993, at 26; *In the States: Massachusetts—"Substantial" Cut in Pollution Predicted from Emissions Banking and Trading System*, 24 *Env't Rep. (BNA)* 1015 (Oct. 1, 1993). Texas and Michigan are well on their way to developing and implementing programs. William Hoffman, *State Gives Go-Ahead for Trading of Pollution Emissions Credits*, *DALLAS BUS. J.*, June 11, 1993, at I-17; *Industry Seeking Emissions Trading Between Stationary, Mobile Sources*, *AIR WATER POLLUTION REP.*, June 21, 1993 (available in LEXIS, *Envirn Library, Pubs File*); *State of Michigan, Environmental Defense Fund and GM Team Up in Clean Air Fight*, *PR NEWswire*, Oct. 7, 1993 (available in LEXIS, *Envirn Library, Pubs File*). Wisconsin is working to develop an "economically friendly emissions trading system." *WEPCO Working with State to Devise NOx, VOC Trading Plan for Ozone Areas*, *UTILITY ENVT REP.*, Dec. 10, 1993, at 9.

implementation plans. If sold to community reuse groups or businesses, surplus federal ERCs could be a source of revenue for the federal government. If donated to community reuse groups or local air quality management districts, surplus federal air credits could generate good will and signify, in some small way, the federal government's commitment to achieving CAA compliance in that particular air basin.³²

As evidenced by the CAA and other pollution controls, Congress and the EPA appear committed to the use of market-based pollution control programs, in combination with, or in place of, command and control methods. Current CAA programs encourage, and at times require, the use of market-based programs to achieve compliance with mandates established for attaining national ambient air quality standards (NAAQS).

The ability of federal agencies to participate in market-based programs may affect the agencies' statutory or regulatory missions. Furthermore, agency utilization of market-based programs will test the CAA's pollution control goals. These programs particularly affect East and West coast federal facilities, such as in the northeast Ozone Transport Region and in southern California.³³ Limits on federal agency participation in these programs hampers and complicates federal agencies' daily activities and also hinders progress toward the attainment of NAAQS in areas where federal facilities are located. Any inefficiencies in the process under which federal agencies participate ultimately will cost the taxpayer, and will increase budget deficit and national debt.

Additionally, there is a movement to use market-based pollution rights and allowance programs in other major pollution control statutes. These market-based programs, like those in the CAA, will combine or replace command and control programs. The method by which federal agencies dispose of air emission reduction credits will carry over and provide insight into federal agencies' ability to effectively participate in these market-based programs in other pollution control laws.

A. Federal Facilities' Potential to Generate ERCs

The real property holdings of the United States government are vast. The federal government owns an estimated twenty-nine percent of the Nation's land.³⁴ Approximately 422,000 federal buildings³⁵ and 27,000

³² Some may argue that surplus federal emissions and ERCs should be transferred along with the affected federal real estate to ensure that CAA conformity requirements are met. The conformity requirements are located at 42 U.S.C.A. § 7506 (West 1993).

³³ These programs would especially impact a federal organization such as the United States Navy which is tied to coastal ports. These ports are located in areas that generally are nonattainment and, therefore, have stringent emissions control and offset requirements.

³⁴ GEORGE C. COGGINS ET AL., *FEDERAL PUBLIC LAND AND NATURAL RESOURCES LAW* 12 (3d ed. 1993). The major administrators of these lands are the Department of the Interior (70%), Department of Agriculture [United States Forest Service] (26%), and Department of De-

federal installations³⁶ are located on this 662 million acres. The federal agencies that administer these real property interests include the Departments of Defense and Energy, the Postal Service, and the National Institutes of Health.

Federal facilities are shrinking in number and size. As summarized in a recent House Energy and Commerce Committee Report,³⁷ events—such as the end of the Cold War, growing budget deficits, and an increasing national debt—are causing Congress to decrease spending.³⁸ This reduced spending has caused some federal facilities to close and scaled back operations in other facilities.³⁹ Large facilities administered by the Departments of Interior, Defense, Energy, and Agriculture are slated for closure.⁴⁰ When these federal facilities close or decrease their operations, they eliminate some or all of their air emission sources. Given these emission reductions, a unique type of valuable federal property now may be available for disposal: the ERC. The federal agency responsible for that facility may apply for, obtain, and then transfer, sell, or otherwise dispose of ERCs along with the facility's other real and personal property.

Because the CAA waived sovereign immunity,⁴¹ federal agencies must comply with all federal, state, interstate, and local requirements.⁴² This duty to comply with CAA requirements means that federal agencies not only are bound by SIP mandates to obtain, for example, operating permits, but also are eligible to participate in SIP programs for the creation, acquisition, and disposal of emission rights and allowances. In air quality management districts where ERC programs exist, federal agencies' opportunities with regard to ERCs are the same as those available to all other regulated entities.

The issue of federal agency disposal of ERCs first arose in the con-

fense (3%). Robert C. Davis & R. Timothy McCrum, *Environmental Liability for Federal Lands and Facilities*, 6 NAT. RESOURCES & ENV'T. Summer 1991, at 31, 32.

³⁶ Statistical Abstract of the United States, Department of Commerce, 1991, cited in L.R. Hourcle, *FED. FACILITIES*, Jan. 1993, at 1.

³⁷ 3 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *FEDERAL FACILITIES COMPLIANCE STRATEGY I* (Nov. 1988).

³⁸ H.R. REP. NO. 814, 102d Cong., 2d Sess. (1992), reprinted in 1992 U.S.C.C.A.N. 1496 [hereinafter House Report]. The House Report accompanied the Community Environmental Response Facilitation Act, Pub. L. No. 102-426, 106 Stat. 2174 (signed by the President on October 19, 1992).

³⁹ House Report, *supra* note 37, at 5, reprinted in 1992 U.S.C.C.A.N. at 1496.

⁴⁰ House Report, *supra* note 37, reprinted in 1992 U.S.C.C.A.N. at 1498. The DOD is projected to reduce its active duty force to 1.6 million personnel by 1995, a decrease of roughly 600,000 troops from its 1987 end strength. *Starting Point for the New Defense Budget*, A.F. MAGAZINE, Apr. 1993, at 10, 11.

⁴¹ House Report, *supra* note 37, at 5, reprinted in 1992 U.S.C.C.A.N. at 1498.

⁴² Section 118 of the CAA waives sovereign immunity for each department, agency, and instrumentality of the executive, legislative, and judicial branches of the federal government. 42 U.S.C.A. § 7418 (West 1993).

⁴³ *Id.* § 7418(a).

text of DOD base realignment and closure (BRAC). Base realignment and closure is a four-phase process in which an independent commission designates certain DOD installations within the United States for realignment or closure.⁴⁵ During realignments, installations lose or gain missions and personnel,⁴⁴ while closure entirely shuts down an installation. The commission's list is forwarded to the President for approval and the President's list is submitted to Congress. The list becomes effective unless Congress disapproves it in its entirety by joint resolution within forty-five days of submission by the President.⁴⁵ Rounds I, II, and III of BRAC were completed in 1989, 1991, and 1993, respectively. Round IV is slated for completion in 1995. Department of Defense installations scheduled for closure or major realignment as a result of rounds I and II totalled 113,⁴⁶ while BRAC round III will close 130 installations and realign 45.⁴⁷ Of these 175 installations from round III, 32 are considered major bases.⁴⁸

With the announcement of the closure of several bases in southern California, nearby military facilities, local businesses, community redevelopment and reuse groups, and the affected air management districts began contacting closing bases about obtaining ERCs.⁴⁹ Both nearby military bases and businesses needed the ERCs for offsets to cover projected emission increases caused by expanding operations. Local reuse groups wanted the ERCs because any future civilian use of the property required that the groups hold the necessary air permits and emission rights dictated by applicable SIPs. Air districts saw the opportunity to request that ERCs be donated to their community banks for distribution by the districts at their discretion, or to be counted as progress toward attainment.

Interested businesses contacted the closing military installations directly, or through emission rights brokers—such as AER*X of Washington, D.C.—to negotiate the purchase of ERCs from the military services. Local reuse groups contacted the military services directly seeking

⁴⁵ House Report, *supra* note 37, at 6, reprinted in 1992 U.S.C.C.A.N. at 1499; Base Closure and Realignment Act of 1988, Pub. L. No. 100-526, 102 Stat. 2623 (codified at 10 U.S.C. § 2687 note (1988)) [hereinafter 1988 BRAC Act]; Defense Base Closure and Realignment Act of 1990, Pub. L. No. 101-510, 104 Stat. 1908 (codified at 10 U.S.C. § 2687 note (1990)) [hereinafter 1990 Defense BRAC Act].

⁴⁴ Martin J. Savoie, Emission Trading Potential for DOD Base Closure, U.S. Army Construction Engineering Research Laboratory, Energy and Utility Systems Division, Champaign, Illinois, at 4 (1993) (unpublished paper, on file with author).

⁴⁵ 1988 BRAC Act *supra* note 43; 1990 Defense BRAC Act, *supra* note 43.

⁴⁶ House Report, *supra* note 37, at 6, reprinted in 1992 U.S.C.C.A.N. at 1499.

⁴⁷ 139 CONG. REC. S11,979 (daily ed. Sept. 20, 1993) (statement of Sen. Simpson).

⁴⁸ *Id.* at S11,964 (statement of Sen. Feinstein).

⁴⁹ Similar efforts to obtain emission rights at closing military facilities also occurred in Texas. *Industry Seeking Emissions Trading Between Stationary, Mobile Sources*, AIR WATER POLLUTION REP., June 21, 1993 (available in LEXIS, Envirn Library, Pubs File).

the transfer and donation of ERCs.⁵⁰ Even members of Congress informed the military services of congressional hope that the credits would be donated to community reuse groups or local air districts.

Apparently ERCs, especially in nonattainment areas, are coveted commodities that could fetch a princely sum on the open market.⁵¹ As a result of these inquiries, the military services began investigating the procedures to dispose of ERCs generated by the realignment and closure of facilities.

The potential for generating ERCs at closing and realigning military bases, as well as at other federal facilities, is substantial. In a paper written in early 1993, (BRAC ETP paper) the United States Army Construction Engineering Research Laboratory estimated the potential number and dollar value of ERCs at selected installations slated for realignment and closure during the first two rounds of BRAC. Many of the installations affected by these BRAC rounds are located in major metropolitan areas that also are nonattainment areas.⁵² The table below lists affected installations located in nonattainment areas.⁵³

**Primary BRAC Rounds I and II Installations
in Nonattainment Areas**

<i>Installation Name</i>	<i>ST</i>	<i>Nearest City</i>	<i>Activity</i>
Luke AFB	AZ	Glendale	Gaining
Williams AFB	AZ	Mesa	Closing
Edwards AFB	CA	Rosamond	Gaining
Norton AFB	CA	San Bernadino	Closing
March AFB	CA	Riverside	Gaining
Sacramento AD	CA	Sacramento	Closing
McClellan AFB	CA	Sacramento	Gaining
Mather AFB	CA	Sacramento	Closing
Naval Elec Com	CA	San Diego	Gaining

⁵⁰ To facilitate the transfer of ERCs from closing military installations to reuse entities, the California/EPA Department of Toxic Substance Control, California's lead agency for base closure issues, recommended revisions to air emissions rules to allow reuse groups to acquire ERCs for nominal fees as bases close. *Single Point of Coordination for Clean Up of Closing California Military Bases Designated by Cal/EPA*, PR NEWSWIRE, Sept. 21, 1993 (available in LEXIS, Envir Libr, Pubs File).

⁵¹ For example, the Sacramento Municipal Utility District (SMUD) has spent \$4.5 million buying credits of various pollutants, and has budgeted \$12 million to buy credits so that it can build four power plants. Patrick Hoge. *SMUD May Buy Pollution Credits Earned by RT*, SACRAMENTO BEB, Mar. 2, 1993, at B4.

⁵² Savoie, *supra* note 44. The paper was written before the completion of BRAC round III in the summer of 1993.

⁵³ *Id.* at 4.

⁵⁴ *Id.* at 8. BRAC round III installations in nonattainment areas in California alone include Alameda Naval Air Station, Alameda Naval Aviation Depot, Oakland Naval Hospital, Treasure Island Naval Station, Mare Island Naval Shipyard, San Diego Naval Training Center, and March AFB. 139 Cong. Rec. S11,966 (daily ed. Sept. 20, 1993).

Fort Ord	CA	Monterey	Closing
Presidio of SF	CA	San Francisco	Closing
Long Beach NH	CA	Long Beach	Closing
Long Beach NS	CA	Long Beach	Closing
Castle AFB	CA	Merced	Closing
George AFB	CA	Victorville	Closing
Tustin MCAS	CA	Santa Ana	Closing
Vallejo NEEC	CA	Vallejo	Closing
Wright-Patterson AFB	OH	Fairborn	Gaining
Rickenbacker ANGB	OH	Columbus	Closing
Fort Belvoir	VA	Alexandria	Gaining
Cameron Station	VA	Alexandria	Closing
Dahlgren Surface WC	VA	Fredericksburg	Gaining
Fort Lewis	WA	Tacoma	Gaining
McChord AFB	WA	Tacoma	Gaining
Puget Sound NS	WA	Seattle	Closing
Everett NS	WA	Everett	Gaining

Given the restrictions in nonattainment areas on new and existing emission sources,⁵⁵ potential ERCs from these realigning and closing installations are especially valuable and significant.

Each DOD installation is much like a self-contained city or town with facilities to support activities related to the installation's military mission and the daily community needs of its personnel.⁵⁶ Categories of air emission sources associated with these installations and their activities vary. The following table lists typical categories of emission sources found at DOD installations.⁵⁷

DOD Installation Emission Sources

- Aboveground/Underground Tanks
- Abrasive Blasting
- Aircraft, Ship, Vehicle Fuel Dispensing
- Aircraft, Ship, Vehicle engines
- Boilers and Furnaces
- Coal Storage Pile Dust
- Dry Cleaning
- Engines/Generators
- Fiberglass Operations
- Fire Fighting Schools
- Foundries
- Furnace, Oven Drying Operations

⁵⁵ Clean Air Act, subch. 1, pt. D, Plan Requirements for Nonattainment Areas, 42 U.S.C.A. §§ 7501-7515 (West 1993).

⁵⁶ Savoie, *supra* note 44, at 8.

⁵⁷ *Id.* at 9.

- Graphic Arts/Printing
- Incinerators
- Jet Engine Test Cell
- Large Ship/Aircraft Coating
- Ordnance Operations
- Plating Shops
- Road Dust
- Solvent Cleaning and Degreasing
- Surface Coating
- Wood Operations
- Welding

To estimate potential ERCs, the BRAC ETP paper examined the emission inventory from major source emissions at one closing California base and at heating source ERC estimates for selected installations nationwide. The single base examined was Mather AFB, located outside of Sacramento, California, in the Sacramento Metropolitan Air Quality Management District (SMAQMD). Sacramento and its surrounding area are nonattainment for ozone, carbon monoxide, and fine particulates (PM-10).³⁶

Mather AFB ERC Estimates for 1991

Basewide Permitted Emissions, lb/yr		Basewide Nonpermitted Emissions, lb/yr	
Source Process	ROG	CO	NOX
Abrasive Blasting	12.3	121.6	464.4
Boilers/Furnaces	564.0		1120.0
Degreasing	407.5		
Aboveground Tanks	3553.0		
Underground Tanks	180.0		
Loading Racks	29399.0		
Aircraft Refueling	441.0		48.1
Jet Engine Test Cell	3794.0		
Painting	56.9	356.6	1415.3
Standby Generators	38407.7	4163.3	1988.4
Total Permitted	1377.0	5194.0	25967.0
Boilers/Furnaces	1511.0		
Aircraft Refueling	16488.0	5194.0	25967.0
Total Nonpermitted	54895.7	9357.3	27955.4
Total Emissions	56273.7	15351.3	53922.4

The table above lists permitted and nonpermitted emission estimates of Mather Air Force Base (AFB) for 1991.³⁷

³⁶ *Id.* at 10.

³⁷ CH2M Hill, Emissions Summary Source Emission Quantification at Mather Air Force Base, 44-45, 48-49 (Nov. 17, 1992) (on file with author) [hereinafter CH2M Hill].

The emission inventories for nonpermitted and permitted sources for 1991 totalled approximately 27 tons per year of reactive organic gases (ROG), 14 tons per year of NO_x , 4.2 tons per year of CO, 0.7 tons per year of SO_x , and 0.5 tons per year of PM-10. The ROG total is roughly one half of the 1990 level.⁶⁰ The most significant permitted sources of ROG are aircraft refueling, underground storage tanks, and painting; while the most significant permitted sources of NO_x are boilers, furnaces, and standby electrical generators.⁶¹ The nonpermitted boiler, furnace, and aircraft refueling emission sources are more significant than the permitted sources.⁶² Overall, the most significant ERCs will come from sources such as boilers, furnaces, electrical generators, fuel loading, and specialized activities such as large-scale painting and plating.⁶³

To get an idea of potential ERCs at other installations, the BRAC ETP paper briefly focused on heating source emissions for nine closing installations in nonattainment areas.⁶⁴

Heating Source ERC Estimates for Selected Installations

Installation	Emissions, tons/yr				
	<i>Nox</i>	<i>Sox</i>	<i>TSP</i>	<i>CO</i>	<i>CO2</i>
Fort Ord	158	9	4	1	91003
Presidio of SF	62	0	2	0	36730
Sacramento AD	20	13	1	0	10476
Cameron Station	11	19	1	0	4449
Philadelphia NS	45	0	1	0	26487
Philadelphia NSY	145	0	4	0	85654
Long Beach NH	21	0	1	0	12598

⁶⁰ By contrast, the totals for 1990 nonpermitted and permitted sources were approximately 52 tons of ROG, 13 tons of NO_x , 4.5 tons of CO, 0.8 tons of SO_x , and 0.5 tons of PM10. Saviole, *supra* note 44, at 11. The numbers for 1990 breakdown as follows:

1990 Basewide emissions, lb/yr					
	<i>ROG</i>	<i>CO</i>	<i>NOX</i>	<i>SOX</i>	<i>PM</i>
Total Permitted	48412	4074	1669	1436	244
Total NonPermitted	56423	5019	25087	206	755
<i>Total Emissions</i>	104835	9093	26756	1642	999

⁶¹ *Id.* at 11.

⁶² *Id.*

⁶³ *Id.* at 8.

⁶⁴ *Id.* at 12. The emission estimates were based on USEPA emission factors for external combustion sources, except for CO_2 emissions. The study assumed an industrial source emission factor for natural gas and fuel oils, and a commercial emission factor for propane. The study estimated CO_2 emissions by the gross calorific value method because USEPA emission factors were unavailable. Energy use information came from the Defense Energy Information System. *Id.*

Long Beach NS	16	0	0	0	9211
Fort Devens	99	303	20	17	75719

According to this table, the potential number of ERCs that can be generated by reducing emissions of NO_x , SO_x , particulates, and CO at these selected closing installations is tremendous.⁶⁵

Market forces determine the dollar value of these potential ERCs. Factors influencing the value of an ERC include the particular area of the country and air basin involved, time of year, current demand for ERCs, transaction costs, control costs for the source generating the ERC, and AQMD discounting. The range in value of one ERC (representing the right to emit one ton of a criteria pollutant) can vary from \$5000 to \$30,000.⁶⁶ Based on this range of prices, the value of ERCs calculated on the total 1991 emissions of Mather AFB range from \$232,000 to \$1,392,000. The value of potential ERCs generated solely by heating sources at the nine closing installations listed above⁶⁷ ranges from \$4,865,000 to \$29,190,000.

The significant costs involved in creating ERCs reduces their potential value. One cost is preparing emission inventories to be used as the basis for calculating the ERCs. Another substantial cost is the application fee associated with each state's or air district's regulatory process to establish ERCs. In California's South Coast Air Quality Management District (SCAQMD),⁶⁸ each permit application to certify ERCs costs more than \$2000.⁶⁹ One application and the accompanying fee is required for each permitted source from which the applicant is seeking ERCs. For

⁶⁵ *Id.* at 12. While not a traded ERC, CO_2 is included in the table to demonstrate the magnitude of such emissions from the heating sources.

⁶⁶ Telephone interview with Joshua D. Margolis, Director of Air Trade Services, Dames and Moore, San Francisco, California (Dec. 21, 1993). A SMAQMD official lists higher values and estimates NO_x credits in SMAQMD cost between \$12,000 and \$40,000 per ton. Hoge, *supra* note 51, at B4. In comparison to these ERC price estimates, the sulphur dioxide allowance trading price remained at \$18, through October to November 1993. *SO₂ Credits Remain at \$180*, Trading Price, Clean Air Network Online Today, Dec. 14, 1993 (available in LEXIS, Environ Library, Pubs File).

⁶⁷ Excluding emissions of CO_2 , which is neither a criteria nor traded pollutant.

⁶⁸ The South Coast Air Basin—which contains the dirtiest air in the nation—consists of a 6600 square mile area of southern California, bounded on the west by the Pacific Ocean and on the north and east by the San Gabriel, San Bernardino, and San Jacinto mountains. The Basin includes the entire Orange County area and the nondesert portions Los Angeles, Riverside, and San Bernardino counties. Mike A. Nazemi & Knut J. Bernuldsen, *Using Mobile Source Emission Reductions to Offset Stationary Source Rule Requirements*, AIR & WASTE MANAGEMENT ASSOC. PAM. 93-RA-112.03 (June 13, 1993).

⁶⁹ Memorandum, David Wang, Chief, Base Closure Branch, Department of Toxic Substances Control, California Environmental Protection Agency, to Paul Blais, California Environmental Protection Agency, subject: Air Emission Reduction Credits at Closing Bases (July 22, 1993).

example, Norton AFB, located in the SCAQMD has 230 active air permits. It would cost the United States Air Force, in permit fees alone, more than \$500,000 to apply for all available ERCs from these permitted sources.⁷⁰ This figure does not include application fees to obtain ERCs from nonpermitted sources.

Another significant factor affecting the value of ERCs is the number of credits that a federal facility will receive when applying to certify its air reductions as ERCs. The number can vary because of another "cost" charged by the regulating body—discounting. For example, in the SMAQMD (where Mather AFB is located) three discounts apply. First, emission reductions must be discounted to levels that would have been emitted if the source had been controlled to near-term control strategy levels. Second, the emission reductions are discounted by an emission reduction to credit ratio of 1.1-to-1 to provide credits for a Community Bank and Priority Reserve. The SMAQMD retains these credits and provides them to small businesses and essential community services that otherwise would be unable to operate in the District without the credits. Finally, the remaining emission reductions are further reduced by a distance ratio. Offsets in a fifteen-mile radius are subject to 1.2-to-1 offset ratio for nonattainment pollutants and 1.1-to-1 for other affected pollutants. This distance ratio ensures that sufficient reductions have been achieved at the credit source, to completely mitigate air quality impacts at the point where emissions are expected to increase.⁷¹

One final concern in the creation of ERCs is the length of time that it takes to complete an emissions trading transaction. According to Joshua D. Margolis, an ERC transaction that is finalized when the air quality management district certifies the exchange of credits can be "as short as three months or as long as a year."⁷² An ERC applicant must conduct an initial cost-benefit analysis to determine whether the creation of ERCs will be beneficial.

The ability of federal agencies to create and dispose of ERCs applies beyond the base realignment and closure context. With greater emphasis on market-based approaches to pollution control, lessons learned in the ERC disposal context can be applied to federal agency participation in these other economic incentive programs.

B. Market-Based Programs

Since the creation of the EPA by President Richard Nixon in 1970,

⁷⁰ *Id.*

⁷¹ CH2M Hill, *supra* note 59, at 5-1, 5-2.

⁷² Judy Pasternak, *AQMD May Trade Strict Rules for "Smog Exchange,"* LOS ANGELES TIMES, May 19, 1991, at A1.

the traditional and dominant approach to environmental control has been through "command and control."⁷³ This approach uses two methods to control pollution: performance standards and technology-based standards. A performance standard involves a regulatory agency establishing a limit for a particular pollutant, while a technology-based standard involves a regulatory agency specifying a technology for the control of a particular pollutant.⁷⁴ Although somewhat successful over the past twenty years, the centralized command and control approach has not solved the environmental challenges facing this country.⁷⁵

In response to the shortcomings of command and control regulations, many have advocated supplementing or substituting with market incentive systems.⁷⁶ Even though economists have recommended market-based environmental protection approaches for more than forty years,⁷⁷ only recently have these approaches received widespread sup-

⁷³ Alvin L. Alm, *A Need For New Approaches; Command and Control Is No Longer a Cure-All*, EPA J., May-June 1992, at 7.

⁷⁴ *Id.*; Robert W. Hahn & Robert N. Stavins, *Incentive Based Environmental Regulation: A New Era from an Old Idea?*, 18 *ECOLOGICAL Q.* 1, 5 (1991). An example of a performance standard is a requirement that places a limit on the maximum allowable units of a particular pollutant that may be emitted over a period of time, while an example of a technology-based standard is a requirement that a polluter employ a particular technology, such as an electric utility's installation of flue gas scrubbers to control sulfur dioxide emissions. *Id.*

⁷⁵ Alm, *supra* note 73. Alvin L. Alm, a former member of the EPA's Science Advisory Board, attributes command and control's limited success at preventing pollution to numerous factors. Those factors include the following:

- (1) a command and control regulatory system's inability to adapt well to changes in population, technology, and economic activity;
- (2) current regulatory programs' general organization around a single media or classes of pollution which tends to shift pollution around, rather than actually reduce it;
- (3) newly emerging environmental problems—like indoor air pollution or global climate change—are ill suited to command and control regulatory systems;
- (4) protracted, resource-intensive, and inflexible regulatory process makes traditional regulation a cumbersome tool; and
- (5) the high cost of certain types of regulations.

Id.

⁷⁶ *Id.* See also Hahn & Stavins, *supra* note 74; Richard Stewart, *Environmental Regulation and International Competitiveness*, 102 *YALE L.J.* 2039 (1993); Marshall J. Breger, *Providing Economic Incentives in Environmental Regulation, Addresses before the Administrative Conference of the United States* (Apr. 23, 1990), in 6 *YALE J. ON REG.* 463 (1991); Henry Lee, *An Answer to the Dilemma on the Front Line*, EPA J., May-June 1992, at 30; Robert N. Stavins, *Harnessing the Marketplace*, EPA J., May-June 1992, at 21; Daniel J. Dudek & John Palmisano, *Emissions Trading: Why Is This Thoroughbred Hobbled?*, 13 *COLUM. J. ENVTL. L.* 217 (1988). The five main categories of market incentive-based policies include pollution charges (taxes or fees), deposit-refund systems, removal of market barriers, elimination of government subsidies, and marketable permit systems. Hahn & Stavins, *supra* note 74, at 7; Alm, *supra* note 73.

⁷⁷ Morgenstern, *supra* note 16. Economists continue to champion market programs—such as emission charges and trading permits—as "the most effective and efficient means of reducing emissions associated with global climate change." William J. Berman, Vice President and Director of Economic Studies at the Committee for Economic Development, an-

port. Advocates of incentive-based approaches argue that they: (1) promote environmental protection at a lower cost than that of command and control approaches; (2) improve United States industries' international competitiveness because of huge savings and increases in productivity as compared to command and control regulation; (3) have comparable or less costs for the government to administer than conventional regulatory methods; (4) provide a "powerful incentive" for private sector development and adoption of new pollution control technologies; and (5) tend to make the environmental debate more understandable to the general public.⁷⁸

1. *Government Support for Economic Programs*—The recent popularity of market-oriented approaches to environmental regulation has been attributed to strong interest by the Executive Office of the President, aggressive participation by some organizations in the environmental community, and a bipartisan congressional study initiated and sponsored by former Senator Timothy Wirth of Colorado and the late Senator John Heinz of Pennsylvania.⁷⁹

Regardless of the support's basis, the commitment of the Congress and the Executive branch to use market-based programs is clear.⁸⁰ Congressional commitment comes in the form of statutes, proposed and passed, as well as in congressionally sponsored reports. The number of market-based programs included in the current CAA, and proposed for inclusion in other pollution control statutes, is quite remarkable. In environmental legislation pending before the 101st Congress, 124 bills con-

nounced the above while at a National Economics Club luncheon on August 10, 1993, while introducing a new CED report, *What Price Clean Air? A Market Approach to Energy and Environmental Policy. Emissions Charges, Trading Permits Called Best Way to Reduce Air Pollution*, 24 Env't Rep. (BNA) 638 (Aug. 13, 1993).

⁷⁸ Hahn & Stavins, *supra* note 74, at 13. One potential difficulty with incentive-based approaches is that the policies "require regulators to change the way they perceive their jobs." *Id.* See also Morgenstern, *supra* note 16.

⁷⁹ Hahn & Stavins, *supra* note 74, at 20-26. Senators Wirth and Heinz commissioned two studies which recommended the application of market approaches to a variety of environmental programs: (1) Project 88, *Harnessing Market Forces to Protect Our Environment: Initiatives for the New President* (Dec. 1988) [hereinafter Project 88] and (2) Project 88—Round II, *Incentives for Action: Designing Market-Based Environmental Strategies* (May 1991) [hereinafter Project 88—Round II] (both on file with author). Another group that appears to support emissions trading is industry. *Industry Seeking Emissions Trading Between Stationary, Mobile Sources*, AIR WATER POLLUTION REP., June 21, 1993 (available in LEXIS, Envirn Library, Pubs File); *WEPCO Working with State to Devise NO_x, VOC Trading Plan for Ozone Areas*, UTILITY ENV'T REP., Dec. 10, 1993, at 9; *Delaware Valley Business, Environmental Groups and Public Agencies Participate in Unique Clean Air Initiative*, PR NEWswire, Jan. 5, 1994 (available in LEXIS, Envirn Library, Pubs File).

⁸⁰ The enthusiasm for market-based air pollution control programs extends beyond the United States—to Canada, Mexico, and Europe. *California Opens First Smog Trades*, TORONTO STAR, Jan. 3, 1994, at B1. A coalition of Canadian industry and environmental organizations has recently recommended that the Canadian government establish air emissions trading programs similar to those in the United States. *Industry/Enviro Coalition Recommends Emissions Trading for Canada*, Clean Air Network Online Today, Dec. 8, 1993 (available in LEXIS, Envirn Library, Pubs File).

tained economic incentives.⁵¹ Project 88 and Project 88—Round II,⁵² the reports sponsored by Senators Wirth and Heinz, examined market-based strategies for protecting the environment. The reports emphasized the "practical employment of economic forces to achieve heightened protection of the environment at lower cost to society,"⁵³ and made recommendations for the use of economic incentives in areas of global air pollution, domestic air quality, energy policy, federal water policy, public land management, and solid and hazardous waste management.⁵⁴

Government Accounting Office reports also recommend the use of economic programs. In a recent GAO report on transportation control measures, investigators found that these controls do not significantly reduce vehicle air pollution, and concluded that market incentives would be more effective in easing air pollution.⁵⁵ Another GAO report concluded that in certain circumstances water pollutant trading could serve as a cost-effective supplement to more traditional water pollution regulatory programs.⁵⁶

The commitment of the Executive branch to such programs can be seen in its statements to the media and in EPA rulemaking. Recent media events include the September 1993 White House and EPA announcement of plans to expand the scope of the Title IV sulfur dioxide emission allowance trading program beyond electric utilities,⁵⁷ and Vice President Gore's recommendation, in his National Performance Review, to promote the use of economic and market-based approaches, including the trading of water pollution credits, to reduce water pollution.⁵⁸

⁵¹ Economic Incentives in Pending Environmental Legislation, 101st Congress, Regulatory Innovations Staff, Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency (1990), in *COMPLYING WITH THE NEW CLEAN AIR ACT 361-421* (Michael A. Brown ed., 1990).

⁵² Project 88, *supra* note 79; Project 88—Round II, *supra* note 79.

⁵³ Project 88, *supra* note 79, at vii.

⁵⁴ One domestic air quality recommendation from the 1988 report was the establishment of the Acid Rain Reduction Credit (ARRC) program, a model for the Clean Air Act Title IV SO₂ allowance program. *Id.* at 30-34.

⁵⁵ *Transportation Controls Ineffective in Cutting Air Pollution*, GAO Reports, 24 Env't Rep. (BNA) 638 (Aug. 13, 1993).

⁵⁶ United States General Accounting Office, GAO/RCED-92-153, *Water Pollution: Pollutant Trading Could Reduce Compliance Costs If Uncertainties Are Resolved 2* (June 1992).

⁵⁷ Melissa Healy, *Clinton Hopes to Clean Up by Buying, Selling Right to Pollute*, LOS ANGELES TIMES, Sept. 9, 1993, at A5. The so called "opt-in" program for industrial sources of sulfur dioxide emissions (which would open the program to a class of smaller polluters such as lead smelters and industrial boilers) was contained in an EPA-proposed rule, *Opting Into the Acid Rain Program*. See 58 Fed. Reg 50,088 (1993) (proposed Sept. 24, 1993).

⁵⁸ Guy Gugliotta, *Gore Report Provides Cornucopia of Big Ideas but Few Details*, WASH. POST, Sept. 8, 1993, at A17; 11 *Economic Approaches for EPA Included in Administration Performance Review*, 24 Env't Rep. (BNA) 843 (Sept. 10, 1993). Three economic approaches to improve water quality thought to have potential by some at the EPA include: effluent reduction trading between point sources; effluent reduction trading between point

The EPA has "adopted an explicit strategic goal to encourage increased use of market-based, economic incentive approaches."⁸⁹ Taking available opportunities to proclaim this goal, the EPA repeatedly has announced its commitment to, and rationale for, the use of market-based control programs in recent CAA rule makings. In its final rule for the Title V operating permit program the EPA declared:

The EPA is committed to using market-based principles to achieve the greatest level of environmental compliance at the least cost. The Title V operating permit program will lay the critical foundation for pursuing market-based programs under the Clean Air Act beyond the acid rain program under Title IV, which already provides for marketable emission allowances within an operating permit system. Before the permit program, there was no ready vehicle for quantifying and accounting for Federal air pollution control requirements at a particular facility. With a Title V permit, those control requirements can be quantified by a facility, the first step in establishing the currency necessary for a market-based system. Moreover, Title V permits will establish monitoring and compliance requirements which are essential to make a marketable system accountable.⁹⁰

The EPA's firm commitment to market-based programs was echoed in its proposed rule on economic incentive programs (EIPs),⁹¹ and in their interim guidance on the generation of mobile-source emission reduction credits (MERCs).⁹² In the MERC guidance, the EPA stated that it favored trading programs "because they offer the greatest environmental benefit for a given level of cost to our society (or conversely, the least costly method for achieving a given level of environmental benefit)."⁹³

and nonpoint sources; and pretreatment trading (effluent reduction trading between indirect dischargers to the same publicly owned treatment plant). Mahesh et al., *Economic Incentives in the Clean Water Act: Some Preliminary Results*, AIR AND WASTE MANAGEMENT ASSOCIATION PAM. 93-TP-59.07 (June 13, 1993).

⁸⁹ Karen H. Martin et al., *Economic Incentive Programs Under Title I of the Clean Air Act*, Air and Waste Management Association Pamphlet 93-TP-59.04, at 1 (13 June 1993).

⁹⁰ Operating Permit Program, 57 Fed. Reg. 32,250, 32,251-52 (1992) (final rule).

⁹¹ Economic Incentive Program Rules, 58 Fed. Reg. 11,110 (1993) (proposed Feb. 23, 1993) [hereinafter Economic Incentive Program Rules]. The EPA stated that it viewed the EIP rule "as an opportunity to encourage the development and early implementation of appropriate EIPs," so as to stimulate the adoption of incentive-based, innovative programs, where appropriate, to assist States in meeting air quality management goals "through flexible approaches which allow for less costly control strategies, and which provide stronger incentives for the development and implementation of innovative emissions reductions technology." *Id.*

⁹² Interim Guidance on the Generation of Mobile Source Emission Reduction Credits, 58 Fed. Reg. 11,134, 11,141 (1993) [hereinafter Interim Guidance on the Generation of Mobile ERC].

⁹³ *Id.*

With support from Congress, the Executive, and the EPA, market-based programs should remain, at least for the near future.⁹⁴ Accordingly, the number of market-based programs in the CAA could signal similar results in other pollution control statutes. Note that despite the widespread acceptance and backing that market-based programs enjoy, federal agencies may not participate in all of these programs.⁹⁵

The next section provides a brief overview of some of the CAA's economic incentive programs in which regulatees, including federal agencies, must be prepared to participate.

2. *Market-Based Programs in the CAA*—The CAA contains numerous market-based approaches to pollution control.⁹⁶ Regulatees either

⁹⁴ Despite this enthusiasm for market programs, some of the existing programs, like emissions trading, have had an insignificant impact on environmental quality. Reitze, *supra* note 2, at 1629. As one environmental law expert put it, "After more than a decade of trying to develop the emissions trading program, we do not have much evidence of either its utility or its success." *Id.*

⁹⁵ For example, most federal entities are unlikely to participate in the buying and selling of allowances under the Title IV Acid Deposition Control program as few power plants owned and operated on federal installations qualify as "utility units" under 42 U.S.C.A. § 7651a (17). Most federal plants do not produce electricity for sale.

One exception is the Tennessee Valley Authority (TVA). The TVA is a wholly-owned government corporation. *see* 41 C.F.R. § 101-43.4803 (1992); 31 U.S.C.A. §§ 846, 856 (1993), which operates 59 coal-fired units at 11 plants in Tennessee, Alabama, and Kentucky. Accordingly, it is a player in the SO₂ allowance program with its plants specifically listed as the recipients of SO₂ allowances.

In May 1992, the TVA bought 10,000 SO₂ allowances (the right to emit 10,000 tons of SO₂) from Wisconsin Power & Light Company, of Madison, Wisconsin, at a cost of between \$250 to \$400 per ton per year. The TVA bought the allowances to "bring it added 'flexibility' in preparing for tougher emissions standards, which take effect at the turn of the century." *Utilities May Cash in on Pollution Control*, BOSTON BUS. J., May 25, 1992 (available in LEXIS, Envirn Library, Pubs File); *TVA to Buy Emission Credits from Utility*, CHICAGO TRIBUNE, May 12, 1992 (available in LEXIS, Envirn Library, Pubs File).

In March 1993, the TVA announced that it planned to install scrubbers at units 1 and 2 of its Cumberland Plant in Cumberland City, Tennessee, before the Title IV Phase I sulfur dioxide scrubber installation deadline of January 1, 1997. Units 1 and 2 are "the largest coal-burning units in TVA's power system, burning 6 million tons of west Kentucky coal annually." The installation of the scrubbers reportedly will achieve overcompliance at the units, allowing the TVA to sell some of its Phase I allowances to offset its cost of installing the scrubbers. *TVA to Become a Seller of Emissions Allowances*, PR NEWSWIRE, Mar. 1, 1993 (available in LEXIS, Envirn Library, Pubs File). This appears to be a puzzling sequence of events for the TVA. The TVA bought 10,000 allowances for "flexibility" at the turn of the century, yet already has declared it believes that it will have surplus allowances to sell at the turn of the century once the scrubbers are installed on Cumberland Units 1 and 2 by the January 1, 1997 deadline. Why did the TVA buy allowances just to turn around and sell them later because they will be surplus?

As a wholly-owned government corporation, the TVA will be required to sell these allowances in accordance with the FPASA and the Federal Property Management Regulation (FPMR) unless they request and are granted a deviation from the General Services Administration (GSA).

⁹⁶ For a general discussion of this area *see* Elman, *supra* note 26, at 353-79; Martin et al., *supra* note 89. Most of the CAA programs listed in the text following this note were gleaned from these two sources. For an excellent discussion of the effectiveness of these methods *see* Reitze, *supra* note 2, at 1616-30.

may, or must, participate in these programs to remain in compliance with applicable SIPs. Some of these approaches include: the emission trading program discussed earlier;⁹⁷ the economic incentive program for correcting missed milestones for nonattainment areas;⁹⁸ the mobile emission reduction program including mobile-source incentives;⁹⁹ the general incentive clauses allowing the use of market programs and incentives;¹⁰⁰ the Title IV acid rain allowance trading program;¹⁰¹ the air toxics offsets program;¹⁰² allowances for the production of ozone depleting chemicals;¹⁰³ and the nationwide lead phase down in gasoline.¹⁰⁴

III. Federal Property System

The Property Clause of the United States Constitution authorizes Congress to legislate regarding property belonging to the United States.¹⁰⁵ Because Congress has exclusive power to dispose of public property, no executive department may exercise that function without congressional authority.¹⁰⁶ Congress primarily executes its property disposal authority

⁹⁷ See *supra* note 1 and accompanying text for discussion of the EPA's emission trading program.

⁹⁸ 42 U.S.C.A. §§ 7511a(g) (West 1993); Economic Incentive Program Rules, *supra* note 91. Under the Title I nonattainment area requirements, Congress specified mandatory and discretionary adoption of EIPs as SIP requirements for missed milestones in certain ozone and carbon monoxide nonattainment areas. Discretionary adoption of EIPs for any criteria pollutant is permitted under 42 U.S.C.A. §§ 7410(a)(2)(A), 7502(c)(6) (West 1993). Economic incentive programs also are allowable in Federal Implementation Plans (FIPs) and in federal ozone measures regulating control of emissions from consumer or commercial products. Economic Incentive Program Rules, *supra* note 91.

While the federal government, industry, and some environmental groups, have heralded market-based programs as the future of pollution control, the public comment period on both the EPA's proposed economic incentive program rules and the proposed interim guidance on the generation of mobile source emission reduction credits was extended seven weeks because no one requested a hearing on the rule or interim guidance. *Id.* *supra* note 91; Interim Guidance on the Generation of Mobile Source ERC, *supra* note 92.

⁹⁹ Interim Guidance on the Generation of Mobile Source ERC, *supra* note 92. Programs include accelerated retirement of vehicles, MERC generation by clean fuel fleets or vehicles, and generation of MERCs by urban buses. *Id.* at 11, 141. See also Daniel J. Dudek & Tom Walton, *Mobile Emissions Reduction Crediting: A Clean Air Act Incentive Program for Retiring High-Emitting Vehicles*, AIR AND WASTE MANAGEMENT ASSOCIATION PAM. 93-RA-112.05 (June 13, 1993).

¹⁰⁰ 42 U.S.C.A. §§ 7410(a)(2)(A), 7502(c)(6) (West 1993). These provisions mention measures including, but not limited to, economic incentives such as fees, marketable permits, and auctions of emissions rights.

¹⁰¹ *Id.* §§ 7651-7651o.

¹⁰² *Id.* § 7412(g).

¹⁰³ *Id.* § 7671f. For a description of the ozone program see David Lee, *Ozone Loss: Modern Tools for a Modern Problem*, EPA J., May-June 1992, at 16.

¹⁰⁴ Regulation of Fuel and Fuel Additives: Lead Phase Down, 49 Fed. Reg. 31,032 (1984) (proposed rule).

¹⁰⁵ U.S. CONST. art. IV, § 3, cl. 2.

¹⁰⁶ JOHN COSGROVE MCBRIDE, GOVERNMENT CONTRACTS—CYCLOPEDIA GUIDE TO LAW, ADMINISTRATION, AND PROCEDURE § 1.10, at 1-1 (rev. through 1993) (citing *United States v. Nicole*,

through the Federal Property and Administrative Services Act of 1949 (FPASA).¹⁰⁷ In the FPASA, Congress established the GSA and delegated the power to dispose of and control property of the United States to the GSA Administrator.¹⁰⁸ Congress also directed the Administrator to prescribe regulations necessary to execute functions under the FPASA.¹⁰⁹ The GSA implements its FPASA authority through the FPMRs.¹¹⁰

The GSA is an independent agency in the Executive branch.¹¹¹ The FPASA consolidated and transferred a variety of real and personal property and related functions, formerly assigned to various agencies, to the GSA.¹¹² Subsequent laws and Executive Orders have assigned related functions and programs to the GSA.¹¹³ The GSA is tasked with making policy and providing services. As a policy maker, the GSA provides guidance and direction to federal agencies in various management fields including: procurement and contracting; real and personal property management; transportation, public transportation, public utilities and telecommunications management; automated data processing management; records management; the use and disposal of property; and the information security program.¹¹⁴ In addition to this policy role, the GSA provides a variety of basic services in these areas to other government agencies.¹¹⁵

As with any large federal agency, the GSA has numerous internal organizations that handle particular areas in the GSA's broad charter. The circumstances of the disposal dictate whether ERCs will be disposed of in accordance with personal property disposal procedures or under real property disposal procedures as a type of property called "related personal property." The two GSA organizations relevant to the disposal of ERCs are the Federal Supply Service, which handles personal prop-

1 Paine 646 (Cole. & Cai. Cas. N.Y. 1826)). "Only Congress and those persons authorized by Congress may dispose of United States property pursuant to appropriate regulations." *United States v. Steinmetz*, 763 F. Supp. 1293 (D. N.J. 1991) *aff'd* 973 F.2d 212 (3d Cir. 1992).

¹⁰⁷ 40 U.S.C.A. §§ 471-544 (West 1993). Examples of other statutes that delegate property disposal authority under narrow circumstances include: the Surplus Property Act of 1944, 50 U.S.C.A. App. §§ 1622-1622(c) (West 1993); Federal Land Policy Management Act of 1976, 43 U.S.C.A. §§ 1701-1784 (West 1993); Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Pub. L. No. 100-526 (codified at 10 U.S.C.A. § 2687 note (West 1993)); Defense Base Closure and Realignment Act of 1990, Pub. L. No. 101-510 (codified at 10 U.S.C.A. § 2687 note (West 1993)).

¹⁰⁸ 40 U.S.C.A. §§ 483, 484 (West 1993). Section 101 of the FPASA established the GSA.

¹⁰⁹ *Id.* § 486(c).

¹¹⁰ 41 C.F.R. ch. 101 (1992). The FPMRs are promulgated pursuant to 40 U.S.C. § 486(c) which directs the GSA Administrator to promulgate regulations as necessary to implement his or her responsibilities under the FPASA. 40 U.S.C.A. § 486(c) (West 1993).

¹¹¹ 41 C.F.R. §§ 105-53.110, 105-53.114 (1992).

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Id.* § 105-53.112.

¹¹⁵ *Id.*

erty matters, and the Federal Property Resources Service, which handles real property matters.¹¹⁶

The FPASA and FPMRs establish the detailed policies and procedures that govern the use and disposal of federal property. While the FPASA is an "old" law and not specifically adapted to deal with the concept of ERCs and marketable emissions rights, ERCs and allowances can be dealt with in the system. Although the regulations governing the federal property system are detailed, they offer enough flexibility through grants of discretionary authority and opportunities for GSA-approved deviations from the regulations to deal effectively with any situation.¹¹⁷ As federal agencies have only recently been confronted with the opportunity to create and dispose of ERCs, this discretionary authority and ability to obtain permission to deviate from the FPMRs will be important. These provisions will enable those federal agencies that are disposing of ERCs to modify their procedures as needed as the agencies navigate their way through their initial disposal actions.

A. Federal Property Disposal in a Nutshell

Federal property use and disposal occurs in distinct phases based on whether property is classified as "excess" or "surplus." Specific procedures in the excess and surplus phases are followed depending on whether the property involved is classified as "personal" or "real." The excess property phase involves the screening of property in a specific federal agency and then among all federal agencies. When an organization within a federal agency no longer requires property, the property is screened throughout the agency to determine if another agency organization can use the property.¹¹⁸ If, after screening the property in the agency, the agency head determines that the property under his or her control is not required for the agency's needs and the discharge of its responsibilities, the property is reported to the GSA as "excess."¹¹⁹ The GSA, using its property disposal system set up under the FPMRs, screens the excess property among all federal agencies to determine if any federal agency can use the property. If another agency has a verified need for the property, it can be transferred from the holding agency to the requesting agency.

¹¹⁶ *Id.* §§ 105-53.144, 105-53.146 (1992).

¹¹⁷ The GSA Administrator may only grant deviations from the regulations. *Id.* §§ 101-43.002, 44.002, 45.002, 46.002.

¹¹⁸ For example, United States Air Force excess property is screened throughout the DOD to determine whether any of the other uniformed services or DOD organizations need the property.

¹¹⁹ The FPMRS defines "excess property" as "any property under the control of any Federal Agency which is not required for its needs and the discharge of its responsibilities, as determined by the head thereof." 40 U.S.C.A. § 472(e) (West 1993); 41 C.F.R. 101-43.001-6 (excess personal property) (1992).

If no federal agency has a need for the excess property, it becomes surplus property.¹²⁰ The transition of property from excess to surplus status occurs automatically on the "surplus property release date," which is established at the time that the property is reported as excess. The date, generally twenty-one to sixty days after the property is reported excess, marks the end of the excess property utilization screening period.¹²¹ Excess personal property reported to the GSA and not transferred to other federal agencies becomes surplus at the close of business on the release date.¹²²

Once property becomes surplus, it is available for disposal outside of the federal government. Surplus property may be disposed of through sale, exchange, lease, permit, transfer, donation, abandonment, or destruction.¹²³

The GSA has delegated its property use and disposal authority to various federal agencies. The DOD has been specifically delegated authority to sell surplus personal property under its control,¹²⁴ and other holding agencies, with GSA approval, may sell certain personal property.¹²⁵

Although the overall structure of the federal property disposal system may appear elementary, it actually is quite complex. The matrix of ERC disposal is fact dependent. Delegations of GSA authority to certain Executive agencies also affect which agency has the ultimate authority to dispose of particular property.

B. Federal Property Disposal

In general, the FPMRs are directed at "executive agencies" which include "any executive department or independent establishment of the executive branch of the Government, including any wholly owned Government corporation."¹²⁶ However, depending on the property involved and how that property ultimately will be disposed of, the FPMRs may extend to the broader category of "federal agencies."¹²⁷ "Federal agency" is defined as

¹²⁰ As defined in the FPASA and FPMRs, surplus property is "any excess property not required for the needs and responsibilities of all Federal agencies, as determined by the Administrator [of GSA]." 40 U.S.C.A. § 472(g) (West 1993); 41 C.F.R. 101-43.001-31 (surplus personal property) (1992).

¹²¹ 41 C.F.R. § 101-43.001-32 (1992).

¹²² *Id.* § 101-43.311-1.

¹²³ 40 U.S.C.A. § 484 (West 1993); 41 C.F.R. subch. H (1992).

¹²⁴ 41 C.F.R. § 101-45.103-1(a) (1992).

¹²⁵ *Id.* § 101-45.105-3.

¹²⁶ 40 U.S.C.A. § 472(a) (West 1993); 41 C.F.R. § 101-43.001-7 (1992). Some of the executive agencies most likely to engage in the disposal of ERCs are the DOD, the Department of Energy, and the TVA.

¹²⁷ 41 C.F.R. § 101-43.001-9 (1992). Different coverage depends on the property involved and what is being done with that property. Those seeking to dispose of or acquire

[A]ny executive agency or any establishment in the legislative or judicial branch of the Government (except the Senate, the House of Representatives, and the Architect of the Capitol and any activities under his direction).¹²⁸

The federal property falling under the GSA and the FPMRs includes "any interest in property" except the public domain, national park and national forest lands; certain categories of naval vessels; and federal government records.¹²⁹ Emission reduction credits, which have the traditional characteristics of property, fall under this broad definition of an "interest in property."

The FPMR divides property based on its status as "real" or "personal." Real property is defined as "Any interest in land, together with the improvements, structures, and fixtures located thereon . . . , and appurtenances thereto, under the control of any Federal agency," with certain exceptions;¹³⁰ improvements, structures, and fixtures designated for disposal without the underlying land;¹³¹ and standing timber, embedded gravel, sand, or stone under the control of any federal agency.¹³²

"Related personal property," a concept closely associated with real property, is relevant to the disposal of emissions rights. "Related personal property" is any personal property:

(a) Which is an integral part of real property or is related to, designed for, or specially adapted to the functional or productive capacity of the real property and removal of this personal property would significantly diminish the economic value of the real property. Normally, common use items, including but not limited to general-purpose furniture, utensils, office ma-

federal property, including ERCs, must pay particular attention to the specific regulatory provision involved. For instance part 101-43, Utilization of Personal Property, specifically directs "executive agencies" on property utilization and provides for transfer of excess property among the broader category of "Federal agencies." *Id.* §§ 101-43.301, .302, .309. Part 101-44, Donation of Personal Property, defines "donable property" as surplus property under the control of an "executive agency." *Id.* § 101-44.001-3. Part 101-45, Sale, Abandonment, or Destruction of Personal Property, applies to "all agencies in the executive, legislative, and judicial branches of the Government, except the Senate, the House of Representatives, and the Architect of the Capitol and any activities under his direction, to the extent provided in the Federal Property and Administrative Services Act of 1949. . . ." *Id.* § 101-45.101(a). Part 101-47, Utilization and Disposal of Real Property, applies to "all Federal agencies, except as may otherwise be specifically provided under each section or subpart." *Id.* § 101-47.101.

¹²⁸ 40 U.S.C.A. § 472(b) (West 1993); 41 C.F.R. § 101-43.001-9 (1992).

¹²⁹ 40 U.S.C.A. § 472(d) (West 1993).

¹³⁰ 41 C.F.R. § 101-47.103-12(a) (1992). Listed exceptions include the public domain; national forest or national park lands; minerals in lands suitable for disposition under mineral leasing and mining laws; lands withdrawn or reserved from the public domain; and crops designated for disposition by severance and removal from the land. *Id.*

¹³¹ *Id.* § 101-47.103-12(b).

¹³² *Id.* § 101-47.103-12(c).

chines, office supplies, or general-purpose vehicles, are not considered to be related personal property; or

(b) Which is determined by the Administrator of General Services to be related to the real property.¹³³

Related personal property is used and disposed of with the real property to which it is related under the real property disposal procedures.¹³⁴ However, if certain requirements are met, the disposal agency has the discretion to sever the related personal property from the realty and dispose of the related personal property as personal property.¹³⁵

Emission reduction credits easily could be classified as related personal property. The right to emit pollutants is critical to the functioning of some tracts of real property, especially in a nonattainment area. For example, in many areas a building cannot run its furnace or boiler to provide heat or hot water without having the right to emit pollutants. Without the ERCs associated with that building, the real property loses its ability to function and its productive capacity, which significantly diminishes its economic value. The fair market value of real property, especially one in a nonattainment area, is enhanced significantly if sold with its right to emit pollutants included. If the ERCs were severed from the particular piece of real property, the buyer would be forced to seek the necessary emissions offsets on the open market at a considerable price.

"Personal" property is defined as any property, except real property, records of the federal government, and certain categories of naval vessels.¹³⁶ Emission reduction credits severed from the real property would classify as personal property and would be disposed of according to the personal property procedures.

"Excess" property, as noted earlier, is "any property under the control of any Federal Agency which is not required for its needs and the

¹³³ *Id.* §§ 101-47.103-13, 101-43.001-27.

¹³⁴ *Id.* §§ 101-47.200, 101-47.300.

¹³⁵ *Id.* § 101-47.203-6(b). Factors to be considered include "whether the severance can be accomplished without seriously affecting the value of the realty and whether a ready disposition can be made of the severed fixtures." *Id.* Likewise, in structures to be demolished, related personal property can be designated for disposition as personal property. *Id.* § 101-47.203-6(c).

¹³⁶ *Id.* § 101-43.001-23. A subset of personal property is "intangible personal property" which is

[P]roperty including but not limited to such classes of items as patents, patent rights, processes, techniques, inventions, copyrights, negotiable instruments, money orders, bonds, shares of stock, and similar evidences of value, except as, in a given case or class of cases, may be excluded by the Administrator of General Services.

Id. § 101-43.001-16. A convincing argument could be made that ERCs qualify as intangible personal property.

discharge of its responsibilities, as determined by the head thereof.¹³⁷ Alternatively, "surplus" property is "any excess property not required for the needs and responsibilities of all Federal agencies, as determined by the Administrator [of the GSA]."¹³⁸

The circumstances of each case determine whether ERCs should be classified as related personal property and disposed of according to the real property disposal regulations or whether the ERCs should be classified as personal property and disposed of according to the personal property disposal regulations.

C. Personal Property

1. Utilization of Excess Property

a. *Agency Responsibilities*—The primary responsibilities of executive agencies under the personal property utilization regulations are to obtain the maximum utilization of federal property and to minimize the procurement of new items.¹³⁹ To meet these responsibilities, each executive agency has a duty to continuously survey property under its control to assure the property's maximum use.¹⁴⁰ When an agency determines that property no longer is required for the purpose of the appropriation from which it was purchased or for the use to which it has been applied, the agency must, to the maximum extent feasible, reassign the property within its activities.¹⁴¹ If the property is excess to the needs of the entire agency, it must promptly make the property available for transfer in accordance with the FPMRs¹⁴² and assist in the transfer of the property to other federal agencies.¹⁴³ This duty presents the issue of whether a federal agency with excess emissions reductions has a responsibility to apply for and obtain ERCs for the use and benefit of other federal agencies in the airshed in need of offsets.

For all executive agencies, the first source of supply is excess property.¹⁴⁴ Under both the FPMRs¹⁴⁵ and the *Federal Acquisition Regula-*

¹³⁷ 40 U.S.C.A. § 472(e) (West 1993); 41 C.F.R. §§ 101-43.001-6 (excess personal property) (1992).

¹³⁸ 40 U.S.C.A. § 472(g) (West 1993); 41 C.F.R. § 101-43.001-31 (surplus personal property) (1992).

¹³⁹ 41 C.F.R. §§ 101-43.302 (1992).

¹⁴⁰ *Id.* § 101-43.101.

¹⁴¹ *Id.* § 101-43.102.

¹⁴² *Id.* § 101-43.101.

¹⁴³ *Id.* § 101-43.302. Excess property must be made available for the federal agencies' direct use or for use by their authorized contractors, cooperatives, and project grantees, and to the Senate, House, Architect of the Capital, mixed ownership Government corporations, the District of Columbia municipal government or nonfederal agencies for which the GSA procures. *Id.* § 101-43.309-1.

¹⁴⁴ *Id.* § 101-43.301.

¹⁴⁵ *Id.* § 101-43.302(a).

tions (FAR),¹⁴⁶ each executive agency must, to the maximum extent practicable, fulfill its requirements for property by obtaining excess personal property from other federal agencies instead of initiating new procurement. Federal agency requirements for personal property supersede any disposal action, thus federal transfers "may be accomplished for surplus property if the holding or selling agency is notified prior to shipment or delivery of donated property or prior to actual removal of property from Government control in the case of sale."¹⁴⁷

The GSA assists federal agencies in meeting their requirement to obtain excess property in lieu of procuring new property by directing GSA regional offices to screen all agency stock replenishment requests and direct delivery purchases requests against lists of excess personal property available in that GSA region.¹⁴⁸ The GSA maintains an automated matching system that matches by national stock number the agency's requirements against reports of excess personal property.¹⁴⁹ The GSA even may take physical custody of excess personal property for redistribution or may direct transfer of the property to executive agencies instead of procuring new property from a commercial source.¹⁵⁰ Agencies must accept GSA substitution of excess property for requested new property unless the agencies provide written statements that such transfers or substitutions would cause serious hardship or impairment to agency operations.¹⁵¹

To maximize the use of excess property, federal agencies are encouraged to designate national and regional utilization officials responsible for promoting the acquisition and profitable use of available excess personal property.¹⁵² Agencies also must establish controls over the processing of transfer orders and establish and maintain an adequate property accountability system.¹⁵³ Additionally, the agencies must develop and maintain an effective system for the prevention and detection of cases involving nonuse, improper use, or unauthorized disposal or destruction of excess personal property received by the agency.¹⁵⁴ This provision prevents an overly cautious agency from acquiring ERCs to hoard in a local ERC bank for speculative future requirements. These accountability records are subject to audit by the federal agency's internal audit group and the GAO.¹⁵⁵

¹⁴⁶ JOHN CIBINIC, JR. & RALPH C. NASH, JR., *FORMATION OF GOVERNMENT CONTRACTS* 333 (2d ed. 1986) (citing FAR 8.102).

¹⁴⁷ 41 C.F.R. § 101-43.301 (1992).

¹⁴⁸ *Id.* § 101-43.302(d).

¹⁴⁹ *Id.* § 101-43.309-2(d).

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

¹⁵² *Id.* § 101-43.103

¹⁵³ *Id.* § 101-43.302(b) (1992).

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

b. Reporting Excess Property—Excess personal property, with limited exceptions, must be reported promptly to the GSA with sufficiently detailed descriptions to permit transfer or sale.¹⁵⁶ Reports to the GSA are made on GSA forms or by automatic data processing media (i.e., computer), and, for most types of property, are made to the GSA regional office for the region in which the property is located.¹⁵⁷ Reports may be submitted up to sixty days before the actual date of availability.¹⁵⁸

Some types of property have additional, specific reporting requirements. Excess-related personal property must be reported to the GSA in accordance with the regulations governing excess real property disposition in 41 C.F.R. part 101-47,¹⁵⁹ while excess personal property, even if located on excess real property, is governed by personal property disposal regulations.¹⁶⁰ Excess intangible personal property must be reported to the GSA in Washington, D.C., and must not be transferred or disposed without prior GSA approval.¹⁶¹

Special reporting requirements exist for executive agencies with installations scheduled to be discontinued, closed, or abandoned and which have excess personal property. Unless inadvisable for national security reasons, these agencies must give advance written notice of these cases as early as possible to the appropriate GSA regional office.¹⁶² Screening this type of property for federal utilization and donation generally takes seventy-five days.¹⁶³

The regulations list specific types of personal property and situations when excess property need not be reported to the GSA for screening among federal agencies.¹⁶⁴ Excess property not required to be formally reported to the GSA is still considered a valuable source of supply for federal agencies¹⁶⁵ and still must be screened locally through regional

¹⁵⁶ *Id.* § 101-43.304-1(a).

¹⁵⁷ *Id.* § 101-43.304-2 (1992). The 10 GSA regional offices are listed at 41 C.F.R. § 101-43.4802.

¹⁵⁸ *Id.* § 101-43.304-1(a).

¹⁵⁹ *Id.* § 101-44.304-3 (1992). Related personal property and its disposal are discussed below.

¹⁶⁰ *Id.*

¹⁶¹ *Id.* § 101-43.307-6. Exceptions to these requirements exist for bonds, notes, or other securities authorized to be disposed of by the Secretary of Treasury under 31 U.S.C. § 324. *Id.*

¹⁶² 41 C.F.R. § 101-43.304-4 (1992). The 1988 and 1990 base closure and realignment laws establish specific statutory requirements for DOD base closure and realignment installations. See *supra* note 43.

¹⁶³ *Id.*

¹⁶⁴ 41 C.F.R. § 101-43.4801 lists this property while 41 C.F.R. § 101-43.305 lists the circumstances.

¹⁶⁵ 41 C.F.R. § 101-43.305 (1992).

offices of the GSA.¹⁶⁶ Emission reduction credits that do not fit under other established categories, likely would be reportable under the "miscellaneous" category.¹⁶⁷ A federal agency would not be required to report ERCs to the GSA as excess if the holding agency arranged with another agency for a direct transfer of the ERCs or prearranged a transfer of ERCs to another agency through the GSA.¹⁶⁸ The C.F.R. enables agency-to-agency transfers of credits with minimal GSA participation.¹⁶⁹

An agency report of excess property is not final. Should the agency later recognize a need for the property, it may request the withdrawal of property previously reported to a GSA regional office as excess.¹⁷⁰

The GSA may take into physical custody or instruct a holding agency to retain for up to 180 days items reported as excess and determined by the GSA to be suitable for redistribution in the federal government.¹⁷¹ This provision would facilitate the GSA taking responsibility of banked ERCs and holding onto them until they are needed by some agency. As the requirements in nonattainment areas become more stringent, federal agencies will need offsets. Accordingly, the GSA should bank ERCs for the future.

c. Transfer Procedures—All transfers of excess personal property among federal agencies are consummated using approved GSA forms and automated requisitions.¹⁷² Most agency-to-agency transfers require prior approval from the appropriate GSA regional office.¹⁷³ Prior GSA approval is not required in two categories of direct agency-to-agency transfers. Those categories involve: (1) reportable property with a total acquisition cost not exceeding \$5000 and which property has not yet been reported to the GSA; and (2) nonreportable property, including property not reportable because it is involved in a direct transfer, with a total acquisition cost not exceeding \$25,000.¹⁷⁴ In either case, while prior approval is not required, the appropriate GSA regional office must be provided a copy of the direct transfer order within ten work days of receipt of the order.¹⁷⁵ These types of transfers would be rare in an ERC context because of the acquisition costs of ERCs, including emissions inventory

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* § 101-43.4801.

¹⁶⁸ *Id.* § 101-43.305(b)(6).

¹⁶⁹ *Id.* Several years ago March AFB, near Riverside, California, was involved in a prearranged transfer of emissions reductions from a nearby VA hospital. The transfer involved minimal participation by the GSA.

¹⁷⁰ 41 C.F.R. § 101-43.305-1 (1992).

¹⁷¹ *Id.* § 101-43.309-4.

¹⁷² *Id.* § 101-43.309-5(a).

¹⁷³ *Id.*

¹⁷⁴ *Id.* § 101-43.309-5(a).

¹⁷⁵ *Id.*

costs to establish a baseline for the reductions and the ERC application costs.

When ERC acquisition costs exceed the \$5000 and \$25,000 levels for a direct transfer, agencies can use a prearranged transfer. A prearranged transfer is one in which a known requirement exists for excess personal property that exceeds the \$5000 and \$25,000 acquisition cost limits for direct transfers. In a prearranged transfer, agencies may request verbal approval of property transfers through the appropriate GSA regional office.¹⁷⁶

The GSA normally approves transfers of excess personal property on a first-come, first-served basis, however, when competing known requirements exist, the GSA may consider a number of factors in determining which agency gets the property.¹⁷⁷ Those factors include national defense requirements, emergency needs, preclusion of new procurement, energy conservation, equitable distribution, transportation costs, and retention of title in the government.¹⁷⁸ When competing federal claims for particular items of excess personal property exist, the GSA will give preference to the federal agency that will retain title in the government.¹⁷⁹

Organizations eligible to participate in transfers of excess personal property include federal agencies (including their cost-reimbursement contractors, cooperatives, and project grantees), the United States Senate and the House of Representatives, the Architect of the Capitol and any of its subordinate activities, mixed ownership government corporations, the District of Columbia municipal government, and nonfederal agencies for which the GSA procures.¹⁸⁰

Whenever possible, excess personal property must be used to reduce the government's contract costs on cost-reimbursement contracts.¹⁸¹ The government furnishes excess property to a contractor in return for a reduction in cost to the government.¹⁸² For example, a military installation could transfer ERCs to a remediation contractor at a base cleanup site or to a contractor resurfacing base roads with materials that emit VOCs.

Subject to certain conditions, excess personal property also may be obtained by: (1) executive agencies for the purpose of furnishing this property to agency cooperatives under cooperative agreements;¹⁸³ and

¹⁷⁶ *Id.* § 101-43.309-5(b).

¹⁷⁷ *Id.* § 101-43.309-5(b), (e).

¹⁷⁸ *Id.* § 101-43.309-5(b), 309-5(e).

¹⁷⁹ *Id.* § 101-43.309-5(e).

¹⁸⁰ *Id.* § 101-43.309-1.

¹⁸¹ *Id.* § 101-43.312.

¹⁸² *Id.*

¹⁸³ *Id.* § 101-43.313.

(2) agency grantees when the nonfederal recipient is the holder of a federally sponsored project grant and is a public agency¹⁸⁴ or is nonprofit and tax exempt under section 501 of the Internal Revenue Code of 1954.¹⁸⁵ Grant documents must authorize the grantee to use excess property in a manner that reduces grant costs to the government.¹⁸⁶ Other conditions apply to grants of excess personal property.¹⁸⁷

Reliable information regarding the availability of excess personal property can be found through several sources. These sources include: personal contact with the GSA or the holding agency; review of GSA-circulated excess personal property catalogues and bulletins; examination and inspection of samples and reports of excess personal property assembled in GSA regional offices; and submission of current and future requirements for excess personal property to the appropriate GSA regional office.¹⁸⁸ The GSA also has an automated matching system that matches by national stock number agency requirements against reports of excess personal property.¹⁸⁹

d. Reimbursement and Proceeds—There are two fiscal components involved in the transfer of excess personal property to eligible federal recipients: reimbursement for the property and reimbursement for the costs of care and handling of the property. The requirement to reimburse the transferor agency depends on the source of funds the transferor agency used to acquire the property, and also which agencies are involved in the property transfer. As a general rule, transfers of excess personal property are without reimbursement.¹⁹⁰ Exceptions to this rule include:

- (1) The property transferred was acquired with funds either not appropriated from the general fund of the United States Treasury or appropriated from the general fund, but by law reimbursable from assessment, tax, or other revenue or receipts, and payment is requested;
- (2) The transferor or the transferee agency is a wholly-owned

¹⁸⁴ Public Agency is defined at C.F.R. § 101-43.001-26 (1992) as:

[A]ny State; political subdivision thereof, including any unit of local government or economic development district; any department, agency, or instrumentality thereof, including instrumentalities created by compact or other agreement between States or political subdivisions; multijurisdictional substate districts established by or pursuant to State law; or any Indian tribe, band, group, pueblo, or community located on a State reservation.

¹⁸⁵ *Id.* § 101-43.314 (1992).

¹⁸⁶ *Id.*

¹⁸⁷ *Id.* § 101-43.314(b).

¹⁸⁸ *Id.* 101-43.309-2.

¹⁸⁹ *Id.*

¹⁹⁰ *Id.* § 101-43.309-3(a).

or mixed-ownership government corporation, is the municipal government of the District of Columbia, or is a nonfederal agency for which the GSA procures;

(3) The transferor or the transferee agency is the United States Postal Service (USPS);

(4) The property is designated as exchange/sale property and is transferred pursuant to 41 C.F.R. part 101-46 [dealing with limited categories of similar items of personal property];

(5) The transferee agency is acquiring the property for use by a project grantee which is a public agency or is nonprofit and exempt from taxation; or

(6) Reimbursement is directed by the GSA.¹⁹¹

Under these six circumstances, reimbursement by the transferee to the transferor is required.

The amount owed to the transferor agency is based on the specifics of the transaction; either the property's fair market value or its fair value.¹⁹² Fair market value is "the best estimate of the gross proceeds that would be recovered if the property were to be sold by competitive bid."¹⁹³ Fair value is twenty percent of the original acquisition cost of new or unused property in good condition¹⁹⁴ and zero percent for all other personal property.¹⁹⁵ Fair market value may be requested by the transferor agency when:

(1) The property being transferred was acquired with funds not appropriated from the general fund of the United States Treasury;

(2) The property is designated exchange/sale rather than excess;

(3) The transferor or transferee agency is the USPS (in this case, reimbursement is required by Executive Order 11,672);

(4) The property being transferred is owned by a nonappropriated fund activity of a federal agency; or

(5) Authorized or required by other specific authority.¹⁹⁶

In contrast, fair value reimbursement is required when there is a

¹⁹¹ *Id.* § 101-43.309-3(a).

¹⁹² *Id.* § 101-43.309-3(b), (c).

¹⁹³ *Id.* § 101-43.001-8.

¹⁹⁴ "Good condition" means that "property is usable without repairs and identical or interchangeable with new items from normal supply sources." *Id.* § 101-43.4801(e).

¹⁹⁵ *Id.* § 101-43.309-3(c).

¹⁹⁶ *Id.* § 101-43.309-3(b).

reimbursable transfer and the fair market value provision does not apply.¹⁹⁷ In reimbursable ERC transactions, the costs to "acquire" them would include costs, such as emissions inventories and application fees. Disagreements between the transferor and transferee agencies regarding reimbursement requirements are referred for final determination to the GSA Regional Administrator for the region in which the property is located.¹⁹⁸

The costs of care and handling of excess personal property pending disposition are the responsibility of the holding agency, while direct costs incurred incident to the transfer are borne by the recipient if billed by the holding agency.¹⁹⁹ Direct costs exclude overhead or administrative costs.²⁰⁰ The holding agency may recover only "costs incurred in the actual packing, preparation for shipment, loading and shipment."²⁰¹ This provision, directed at the more traditional forms of personal property, appears to have little application to the transfer of ERCs.

Proceeds of a reimbursable transfer sale are paid either to the transferor agency or into the miscellaneous receipts at the United States Treasury. Proceeds must be paid to the transferor agency when:

- (1) The transferor agency acquired the property with funds not appropriated from the general fund of the Treasury;
- (2) The transferor agency is the USPS;
- (3) The transferor agency is a wholly owned or a mixed-ownership government corporation as defined in the Government Corporation Control Act (31 U.S.C. 841);
- (4) The transferor agency is the municipal government of the District of Columbia;
- (5) The transferor agency is a nonfederal agency for which the GSA procures;
- (6) The transferor agency acquired the property with appropriated funds, but by law is authorized to recover the proceeds;
- (7) The property is transferred under the exchange/sale authority of 41 C.F.R. part 101-46; or
- (8) The property transferred is the private property of a

¹⁹⁷ *Id.* § 101-43.309(c).

¹⁹⁸ *Id.* § 101-43.309-3(d).

¹⁹⁹ *Id.* § 101-43.310-1.

²⁰⁰ *Id.*

²⁰¹ *Id.*

nonappropriated fund activity.²⁰²

In all other reimbursable transfer cases where the transferor agency acquired the property with appropriated funds but has no specific authority to recover the proceeds, the transferee agency must deposit the transfer proceeds to miscellaneous receipts in the United States Treasury.²⁰³ As a practical matter, if the transferor agency does not recover the proceeds for use in their agency activities, the agency may have little incentive to expend their resources to create the ERCs in the first place.

2. Disposal of Surplus Personal Property—When property moves from excess status to surplus status, it can be disposed of outside of federal agencies. Excess personal property not transferred to other federal agencies becomes surplus at the close of business on the surplus release date. The date, and thus the length of the excess property screening period, is dictated by whether the property is reportable or nonreportable. The date for reportable property is established to occur sixty calendar days or less after receipt of the excess personal property report in the proper GSA regional office.²⁰⁴ Property excepted from reporting requirements becomes surplus when it has been made available by the holding agency for federal use for at least twenty-one calendar days after excess determination and has not been selected for transfer to other federal agencies.²⁰⁵

For agencies requiring additional time to complete a property transfer, the surplus release dates may be extended with GSA approval.²⁰⁶ Extensions of surplus release dates could become important to an agency that must prepare emissions inventories and take other necessary steps to obtain ERCs. Actually obtaining ERCs from the local AQMD is a lengthy and involved process. A typical ERC transfer through the AQMD can take from three to twelve months to complete.²⁰⁷

Surplus property is disposed of by the Administrator of the GSA, or when authority has been delegated, by the executive agency in possession of the property.²⁰⁸ Disposal occurs by: sale; exchange; lease; permit; transfer for cash; credit or other property; or by donation, abandonment

²⁰² *Id.* § 101-43.310-2(a). Nonappropriated fund property is property acquired by religious or morale, recreation or welfare activities, post exchanges, ship stores, military officer or enlisted clubs, veterans' canteens, and similar activities with funds generated by government employees and their dependents for operation of these facilities. Nonappropriated fund property is not federal property. *Id.* § 101-43.001-21.

²⁰³ *Id.* § 101-43.310-2.

²⁰⁴ *Id.* § 101-43.311-1.

²⁰⁵ *Id.* § 101-43.311-2(a).

²⁰⁶ *Id.* §§ 101-43.311-1, .311-2(a).

²⁰⁷ See *supra* note 72 and accompanying text.

²⁰⁸ 40 U.S.C.A. § 484(a), (b) (West 1993); 41 C.F.R. § 101-45.105-3(b), (c); *id.* § 101-45.103-1(a) (delegation to the DOD) (1992).

or destruction.²⁰⁹ As a general rule, all disposals or contracts for disposal of surplus property (other than by abandonment, destruction, donation, or through contract brokers) must be made by publicly advertising for bids.²¹⁰

a. Donation of Personal Property to Public Agencies—A number of public groups recently have sought the no cost transfer of ERCs or emissions reductions from realigning or closing federal facilities. Community groups seek to acquire these rights to assist them in their plans to reuse and redevelop the installations for civilian purposes. Affected AQMDs seek the reductions and ERCs for community banks to be used as progress toward nonattainment milestones and, ultimately, attainment. The groups could obtain these ERCs through the personal property donation program.

The Federal Property Administrative Services Act (FPASA) establishes an elaborate program for the donation of surplus personal property.²¹¹ Under the program, executive agency controlled surplus personal property may be transferred to a state property distribution agency for donation to public agencies and other eligible donees within the state.²¹² The transfers are without cost, except for the cost of care and handling.²¹³ The FPASA gives the Administrator of General Services discretionary power to prescribe and execute the necessary regulations for this federal surplus property donation program.²¹⁴ The GSA has implemented this program in great detail in 41 C.F.R. part 101-44, Donation of Surplus Property.

The federal personal property donation program is a tremendous boon to eligible donees because it gives them the first chance to obtain certain property. The regulations specifically require that any surplus personal property eligible for donation be held available for screening in the donation program before the property can be assigned for sale, abandonment, or destruction.²¹⁵ The types of donable property, number of eligible donees, and the purposes for which donees can acquire surplus property form an elaborate regulatory matrix.

A prerequisite to state participation in the federal surplus personal property donation program is the establishment of a single state agency responsible for all transferred property and distribution. The single state agency must be established and operated pursuant to a detailed plan

²⁰⁹ 40 U.S.C.A. § 484(c) (West 1993); 41 C.F.R. pt. 101-45 (1992).

²¹⁰ 40 U.S.C.A. § 484(e) (West 1993); 41 C.F.R. § 101-45.304-1 (1992).

²¹¹ 40 U.S.C.A. § 484(j) (West 1993).

²¹² *Id.*

²¹³ *Id.* § 484(j)(1).

²¹⁴ 41 C.F.R. § 101-44.201 (1992).

²¹⁵ *Id.* § 101-43.311-2.

developed according to state law and conforming with the FPASA.²¹⁶ In addition to providing for the agency's establishment and operation, the state plan of operation must assure that the state agency has the necessary organizational and operational authority and capability to effectively, accurately, and equitably administer its program.²¹⁷ The Administrator of General Services must approve all plans.²¹⁸

A state also must include in its plan numerous assurances and procedures specified in the FPMRs. These include the requirement and procedures for donees to return donable property to the state agency if such property has not been placed in use for the purposes for which it was donated within one year of donation or if it ceases to be used by the donee for such purposes within one year of being placed into use.²¹⁹ Procedures require a state agency to impose terms, conditions, reservations, and restrictions on the donee for property with an acquisition cost of \$5000 or more, and for special categories of property which the GSA determines warrant special handling or use limitations.²²⁰ Fair and equitable distributions of surplus personal property provides for donation to all eligible donees in the state.²²¹ The FPMRs also include procedures to determine applicant eligibility²²² and state review of property utilization, compliance actions, and fraud investigations.²²³

(1) *Donable Property*—All surplus personal property under the control of an executive agency is eligible to be transferred for donation, with some limited exceptions. The exceptions relevant to the disposal of ERCs include property which the Administrator of General Services periodically specifies as: nondonable;²²⁴ nonappropriated fund property;²²⁵ and property requiring reimbursement on transfer.²²⁶ Such nondonable property must be disposed of by sale, abandonment, or destruction. Disposing ERCs is complex and determinations must be made on a case-by-case basis looking to the property's GSA designation, the

²¹⁶ *Id.* § 101-44.202.

²¹⁷ *Id.*

²¹⁸ *Id.*

²¹⁹ *Id.* § 101-44.202(c)(4).

²²⁰ *Id.* § 101-44.202(c)(6). These are the property categories listed in 41 C.F.R. § 101-44.108.

²²¹ *Id.* § 101-44.202(c)(8).

²²² *Id.* § 101-44.202(c)(9).

²²³ *Id.* § 101-44.202(c)(10).

²²⁴ *Id.* § 101-44.001-3.

²²⁵ *Id.*

²²⁶ *Id.* § 101-43.309-3. Such property includes that property "acquired with funds either not appropriated from the general fund of the U.S. Treasury or appropriated from the general fund but by law reimbursable from assessment, tax, or other revenue or receipts, and payment is requested." *Id.* § 101-43.309-3(a).

agencies involved, and to the funds originally used to buy the credits.

(2) *Eligible Donees*—The regulations establish two general and three specific classes of donees in a state to which surplus personal property may be donated through the state agency.²²⁷ The two general classes are public agencies²²⁸ and nonprofit tax-exempt educational or public health institutions or organizations.²²⁹ Section 101-44.207 establishes the criteria for determining eligibility of public agencies and nonprofit tax-exempt activities in each state to participate in the surplus personal property donation program and the authorized purposes for which the donated property may be used.²³⁰

Eligible public agencies listed in the FPMRs include:

any State; political subdivision thereof, including any unit of local government or economic development district; any department, agency, or instrumentality thereof, including instrumentalities created by compact or other agreement between States or political subdivisions; multijurisdictional substate districts established by or pursuant to State law; or any Indian tribe, band, group, pueblo, or community located on a State reservation.²³¹

The regulations also include a nonexhaustive list of eligible nonprofit tax-exempt educational and public health activities. That list includes: medical institutions; hospitals; clinics; health centers; providers of assistance to homeless individuals; schools, including those for the mentally retarded and physically handicapped; colleges; universities; child care centers; FCC-licensed educational radio or television stations; public museums; free libraries; and organizations or institutions that receive funds appropriated for programs for older individuals.²³²

²²⁷ The term "donee" includes:

a service educational activity; a State, political subdivision, municipality, or tax-supported institution acting on behalf of a public airport; a public agency using surplus personal property in carrying out or promoting for the residents of a given political area one or more public purposes, such as conservation, economic development, education, parks and recreation, public health, and public safety; an eligible nonprofit tax-exempt educational or public health institution or organization; the American National Red Cross; a public body; an eleemosynary institution; or any State or local government agency, and any nonprofit organization or institution, which receives funds appropriated for programs for older individuals under the Older Americans Act of 1965, as amended, under title IV or title XX of the Social Security Act, or under titles VIII and X of the Economic Opportunity Act of 1964 and the Community Services Block Grant Act.

Id. § 101-44.001-4.

²²⁸ *Id.* § 101-44.207(b)(1).

²²⁹ *Id.* § 101-44.207(c).

²³⁰ *Id.* § 101-44.207.

²³¹ *Id.* §§ 101-44.001-10, 101-44.207(b)(1).

²³² *Id.* § 101-44.207(c).

A public agency must use surplus personal property acquired through the state agency to implement or promote one or more public purposes for the residents of a given political area.²⁸³ The regulations define "public purpose" as:

a program or programs carried out by a public agency which are legally authorized in accordance with the laws of the state or political subdivision thereof and for which public funds may be expended. Public purposes include but are not limited to programs such as conservation, economic development, education, parks and recreation, public health and public safety;²⁸⁴

The regulations explain each authorized public purpose in detail,²⁸⁵ and also state that the list of public purposes is not exclusive. Under the regulations, a public agency can acquire donable surplus personal property—such as ERCs—for almost any purpose that arguably is directly related to the public interest.

The following public purposes support the acquisition of air credits for air quality improvement and other uses: public health (which specifically includes air pollution control);²⁸⁶ economic development (which specifically includes environmental and antipollution programs of municipal, county, or state agencies);²⁸⁷ and conservation.²⁸⁸ The public purposes listed in the FPMRS support public agencies acquiring surplus federal ERCs to ensure that—when required by state law to have permits or allowances—public agency emissions are in compliance with the SIP.

While property acquired by donation by a public agency must be used for a public purpose, surplus personal property acquired by a non-profit tax-exempt educational or public health institution or organization must only be used for educational or public health purposes.²⁸⁹ The property may not be used for nonrelated or commercial purposes.²⁴⁰

In addition to the general provisions regarding the donation of sur-

²⁸³ *Id.*, § 101-44.207(b)(2).

²⁸⁴ *Id.*, § 101-44.207(a)(2).

²⁸⁵ *See id.*, § 101-44.207(b).

²⁸⁶ *Id.*, §§ 101-44.207(a)(19), 101-207(b)(2)(v).

²⁸⁷ *Id.*, §§ 101-44.207(a)(7), 101-44.207(b)(2)(ii).

²⁸⁸ *Id.*, §§ 101-44.207(a)(6), 101-44.207(b)(2)(i).

²⁸⁹ *Id.*, § 101-44.207(d). "Public health" means

a program or programs to promote, maintain, and conserve the public's health by providing health services to individuals and/or by conducting research, investigations, examinations, training, and demonstrations. Public health services may include but are not limited to the control of communicable diseases, immunization, maternal and child health programs, sanitary engineering, sewage treatment and disposal, sanitation inspection and supervision, water purification and distribution, air pollution control, garbage and trash disposal, and the control and elimination of disease-carrying animals and insects.

Id., § 101-44.207(a)(19).

²⁴⁰ *Id.*

plus personal property to public agencies and eligible nonprofit tax-exempt activities, the regulations have special provisions for the donation of surplus personal property to three specific classes of donees: service educational activities,²⁴¹ public airports,²⁴² and the American National Red Cross.²⁴³ The two groups relevant for marketable permit purposes are service educational activities and public airports. Department of Defense surplus personal property usable and necessary for education activities of special interest to the Armed Forces may be transferred through the GSA to the appropriate state agency for distribution through donation to service educational activities.²⁴⁴ These activities include maritime academies or military, naval, Air Force, or Coast Guard preparatory schools.²⁴⁵ Service educational activities must apply to the GSA for surplus personal property under the control of the DOD.²⁴⁶

Surplus personal property determined by the Administrator of the Federal Aviation Administration to be essential, suitable, or desirable for the development, improvement, operation, or maintenance of a public airport may be donated with GSA approval to public airport applicants.²⁴⁷ Approval of such transfers is at the discretion of the Administrator of the GSA.²⁴⁸ Public airport applicants for surplus personal property apply to the GSA for the property. Such property must be essential, suitable, or desirable for the development, improvement, operation, or maintenance of a public airport or reasonably necessary to fulfill the immediate and foreseeable future requirements of the applicant for the development, improvement, operation, or maintenance of a public airport.²⁴⁹ Airports share many of the same emissions sources as military installations. These airport sources need ERCs or offsets to operate. Thus, this provision could be used to obtain surplus ERCs for airport purposes.

(3) *Donation Screening*—Holding agencies must provide a

²⁴¹ *Id.* § 101-44.400.

²⁴² *Id.* § 101-44.500.

²⁴³ *Id.* § 101-44.600. Property that has been determined to be surplus property and that has been processed, produced, or donated by the American National Red Cross, must be made available for donation to the Red Cross for charitable purposes, unless the GSA Administrator directs otherwise. *Id.*

²⁴⁴ *Id.* § 101-44.400. These transfers are authorized under 40 U.S.C. § 484 (§ 203(j)(2) of the FPASA).

²⁴⁵ 41 C.F.R. § 101-44.400 (1992).

²⁴⁶ *Id.* § 101-44.402. When the service educational activity no longer needs or ceases to use the donated property, the activity must report the property to the appropriate state agency for transfer. When the state agency does not require the property, the Defense Reutilization and Marketing Office (DRMO) (the DOD property disposal agency) accepts the property for disposal or advises the activity as to how to dispose of the property. *Id.* § 101-44.403. This is an interesting provision in that activities no longer needing DOD ERCs must return them.

²⁴⁷ *Id.* § 101-44.500; 50 U.S.C. app. § 1622(g), Surplus Property Act of 1944.

²⁴⁸ 41 C.F.R. § 101-44.501(b) (1992).

²⁴⁹ *Id.* § 101-44.502.

period of twenty-one calendar days following the surplus release date for donation screening of surplus reportable and nonreportable property determined to be usable and necessary for donation purposes.²⁵⁰ During this donation screening period, applications for surplus personal property are processed in a specific sequence. Department of Defense personal property reportable to the GSA is reserved for public airport donation during the first five calendar days of the donation screening period and for service educational activities for the next five days of the screening period.²⁵¹ The property is then available on a first-come, first-served basis during the remaining portions of the donation screening period.²⁵² Other executive agency personal property reportable to the GSA is reserved for public airport donation during the first five calendar days of the donation screening period and is then available on a first-come, first-served basis for the remainder of the period.²⁵³ All executive agency personal property not reportable to the GSA is made available on a first-come, first-served basis.²⁵⁴

The property is generally transferred and donated free of charge. Pending donation, each holding agency is responsible for the care and handling of its property. The holding agency's direct costs to pack and prepare property for shipment, or load property incident to the donation, must be borne by the state agency or designated donee.²⁵⁵ The holding agency may waive the amount if uneconomical or impractical to collect.²⁵⁶

One issue not clearly addressed by the regulations is who must pay for the creation of ERCs in the first instance. Emission reduction credits are unique in that the federal agency must expend resources to create the ERCs through the local AQMD procedures. If an agency has surplus emissions reductions that qualify as donable property transferrable free of charge, the agency has no incentive to expend resources to apply for and create the ERCs.

The holding agency must retain surplus property reserved for donation for a period not to exceed forty-two calendar days from the surplus release date pending receipt of an approved GSA transfer order and specific instructions for transfer.²⁵⁷ The transferee is responsible for removing the property or arranging with common carriers for its shipment.²⁵⁸ At the end of the forty-two day period, the holding agency may dispose

²⁵⁰ *Id.* §§ 101-44.102(d), 101-44.109(a).

²⁵¹ *Id.* § 101-44.109(b).

²⁵² *Id.*

²⁵³ *Id.*

²⁵⁴ *Id.*

²⁵⁵ *Id.* §§ 101-44.102(c), 101-44.104.

²⁵⁶ *Id.*

²⁵⁷ *Id.* § 101-44.102(e).

²⁵⁸ *Id.*

of the property by sale or other authorized disposal if the GSA approval and instructions have not been received.²⁵⁹

As with any government transaction, the parties must have the proper documentation. Surplus property must not be released by a holding agency for donation until the agency has received the appropriate form signed by the GSA approving the donation.²⁶⁰ Requests for donation may be disapproved when the GSA determines it is in the public interest to do so; when the property is not surplus; or when a transfer of the property to a federal agency is pending.²⁶¹

The GSA must allocate donable property to states on a fair and equitable basis applying criteria listed in the regulations.²⁶² The GSA's involvement may be required when ERC allocations involve interstate AQCRs or in areas such as the Northeast ozone transport region.

The procedures for a state agency to request that the GSA transfer donable personal property are set forth in section 101-44.204 of the C.F.R. The state agency must certify in its request to the GSA for the transfer of donable property that: it is the designated state agency authorized to receive surplus property for distribution to eligible donees; it has adequate funds, facilities, and personnel to effectively account for, warehouse, maintain, and distribute the property; the property requested is usable and needed by a public agency for one or more public purposes; the donee acquiring the property is eligible within the meaning of the FPASA and GSA regulations; and that the property is usable and needed by the donee.²⁶³

A state agency or donee may request that surplus property which is being offered for sale be withdrawn and approved for donation, only if such property was not previously made available for donation or such action is not harmful to the sale.²⁶⁴ States only get one opportunity to claim property being donated. They cannot go after property by requesting that it be withdrawn from sale once the donation period is over and the property is offered for sale.

²⁵⁹ *Id.*; see also *id.* § 101-44-114(a).

²⁶⁰ *Id.* § 101-44.112(a).

²⁶¹ *Id.* § 101-44.112(b).

²⁶² *Id.* § 101-44.203. The criteria applied by the GSA in effecting allocation and transfer of surplus personal property among the states include: need and usability of property; regions or states in greatest need of the particular type of property; extraordinary needs occasioned by disasters; the quantity of that type of property previously allocated to a state agency or potentially available to a state agency from a more advantageous source, a state agency's previous performance in effecting timely pickup, removal, or distribution of prior property allocations from the GSA; and equitable distribution based on the property's condition and acquisition cost, as well as the ratio of population and per capita income of each state. *Id.*

²⁶³ *Id.* § 101-44.204(a).

²⁶⁴ 41 C.F.R. § 101-44.107 (1992).

Title to donable property picked up or shipped to a state agency remains vested in the United States even though the state has taken possession of the property.²⁶⁵ Conditional title to the property passes to the eligible donee when the donee executes the certifications and agreements required by the state agency and has taken possession of the property.²⁶⁶ The state agency may not retain for use in performing its own functions surplus property approved for transfer by GSA for donation unless the use of such property is authorized by the GSA pursuant to the terms of a cooperative agreement between the state agency and the GSA.²⁶⁷ The title to all donable property located in a state agency distribution center also vests in the United States with only the right to possession granted to the state agency.²⁶⁸ While title to the property remains vested in the United States, the state agency has a duty to protect the property.²⁶⁹ The state agency must report to the GSA any unneeded property in its possession.²⁷⁰ With GSA approval and assistance, a state may sell usable unneeded property or abandon or destroy unusable unneeded property.²⁷¹

The FPMRs provide directions for the distribution of property to donees. Donees must certify to the state agency, among other things, that they will: agree to hold the federal government harmless; return to the state agency donated property that either is not placed in use for its donated purpose within one year of donation or which ceases to be used for those purposes within one year of being placed in use; and abide by applicable terms, conditions, reservations and restrictions including a period of restriction during which the donee must use the property only for the purpose for which it was acquired.²⁷² The state agency's distribution document must indicate the primary purpose for which the property is to be used.²⁷³

Conditional title to surplus personal property passes to an eligible donee when the donee has executed the state agency distribution document and taken possession of the property.²⁷⁴ Should the donee dispose of the property without authorization during the period of restriction (the period during which the donee must use the property for the purpose for which it was acquired),²⁷⁵ the state must recover the greater of either the gross proceeds realized from the disposal or the fair market value of the

²⁶⁵ *Id.* § 101-44.204(b).

²⁶⁶ *Id.*

²⁶⁷ *Id.* § 101-44.204(b)(4).

²⁶⁸ *Id.* § 101-44.205(a).

²⁶⁹ *Id.* § 101-44.205(b).

²⁷⁰ *Id.* § 101-44.205(g).

²⁷¹ *Id.* §§ 101-44.205(i), 101-44.205(k).

²⁷² *Id.* § 101-44.208(a).

²⁷³ *Id.* § 101-44.208(b).

²⁷⁴ *Id.* § 101-44.208(c).

²⁷⁵ *Id.* § 101.44.208(a)(6).

property, when it is otherwise impossible or impracticable to recover property disposed of improperly during the period of restriction.²⁷⁰ Coordination with the GSA may be required before enforcement action by the state to sell or demand the payment of fair market value of donated property.²⁷¹ This provision prevents eligible donees from acquiring ERCs for a stated permissible purpose and then selling them for a profit or donating them to the local AQMD's emission bank.

States may amend, modify, or grant releases from the terms, reservations, or restrictions that it has imposed on use of donated property if the state's plan of operations provides standards for these actions.²⁷² Personal property returned to a state agency by a donee must be redistributed to other donees in the state, or otherwise transferred or disposed of pursuant to the state plan of operation.²⁷³

The Administrator of General Services is authorized under section 203(j)(4) of the FPASA to impose appropriate conditions on the donation of property having characteristics requiring special handling or use limitations.²⁸⁰ The FPMRs specifically address the numerous categories of property.²⁸¹ While ERCs do not fit in any of these categories, the general grant of authority in the FPASA to the GSA authorizes the GSA to impose restrictions on the use and transfer of ERCs.

A donation program regulatory provision having ramifications for federally donated air credits is one that allows the recovery of property for federal use which provides:

[o]ccasionally, Federal agencies may develop on an exigency basis requirements for personal property items derived from surplus sources in the possession of a State agency. The State agency should cooperate with GSA in the recovery of property to fulfill Federal needs. The transfer will be subject to payment by the acquiring agency of the costs of care and handling, including transportation that were incurred by the State agency initially acquiring this property.²⁸²

This section would allow federal agencies to condition the donation of ERCs to the local AQCD or state air agency and then recall them on an

²⁷⁰ *Id.* §§ 101-44.208(e), 101-44.208(f).

²⁷¹ *Id.* § 101-44.208(g).

²⁷² *Id.* § 101-44.208(h).

²⁷³ *Id.* § 101-44.208(i).

²⁸⁰ *Id.* § 101-44.108.

²⁸¹ Those categories include drugs and medical materials, aircraft, munitions, bedding and upholstered furniture, tax free and specially denatured alcohol, franked and penalty envelopes and paper with official letterhead, pesticides and herbicides, vessels, and noncertified electronic products. *Id.*

²⁸² *Id.* § 101-44.117

"exigency basis." This may be impractical, but provides a bargaining chip that could benefit federal agencies in negotiations with their AQMD.

(4) *Miscellaneous Issues*—Two final points dealing with the personal property donation program deserve mention. First, each federal agency must submit to the GSA an annual report of the donation of surplus personal property.²⁸³ The GSA must submit biennially to the President of the Senate and Speaker of the House of Representatives a detailed report regarding the surplus property donation program, statistics on the excess personal property transferred, and recommendations necessary or desirable.²⁸⁴ Such reports and recommendations may play a significant role once federal agencies and those seeking to obtain surplus federal ERCs realize the value and importance of ERCs in the CAA and marketplace. Once the players recognize the value of ERCs and other marketable rights, they may seek to modify the FPMRs and statutes to better accommodate the transfer of ERCs.

Finally, deviations from the regulations may be granted by the Administrator of General Services.²⁸⁵ To donate personal property ERCs directly to a reuse group or AQMD, an agency would require such a deviation.

b. Direct Donations of Personal Property to Public Bodies—

In addition to the extensive surplus property donation program discussed above (that uses a state agency as the clearinghouse for the transfer and donation of surplus personal property to eligible donees within a state), the FPMRs establish a second, more limited, donation program. This smaller program—which permits the donation of low value property from an executive agency directly to a public body—is necessary in understanding the FPMRs, but rarely used with ERC transactions.²⁸⁶

This program differs from the primary donation program established by the FPMRs. First, donable property is limited to property that has no commercial value or of which the estimated cost of continued care and handling would exceed its estimated sales proceeds.²⁸⁷ Before donating the property, the executive agency must affirmatively find in writing that the property meets these conditions.²⁸⁸ For property that had an original cost exceeding \$1000, the agency must have the findings approved by a reviewing authority.²⁸⁹

Second, the property may be donated directly from the executive

²⁸³ *Id.* § 101-44.4701.

²⁸⁴ *Id.*

²⁸⁵ *Id.* § 101-44.002.

²⁸⁶ *Id.* subpt. 101-44.7.

²⁸⁷ *Id.* § 101-44.700.

²⁸⁸ *Id.* §§ 101-44.701 to -.702.

²⁸⁹ *Id.*

agency to the donee, rather than being transferred to a state agency for donation to the donee. Finally, eligible donees are "public bodies"²⁹⁰ rather than "public agencies."²⁹¹ The term "public body" is more restrictive than "public agency."²⁹²

c. Sale of Surplus Personal Property—Surplus personal property that is not disposed of through donation may be sold, abandoned, or destroyed. The regulations dealing with the sale, abandonment, and destruction of surplus personal property apply to all agencies in the executive, legislative, and judicial branches of government, with the exception of the Senate, the House of Representatives, and the Architect of the Capitol and subordinate activities.²⁹³ A federal agency's need for personal property is paramount to any disposal of that property, if that need is made known to the holding or selling agency before actual removal of the property from government control.²⁹⁴

Through its regional offices, the GSA is the single sales agency of the government in the sale of personal property under the control of executive agencies and is responsible for conducting all aspects of sales for holding agencies.²⁹⁵ There are three situations applicable to ERC disposal when the GSA allows holding agencies to sell surplus personal property. First, the GSA has specifically delegated to the DOD the authority to sell all surplus property under its control.²⁹⁶ Second, after screening property as excess and for donation to public agencies, a holding agency may, on notification to the appropriate GSA regional office, sell small lots of personal property (when the estimated sales proceeds will not exceed \$5000) and perishable items (regardless of the estimated sales proceeds).²⁹⁷ If AQMD regulations establishing ERCs made them "perishable items" by establishing a time period in which the ERCs must be used, the holding agency would have added flexibility to sell those ERCs. Finally, after required screening, a holding agency may, with GSA approval, sell personal property where the estimated sales proceeds exceed \$5000.²⁹⁸ This provision would also allow an agency to sell its own ERCs.

²⁹⁰ *Id.* § 101-44.001-11. "Public body" means:

any State, territory, or possession of the United States; any political subdivision thereof; the District of Columbia; the Commonwealth of Puerto Rico; any agency or instrumentality of any of the foregoing; any Indian tribe; or any agency of the Federal Government.

Id.

²⁹¹ *Id.* § 101-44.001-10.

²⁹² Compare 41 C.F.R. § 101-44.001-10 and 41 C.F.R. § 101-44.001-11 (1992).

²⁹³ *Id.* § 101-45.101.

²⁹⁴ *Id.* § 101-45.102.

²⁹⁵ *Id.* §§ 101-45.103-1(a), 101-45.301.

²⁹⁶ *Id.* § 101-45.103-1(a). This delegation is important in the context of base closure and realignment.

²⁹⁷ *Id.* § 101-45.105-3(b).

²⁹⁸ *Id.* § 101-45.103-3(c).

(1) *Eligible Buyers*—Almost anyone can buy surplus personal property from the government. Enterprising government employees who wish to enter the emissions rights market can purchase government personal property unless prohibited by the employees' executive agencies regulations.²⁹⁹ Contractors that are not suspended, debarred, or otherwise ineligible, also can buy surplus ERCs.³⁰⁰

(2) *Methods of Sale*—The GSA regional office will program for sale surplus property not transferred by donation.³⁰¹ The two methods of sale are competitive bid and negotiation.

(a) *Competitive Bid Sales*—Except in specified circumstances, property must be sold by competitive bid sale after advertising.³⁰² Competitive bid sales include sealed bid sales, spot bid sales, and auction sales.³⁰³ Sealed bid sales require bidders to submit to the designated office sealed written bids. The bids must be on the specified bid forms and are opened publicly at a specified time and place.³⁰⁴

In spot bid sales, the bidders are present—furnished bid forms in advance of the bidding—and the official in charge requests bids on specific items offered for sale. The terms of the spot bid sale reserve the right to reject all bids, and items on which all bids are rejected may be reoffered at the same sale to secure an acceptable bid price. Immediately following the offering of the item or lot, all bids are examined and award is made or bids are rejected. Mailed, written, or drop bids also may be permitted.³⁰⁵

Auction sales involve sales "by outcry, orally soliciting bids by gradual increase using a rhythmic chant calling the amount bid and the increased amount being solicited until the highest bid is received."³⁰⁶ The terms and conditions of the auction sale are published and distributed to participating buyers, with any special or unusual conditions of sale announced by the auctioneer immediately prior to the commencement of the sale. All offerings must reserve in the government the right to accept or reject any or all bids. To secure acceptable bids, lots for which all offers have been rejected may be reoffered later at the same auction sale.³⁰⁷

(b) *Negotiated Sales*—The second approved method of sale of surplus personal property is by negotiation. Property may be sold by

²⁹⁹ *Id.* § 101-45.302.

³⁰⁰ *Id.* subpt. 101-45.6.

³⁰¹ *Id.* § 101-45.303.

³⁰² *Id.* § 101-45.304-1.

³⁰³ *Id.*

³⁰⁴ *Id.* § 101-45.304-1(a).

³⁰⁵ *Id.* § 101-45.304-1(b).

³⁰⁶ *Id.* § 101-45.001-1.

³⁰⁷ *Id.* § 101-45.304-1(c).

negotiation only under limited conditions, subject to obtaining such competition as is feasible under the circumstances.⁹⁹⁸ Such circumstances include:

(1) The agency determines that the sale involves property:

(i) That has an estimated fair market value not in excess of \$ 15,000;

(ii) Where public exigency will not admit of the delay incident to advertising;

(iii) Where bid prices after advertising therefor are not reasonable (either as to all or some part of the property), or bid prices have not been independently arrived at in open competition, and it is determined that readvertising will serve no useful purpose: Provided, That all responsible bidders who responded to the previous advertising are afforded an opportunity to submit offers for the property; or

(iv) That the disposal will be to a State, territory, possession, political subdivision thereof, or tax-supported agency therein, and that the estimated fair market value of the property and other satisfactory terms of disposal are obtained by negotiation [See 41 C.F.R. § 101-45.304-12].

(2) Full and adequate justification for negotiated sale has been submitted to the head of the selling agency or his designee for prior approval, and he has determined:

(i) That the public health, safety, or national security will thereby be promoted; or

(ii) That it is necessary in the public interest during the period of a national emergency declared by the President or the Congress.

(3) Full and adequate justification for negotiated sale has been submitted to the Administrator of General Services for his prior approval, and he has determined that the property involved is of a nature and quantity which, if disposed of by advertising would cause such an impact on an industry or industries as to adversely affect the national economy: Provided, That the estimated fair market value of such property and other satisfactory terms of disposal can be obtained by negotiation.

(4) Negotiation is otherwise authorized by the FPASA or other law.⁹⁹⁹

⁹⁹⁸ *Id.* § 101-45.304-2(a).

⁹⁹⁹ *Id.* § 101-45.304-2(a).

The disposal of surplus ERCs or marketable permits by negotiation could occur under these conditions depending on the facts of the case. The most likely situations would involve (1)(iii) and (iv), (2)(i), and (4) (if a specific law was passed).

Generally, when property is sold by negotiated sale, the selling price is a term determined during the course of negotiations. However, property may be sold by negotiated sale at fixed prices with the prior approval of the Administrator of General Services.³¹⁰ Before offering this property to the public, it may be offered at fixed prices, through state surplus property agencies, to state and local governments that have expressed an interest in the property.³¹¹

With limited exception, the selling agency must prepare an explanatory statement of the circumstances of each proposed disposal by negotiation.³¹² The statement must be submitted to the Administrator of General Services for review and transmitted to the appropriate committees of the Senate and House of Representatives. When the committees have not taken any action on the proposed negotiated disposal, the selling agency may consummate the sale on or after thirty-five days from the date of the GSA's letters transmitting the explanatory statement to the congressional committees.³¹³

Holding agencies authorized to sell personal property when the estimated sales proceeds will not exceed \$5000, and for perishable items regardless of estimated sales proceeds, may only use the competitive bid sales method.³¹⁴ Other requirements for these limited sales are outlined in C.F.R. § 101-45.304-3.

*(c) Advertising of Competitive Bid and Negotiated Sales—*Adequate public notice must be given to each offering for sale of property to be disposed of by competitive bid sale.³¹⁵ Negotiated sales also must be advertised. Advertising must be made in sufficient time before the sale to permit full and free competition, except when the nature and condition of the property does not permit.³¹⁶ The extent of advertising depends on the quantity and type of property to be sold, the logical market of disposal, the type of sale contemplated, and the public interest.³¹⁷ Sealed bid sales require advertising by the distribution of written invita-

³¹⁰ *Id.* § 101-45.304-2(b).

³¹¹ *Id.* § 101-45.304-2(b)(2). This is done in accordance with the procedures outlined in 41 C.F.R. § 101-45.304-12 (1992).

³¹² *Id.* § 101-45.304-2(c).

³¹³ *Id.* § 101-45.304-2(c)(1).

³¹⁴ *Id.* § 101-45.304-3.

³¹⁵ *Id.* § 101-45.304-7.

³¹⁶ *Id.*

³¹⁷ *Id.*

tions for bids (IFBs), including public posting of the IFBs, and may be supplemented by advertising in newspapers or trade journals.³¹⁵ Spot bid sales also require advertising through written IFBs or other notices, including public posting of the IFBs.³¹⁶ Notice also may be given by newspaper or trade journal.³²⁰ Auction sales ordinarily should employ newspaper or trade journal advertising, in addition to other appropriate written notice.³²¹ Limited sales by holding agencies require advertising by public posting or mailing a standard government property sale poster for property valued under \$500 fair market value, and by classified advertisement in at least one local newspaper in the trading area for property with fair market value estimated to exceed \$500.³²²

The Department of Commerce also may regularly publish in the *Commerce Business Daily* a synopsis of principal proposed sales of government personal property.³²³ When the acquisition cost of property to be sold at one time at one place is \$250,000 or more, notice of the proposed sale must be forwarded to the Department of Commerce for publication. When the acquisition cost is less than \$250,000, the notice may be forwarded to the Department of Commerce if deemed appropriate.³²⁴

With a limited exception for credit sales to state and local governments,³²⁵ personal property cannot be offered for sale or sold on credit without the prior approval of the Administrator of General Services or designee.³²⁶ The terms and conditions of sale may require a bid deposit, normally twenty percent of the estimated contract price,³²⁷ with final payment due prior to removal of the property from the possession of the government.

To be considered for award, bids must be responsive. To be responsive

³¹⁵ *Id.* § 101-45.304-7(a)(1). Invitation for bids are placed on standard GSA forms specified in 41 C.F.R. § 101-45.304-8 and generally include: (1) a cover sheet detailing the method of sale, sale number, general categories of property being offered, selling activity, inspection period, and the bid opening time and date of sale; (2) a bid and award sheet detailing the person to contact for sales information, address to which bids should be mailed, bid opening details (place, date, and time), whether or not bid deposit is required, number of days for payment to be made and property to be removed; (3) general sales terms and conditions; (4) special sales terms and conditions; (5) a bid page for submission of actual bid; and (6) a description of the property for sale which adequately describes the property including all factual information necessary to convey to prospective bidders an accurate, concise, and clear understanding of the property being offered.

³¹⁶ *Id.* § 101-45.304-7(a)(2).

³¹⁷ *Id.*

³¹⁸ *Id.* § 101-45.304-7(a)(3).

³¹⁹ *Id.* § 101-45.304-7(a)(4).

³²⁰ *Id.* § 101-45.304-7(b).

³²¹ *Id.*

³²² *Id.*; see also *id.* § 101-45.304-12(a)(3).

³²³ *Id.* § 101-45.304-9.

³²⁴ *Id.* § 101-45.304-10.

a bid must comply in all material respects with the invitation for bids so that, both as to the method and timeliness of submission and as to the substance of any resulting contract, all bidders may stand on an equal footing and the integrity of the formal advertising system may be maintained.³²⁵

Bids must be received by the contracting officer not later than the exact time set in the IFB for the opening of bids.³²⁹ Specific regulatory provisions address late bids and mistakes in bids.

(3) *State and Local Government Purchases*—State and local governments seeking to acquire personal property that is unavailable through the donation program (because the property was not donable)³³⁰ must purchase the property. State and local governments may purchase nondonable personal property three separate ways: by negotiation through their state agencies for surplus property; by negotiation at fixed prices through their state agencies for surplus property; or by participating in public sales of government personal property on a competitive bid basis.³³¹

Personal property may be sold by negotiation to state and local governments through their state agencies—subject to obtaining feasible competition under the circumstances—provided that the state agencies obtain estimated fair market value and other satisfactory disposal terms.³³² The selling agency has the discretion to honor requests by state agencies for state and local governments to purchase property by negotiation prior to offering the property for public sale. The selling agency may deny the request and offer the property for public sale. Likewise, the decision to offer property approved to be sold at fixed prices through state agencies to state and local governments prior to public sale is discretionary with the selling agency.³³³

Bid deposits and payments for property prior to removal are waived for sales made to state and local governments. Payment is due thirty days after purchase with simple interest charged at a rate established by the Secretary of the Treasury pursuant to the Contract Disputes Act on sums overdue.³³⁴ State and local governments include a “[s]tate, terri-

³²⁵ *Id.* § 101-45.701(a).

³²⁹ *Id.* § 101-45.702.

³³⁰ Property may not be donable because the GSA has designated it as not donable, it is nonappropriated fund property, or it requires reimbursement. *Id.* § 101-44.001-3.

³³¹ *Id.* § 101-45.304-12.

³³² *Id.* § 101-45.304-12(e)(1). The estimated fair market value is the selling agency's best estimate of what the property would be sold for if it was offered for public sale. *Id.* § 101-45.304-12(b)(1).

³³³ *Id.* § 101-304.304-12(f).

³³⁴ *Id.*

tory, possession, political subdivisions thereof, or tax supported agency therein.³³⁵

(4) *Terms of Sale and Sales Proceeds*—The FPASA requires that, except in certain listed instances, the proceeds from the sale of surplus personal property be deposited into the Treasury as miscellaneous receipts.³³⁶ The relevant exceptions include property sold that originally was acquired by funds not appropriated from the general fund of the Treasury, or appropriated from the general fund and by law reimbursable from assessments, taxes, or other revenues. The gross proceeds from the sale of this property must be deposited by the selling agency in the reimbursable fund or appropriation, or paid to the federal agency accountable for the property.³³⁷ Where the sales proceeds are ultimately deposited will have some impact on a federal agency's efforts to create and dispose of ERCs.

(5) *Miscellaneous Issues*—Certain awards of sales contracts require a review by the Attorney General to ensure the award's consistency with antitrust laws.³³⁸ These awards include those proposed to any private interest of personal property with an estimated fair market value of \$3,000,000 or more, or of a patent, process, technique, or invention irrespective of cost. The selling agency cannot effect disposition until it has received the Attorney General's advice.³³⁹ Emission reduction credit sales from a closing installation conceivably could reach this dollar threshold, triggering the antitrust review.

d. *Abandonment or Destruction of Personal Property*—An executive agency may abandon or destroy personal property if a duly authorized official of the agency makes a written finding that the property has no commercial value or the estimated cost of its continued care and handling would exceed the estimated proceeds from its sale.³⁴⁰ These are the same conditions that allow an executive agency to donate surplus personal property directly to a public body.³⁴¹ The manner of abandonment or destruction must not be detrimental to public health or safety, nor may it infringe on the rights of others.³⁴² A state agency must notify the appropriate GSA regional office before abandoning or destroying any federal property.³⁴³ Public notice of the intent to abandon or destroy per-

³³⁵ *Id.* § 101-45.304-12(b)(3).

³³⁶ 40 U.S.C.A. § 485(a) (West 1993).

³³⁷ 41 C.F.R. § 101-45.307 (1992).

³³⁸ *Id.* § 101-45.310.

³³⁹ *Id.*

³⁴⁰ *Id.* § 101-45.901. "No commercial value" means a determination that the property has neither utility nor monetary value (either as an item or as scrap). *Id.* § 101-45.001-7.

³⁴¹ See *supra* notes 286-289 and accompanying text.

³⁴² *Id.* § 101-45.901(a).

³⁴³ *Id.* § 101-45.901(b).

sonal property must be given in most cases.³⁴⁴ This notice must be provided in a local newspaper or by posting signs in at least one common use facility available to the public³⁴⁵ and must include an offer to sell the property through negotiated sale.³⁴⁶ Some commentators have questioned whether federal agencies with surplus emissions reductions can let them lapse. The reductions do not have value as ERCs until they are certified by the AQMD as ERCs. However, because of the potential value of ERCs in a nonattainment area, it can be argued that the reductions have commercial value and cannot be abandoned. Conversely, if the costs of creating the ERCs exceed sales proceeds, no reason to create the ERCs exists, and abandonment would be justified. Abandonment of the emissions reductions could be viewed as a direct donation to the local AQMD bank or as a federal contribution towards attainment. A direct donation would likely require a GSA approved deviation from the FPMRs.

D. Real Property

A discussion of real property disposal procedures is relevant to the disposal of ERCs because ERCs can be classified as related personal property. Related personal property is any personal property that is an integral part of the real property and, if removed, would significantly diminish the economic value of the real property.³⁴⁷ Without the rights to emit air pollutants, many buildings and tracts of real property, especially in nonattainment areas, would be worth significantly less. In some instances, the buildings would have very limited utility. Because of this relationship between ERCs and the real property to which they are attached, ERCs can be classified as related personal property. Accordingly, ERCs can be disposed of along with the related real property—according to the FPMRs real property disposal provisions.³⁴⁸

A windfall could result for those that acquire federal real property to which emission rights are attached. Emission rights or permits transferred with the property, will ease the new owner's burden in meeting CAA requirements. Recipients will only obtain ERCs related to the real property that they are acquiring. Emission reduction credits detached from the real property must be obtained through the personal property disposal procedures.

To a great extent, the procedures for the use and disposal of real

³⁴⁴ *Id.* §§ 101-45.902-1, 902-2.

³⁴⁵ *Id.* § 101-45.902-1.

³⁴⁶ *Id.*

³⁴⁷ *Id.* §§ 101-47.103-13, 101-43.001-27.

³⁴⁸ *Id.* §§ 101-47.20, 101-47.300. Recall that if certain conditions are met, the disposal agency has the discretion to sever related personal property from its realty and dispose of the related personal property in accordance with the personal property disposal procedures. *Id.* § 101-47.203-6(b). See *supra* note 135 and accompanying text.

property and related personal property parallel those for personal property. However, the real property disposal provisions have some unique features.

1. Utilization of Excess Real Property—In keeping with their overall property disposal program, the GSA's policy regarding real property is: to encourage identifying and reporting of excess real property; to achieve maximum use of excess real property to minimize expenditures for real property purchases; and to transfer excess real property between federal agencies, to mixed-ownership government corporations, and to the municipal government of the District of Columbia.³⁴⁹

a. Agency Responsibilities—To accomplish this policy, the GSA has established guidelines for executive agencies.³⁵⁰ Agencies have the duty to annually survey real property under their control, to identify property that is not needed, underutilized, or not being put to optimum use.³⁵¹ If an agency identifies other needs for the property, the agency must determine whether continuation of the current use, or another federal use, would better serve the public.³⁵² An agency must maintain its real property inventory at the "absolute minimum consistent with economical and efficient conduct of the affairs of the agency," and must promptly report to the GSA all real property and related personal property determined to be excess.³⁵³ To meet federal needs, the GSA administrator may request that executive agencies institute specific surveys to determine if portions of real property under their control are excess.³⁵⁴

As with personal property, an agency must, to the extent practicable, fulfill its real property needs by using excess property.³⁵⁵ Before requesting a transfer of excess real property, executive agencies should review the holdings of the bureaus or other organizations in the agency to determine whether the requirement can be met through improved utilization,³⁵⁶ and review property that the agency has assigned on a lease or permit basis to other federal agencies, public bodies, or private interests and terminate the lease or permit if it is not prohibited by the lease or permit terms.³⁵⁷ To ensure that no executive agency buys real property when excess or surplus real property is available from another federal agency, each agency must notify the GSA of its property needs and

³⁴⁹ *Id.* § 101-47.201-1.

³⁵⁰ *Id.* § 101-47.201-2.

³⁵¹ *Id.* § 101-47.201-2(a). The requirements for conducting annual real property inventories are contained in 41 C.F.R. part 101-3.

³⁵² *Id.*

³⁵³ *Id.* See also *id.* § 101-47.202-1.

³⁵⁴ *Id.* § 101-47.202-1(b).

³⁵⁵ *Id.* § 101-47.201-2(b).

³⁵⁶ *Id.* § 101-47.201-2(d)(2)(i).

³⁵⁷ *Id.* § 101-47.201-2(d)(2)(ii).

determine whether suitable property is available in the federal government.³⁵⁸ This notice is not required if the agency's proposed real property acquisition is dictated by specific factors such as "exact geographical location, topography, engineering or similar characteristics which limit the possible use of other available property."³⁵⁹ The size and quantity of excess real property to be transferred should be limited to actual requirements.³⁶⁰

Organizations eligible to participate in the transfer of excess federal real property and related personal property include federal agencies, mixed-ownership government corporations, and the District of Columbia municipal government.³⁶¹

b. Transfer Procedures and Approval—To satisfy its needs for real and related personal property, a federal agency first must look to property in its control.³⁶² The agency then must look to other federal agencies to fulfill its requirements by obtaining excess property from those agencies.³⁶³ The GSA facilitates this search for excess property held by other agencies. The GSA reviews its records and inventories of property that will be reported excess, property that has been reported excess, and surplus property.³⁶⁴

The GSA screens the excess real and related personal property for those federal real property holding agencies that reasonably may be expected to have use for the property.³⁶⁵ The screening period is thirty calendar days from the notice of availability from the GSA.³⁶⁶ During this screening period, agencies must advise the GSA of a firm or tentative requirement for the property.³⁶⁷ If the requirement is tentative, the agency has an additional thirty calendar days to advise the GSA if there is a firm requirement.³⁶⁸ Within sixty calendar days of advising the GSA of their firm requirement, the agency must furnish the GSA a request for transfer of the property.³⁶⁹

When an agency desires the transfer of real property and related personal property reported to the GSA, the agency submits a request for

³⁵⁸ *Id.* § 101-47.201-2(c).

³⁵⁹ *Id.*

³⁶⁰ *Id.* § 101-47.201-2(d)(5).

³⁶¹ *Id.* §§ 101-47.203-7(b), 101-47.203-7(g).

³⁶² *Id.* § 101-47.203-1.

³⁶³ *Id.* §§ 101-47.203-2, 101-47.203-3.

³⁶⁴ *Id.*

³⁶⁵ *Id.* § 101-47.203-5.

³⁶⁶ *Id.* § 101-47.203-3(a).

³⁶⁷ *Id.*

³⁶⁸ *Id.*

³⁶⁹ *Id.*

transfer on the appropriate GSA form to the proper GSA regional office.³⁷⁰ The GSA then determines whether the transfer of the requested property is in the government's best interest and if the requesting agency is the appropriate agency to hold the property.³⁷¹

The GSA will transfer the requested property to executive agencies when the proposed land use is consistent with GSA policy and guidelines to obtain the maximum utilization and transfer of excess real property and related personal property.³⁷² In determining whether a proposed transfer should be approved under the policy guidelines, the GSA and the OMB may informally consult to obtain all available data regarding actual program needs for the property.³⁷³ With minor exceptions, it is the responsibility of the GSA to execute or authorize all approved transfers of property to the requesting agency.³⁷⁴

c. Reimbursement and Proceeds—Reimbursement for transfers of excess federal real property and related personal property is made pursuant to an agreement between the Director, Office of Management and Budget, and the Administrator of General Services.³⁷⁵ As with the transfer of excess personal property, the duty to reimburse and the amount due are fact specific. In certain circumstances, reimbursement is required, while other times reimbursement must be made, unless authorization for transfer without reimbursement exists.

The transferee must always pay the estimated fair market value of the requested property when: (1) the property transferred was acquired with funds either not appropriated from the general fund of the United States Treasury or appropriated from the general fund but by law reimbursable from assessment, tax, or other revenue or receipts, and the transferor agency requests payment; and (2) the transferor or transferee agency is a wholly-owned or mixed-ownership government corporation or the municipal government of the District of Columbia.³⁷⁶ These two situations are almost identical to those requiring reimbursement for the transfer of excess personal property discussed earlier.³⁷⁷

If the transfer does not fall in the two situations that always require reimbursement, reimbursement must be made at one hundred percent of the estimated fair market value of the requested property unless a transfer without reimbursement is authorized.³⁷⁸ The two methods under which

³⁷⁰ *Id.* § 101-47.203-7.

³⁷¹ *Id.*

³⁷² *Id.* § 101-47.203-7(d).

³⁷³ *Id.*

³⁷⁴ *Id.* § 101-47.203-7(e).

³⁷⁵ *Id.* § 101-47.203.7(b).

³⁷⁶ *Id.* § 101-47.203-7(f)(1); 40 U.S.C.A. § 485(c) (West 1993).

³⁷⁷ See *supra* note 191 and accompanying text.

³⁷⁸ 41 C.F.R. § 101-47.203-7(f)(2) (1992).

property may be transferred without one hundred percent reimbursement are: (1) where Congress has specifically authorized the transfer without reimbursement³⁷⁹ and (2) where the Administrator of the GSA, with the approval of the Director of the Office of Management and Budget, has approved an agency request for an exception from the one hundred percent reimbursement requirement.³⁸⁰ The GSA only will approve when the exception "would further essential agency program objectives and at the same time be consistent with Executive Order 12348 [on improved utilization and management of Federal real property]."³⁸¹ The estimated fair market value of the real property at issue is determined by the GSA.³⁸²

An agency must look to the individual circumstances to determine if it will receive any transfer proceeds. An agency that generates ERCs by expending significant amounts of money for inventories and application fees to increase the marketability and value of its excess and surplus property could be wasting limited resources if the transfer or disposal is nonreimbursable.

Generally, all proceeds from the transfer of excess real property and related personal property to a federal agency are deposited into the Treasury as miscellaneous receipts.³⁸³ Three exceptions exist where proceeds from the transfer are deposited elsewhere, and may then be used for specific agency purposes. First, all of the proceeds of transfers of real and related personal property made by the GSA, except for transfers of property under the control of a military department, are set aside in a separate fund at the Treasury to be used to pay for the direct expenses incurred in utilizing excess property and disposing of surplus property. These direct expenses are limited to fees of appraisers, auctioneers, realty brokers, and for advertising and surveying. Excess funds are deposited annually to miscellaneous receipts.³⁸⁴

Second, when the property transferred was acquired through the

³⁷⁹ One situation that Congress has specifically stated does not require reimbursement is the transfer of excess real property and improvements under the control of one military department in the DOD to the other military departments within the DOD. 40 U.S.C.A. § 485(h) (West 1993). That Congress specifically noted that these transfers within the DOD do not require reimbursement appears to be directed at quashing interservice bickering. Property would not be the subject of a transfer between executive agencies until it left the DOD. The DOD is the executive agency that controls the property, while the military departments are merely components in the DOD. The DOD has a duty to transfer property among DOD components to obtain maximum use of that property. The property is not excess to the DOD's needs until no DOD component has a use for it. Thus, the property would not be the subject of an interagency reimbursable transfer as excess property until the property is the subject of a transfer to an agency outside of the DOD.

³⁸⁰ 41 C.F.R. § 101-47.203-7(f)(2) (1992).

³⁸¹ 41 C.F.R. § 101-47.203-7(f)(2)(ii)(B)(2) (1992).

³⁸² *Id.* §§ 101-47.203-7(f)(1), 101-47.203-7(f)(2)(i).

³⁸³ 40 U.S.C.A. § 485(a) (West 1993).

³⁸⁴ *Id.* § 485(b).

use of funds either not appropriated from the general fund, or appropriated from the general fund but by law reimbursable from assessments, taxes, other revenues or receipts, then the net proceeds of the transfer are credited to the reimbursable fund or appropriation, or paid to the federal agency which declared the property to be excess.³⁸⁵

Finally, the proceeds of the transfer of excess real property and improvements under the control of a military department to a transferee outside of the DOD are deposited to a special account at the Treasury. To the extent provided in appropriations acts, fifty percent of the amount deposited in the account may be used for facility maintenance and repair or environmental restoration at the military installation where the property is located while the remaining fifty percent may be used for facility maintenance and repair or environmental restoration by the military department that had jurisdiction over the property before its transfer.³⁸⁶ This last provision is an economic incentive for military departments to generate ERCs and transfer them with the real property.

2. *Disposal of Surplus Real Property*—Real property, or related personal property reported as excess, that has been screened for the needs of federal agencies or waived from screening by the GSA, and which has not been designated by the GSA for use by a federal agency, is subject to determination as surplus property by the GSA.³⁸⁷ The GSA sets the surplus determination date and notifies federal agencies. The surplus screening period typically ends thirty calendar days from the date of the GSA's notice of availability as surplus, if no agency expresses a requirement for the property.³⁸⁸ The screening period is extended thirty or sixty days beyond the initial period, if an agency expresses a tentative or firm requirement for the property and later fails to furnish the GSA with the request to transfer the property.³⁸⁹ This extension allows other interested agencies to request the property. Property not required to be reported to the GSA and not designated by the holding agency for utilization by other agencies is subject to determination as surplus by the holding agency.³⁹⁰

a. *Surplus Property Disposal Policies*—The GSA has established general policies regarding disposal of surplus real property and related personal property. The policies state that such property: must be disposed of in the most economical manner consistent with the best interest of the government; must ordinarily be disposed of for cash consistent with the best interest of the government; and may be disposed of by

³⁸⁵ *Id.* § 485(c).

³⁸⁶ *Id.* § 485(h).

³⁸⁷ 41 C.F.R. § 101-47.204-1 (1992).

³⁸⁸ *Id.* § 101-47.203-5(a).

³⁸⁹ *Id.*

³⁹⁰ *Id.* § 101-47.204-2. Nonreportable property includes leased space assigned to the agency by the GSA, and leases, permits, licenses, easements, or similar instruments, if the term remaining is less than nine months. *Id.* § 101-47.202-4.

exchange for privately owned property only for property management considerations such as boundary realignment, provision of access, or where authorized by law.³⁹¹

(1) *Disposal Authority*—Real property must be disposed of in accordance with the FPASA and FPMRs.³⁹² It may be disposed of under other laws, only if the disposal agency obtains written GSA approval that the provisions of any other law under which the disposal agency proposes to make the disposal are not inconsistent with the FPASA.³⁹³ These restrictions do not apply to certain real property disposals authorized under the FPASA, or by any special statute directing a named agency to transfer specific real property.³⁹⁴

(2) *Disposal Agency*—As a general rule, the GSA is the disposal agent for all real property and related personal property, except as provided for in the regulations and where the GSA Administrator has delegated authority.³⁹⁵ The FPMRs specifically provide that the holding agency is the disposal agency for "leases, permits, licenses, easements, and similar real estate interests held by the Government in non-Government-owned property," fixtures, structures, and improvements to be disposed of without the underlying land; and "standing timber and embedded gravel, sand, stone and underground water to be disposed of without the underlying land."³⁹⁶ The holding agency may request that the GSA act as the disposal agency for all but the standing timber and embedded gravel, sand and stone, and underground water.³⁹⁷

The Administrator of General Services has delegated certain authority to the Secretary of Defense, Secretary of Agriculture, and Secretary of the Interior, regarding excess real property and related personal property under their control. The Secretaries may determine that property which has a total estimated market value of less than \$15,000 is not required for the needs and responsibilities for federal agencies and should be disposed by means advantageous to the United States.³⁹⁸ This provision is seldom used because of the low dollar threshold. The departments are not required to report this property to the GSA. Congress, in the Defense base closure laws,³⁹⁹ required the GSA Administrator to del-

³⁹¹ *Id.* § 101-47.301-1.

³⁹² *Id.* § 101-47.301-3.

³⁹³ *Id.*

³⁹⁴ *Id.*

³⁹⁵ *Id.* § 101-47.302-3. 40 U.S.C.A. §§ 486(d) and (e) authorize the Administrator of General Services to delegate authority under the FPASA.

³⁹⁶ 41 C.F.R. § 101-47.302-2 (1992).

³⁹⁷ *Id.*

³⁹⁸ *Id.* §§ 101-47.601 - 603.

³⁹⁹ Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Pub. L. No. 100-526 (codified at 10 U.S.C.A. § 2687 note (West 1993)); Defense Base Closure and Realignment Act of 1990, Pub. L. No. 101-510 (codified at 10 U.S.C.A. § 2687 note (West 1993)).

egate certain authority to the Secretary of Defense under the FPASA to utilize excess property and to dispose of surplus property at the closing and realigning bases.⁴⁰⁰

The disposal agency must classify the property according to its estimated highest and best use to determine the methods and conditions applicable to the disposal of the property.⁴⁰¹ Highest and best use is defined as "the most likely use to which a property can be put, so as to produce the highest monetary return from the property, promote its maximum value, or serve a public or institutional purpose."⁴⁰²

b. Disposals to Public Agencies—The real property disposal program does not have a donation program similar to the personal property program. Instead, the real property disposal program has "public benefit disposals" at or below fair market value.

A public agency may acquire surplus real and related property with or without reimbursement through a number of statutes known as "public benefit disposals."⁴⁰³ The regulations list a group of eleven statutory provisions that make up the public benefit disposals.⁴⁰⁴ Most of those listed could apply to the disposal of related personal property ERCs and pollution allowances. Some of these disposals require no consideration be paid to the United States (similar to the surplus personal property donations through the state property agencies) while others require that the property be sold or leased to the public recipient.

Public benefit disposal provisions include the following:

- Conveyance of real and related personal property which the Secretary of the Interior determines is desirable for use as historic monuments;⁴⁰⁵
- Conveyance of surplus real or personal property which the FAA Administrator determines is "essential, suitable, or desirable" for public airport purposes;⁴⁰⁶

⁴⁰⁰ 10 U.S.C. §§ 2687 note, 204(b)(1), 2095(b)(1) (1992).

⁴⁰¹ 41 C.F.R. § 101-47.303-1 (1992).

⁴⁰² *Id.* § 101-47.4909. The determination of highest and best use must be based on "the property's economic potential, qualitative values (social and environmental) inherent in the property itself, and other utilization factors controlling or directly affecting land use (e.g., zoning, physical characteristics, private and public uses in the vicinity, neighboring improvements, utility services, access, roads, location, and environmental and historical considerations)." *Id.* Furthermore, the "projected highest and best use should not be remote, speculative, or conjectural." *Id.* The "analysis and determination of highest and best use is based on information compiled from the property inspection and environmental assessment." *Id.*

⁴⁰³ *Id.* § 101-47.203-5(d).

⁴⁰⁴ *Id.* § 101-47.4905

⁴⁰⁵ 40 U.S.C. § 484(k)(3); 41 C.F.R. § 101-47.308-3 (1992) (no compensation).

⁴⁰⁶ 50 U.S.C. app. § 1622(g); 41 C.F.R. § 101-47.308-2 (1992) (no compensation).

• Transfer or conveyance determined by the Attorney General to be required for correctional facility use;⁴⁰⁷

• Disposals for wildlife conservation purposes;⁴⁰⁸

• Disposal as recommended by the Secretary of the Department of Education for schools, classroom, or other educational purposes;⁴⁰⁹

• Disposal as recommended by the Secretary of Health and Human Services for public health protection including research;⁴¹⁰

• Disposal as recommended by the Secretary of Interior for use as public park or recreation areas;⁴¹¹

• Transfer by the Secretary of Housing and Urban Development or Secretary of Agriculture for low or moderate income housing and related facilities;⁴¹²

• Transfer or disposal through Department of Health and Human Services under the McKinney Act to assist the homeless;⁴¹³

• Transfer to the District of Columbia of jurisdiction over properties within the District for administration and maintenance;⁴¹⁴ and

• Disposals by negotiation to a public agency for fair market value.⁴¹⁵

When property is determined to be surplus, the disposal agency must review the list of public benefit transfer statutes and list the public agencies eligible to procure the entire property or part of the property.

⁴⁰⁷ 40 U.S.C. § 484(p); 41 C.F.R. § 101-47.308-9 (1992) (no compensation).

⁴⁰⁸ 16 U.S.C. § 667b-d (1992) (no compensation).

⁴⁰⁹ 40 U.S.C. § 484(k)(1)(A); 41 C.F.R. § 101-47.308-4((a)(1)) (1992) (sale or lease).

⁴¹⁰ 40 U.S.C. § 484(k)(1)(B); 41 C.F.R. § 101-47.308-4((a)(2)) (1992) (sale or lease).

⁴¹¹ 40 U.S.C. § 484(k)(2); 41 C.F.R. § 101-47.308-7 (1992) (sale or lease).

⁴¹² 40 U.S.C. § 484b; 41 C.F.R. § 101-47.308-6 (1992) (sale or lease).

⁴¹³ 42 U.S.C.A. § 11411 (West 1993); 41 C.F.R. § 101-47.9 (1992) (lease).

⁴¹⁴ 40 U.S.C.A. § 122 (West 1992) (under conditions to be agreed upon).

⁴¹⁵ 40 U.S.C.A. § 484(e)(3)(H) (West 1992); 41 C.F.R. § 101-47.304-9(a)(4) (1992). These negotiated sales to public bodies "will be considered only when the disposal agency has made a determination that a public benefit will result from the negotiated sale which would not be realized from a competitive sale disposal." *Id.*, § 101-47.304-9(c).

⁴¹⁶ 41 C.F.R. § 101-47.4905 (1992).

under those statutes.⁴¹⁷ Before public advertising, negotiation, or other disposal action, the disposal agency must notify eligible public agencies that the property has been declared surplus.⁴¹⁸ Notice also must be provided to various officials specified in the regulations, including the Governor of the state in which the property is located, the mayor and county clerk where the property is located, the head of any other local government body known to be interested in, and eligible to acquire, the property, and the sole state point of contact.⁴¹⁹ Notice must also be posted in the post office in the locality where the property is located, and in other prominent public buildings. Notice also must be sent to the appropriate federal departments and agencies that may be involved in the disposal under the public benefit disposal statutes.⁴²⁰

If the disposal agency does not receive notice within the twenty calendar-day window provided in the notice of a public agency's desire to acquire the property under the listed statutes or is not notified by a facilitating federal agency, the disposal agency may assume that no public agency or nonprofit institution desires to procure the property.⁴²¹ The disposal agency otherwise must promptly review each response of a public agency to the notice. The disposal agency determines and notifies the public agency of the time period in which the public agency has to develop and submit its (1) formal application for the property or (2) its comments as to the compatibility of the disposal with its development plans and programs.⁴²² The disposal agency must consider and act on the formal application for the property in accordance with the statute and regulations under which the public agency is applying for the property.⁴²³ When interested parties send comments to the disposal authority indicating that the disposal is incompatible with state, regional, or local development plans and programs, the disposal agency must attempt to resolve the differences consistent with its statutory responsibilities regarding disposal of surplus property.⁴²⁴

Public benefit transfers involve two significant elements. First, all of these transfers are at the discretion of the GSA or the agency head to whom the GSA has delegated disposal authority. The FPASA and FPMRs use the term "may" in describing the authority to execute these transfers. Second, the FPASA empowers the Secretaries concerned the authority to grant releases from any terms contained in the transfer instru-

⁴¹⁷ *Id.* § 101-47.302(a).

⁴¹⁸ *Id.* § 101-47.303-2(b).

⁴¹⁹ *Id.*

⁴²⁰ *Id.*

⁴²¹ *Id.* § 101-47.303-2(f).

⁴²² *Id.* § 101-47.303-2(g), (h).

⁴²³ *Id.* § 101-47.303-2(i).

⁴²⁴ *Id.*

ments.⁴²⁵ In sale or lease transfers that require compensation—such as those for health, education, and park purposes—the Secretaries could use this authority to release that obligation.

Reporting agencies may withdraw reports of excess real property any time prior to transfer to another federal agency or prior to the execution of a legally binding agreement for the disposal of surplus property. Such withdrawals require GSA approval.⁴²⁶

c. Disposal by Sale—Surplus real property and related personal property not transferred or disposed to a public agency may be sold or leased. As with personal property sales, the two methods of disposition are competitive bids and negotiated sales.

With a few listed exceptions, the disposal agency must obtain an appraisal of the fair market value, and in appropriate cases the fair annual rental value, of the property available for disposal.⁴²⁷ This appraisal must be conducted by an experienced and qualified person familiar with the types of property to be appraised.⁴²⁸

(1) Competitive Bids—All surplus real and related personal property must be sold or leased by advertising for bids, unless the proposed disposal fits in one of the listed exceptions for which a negotiated disposal is permitted.⁴²⁹ Advertising for bids, or sealed bidding, must ensure “full and free competition which is consistent with the value and nature of the property involved.”⁴³⁰ The advertisement must designate the place to which bids are to be delivered or mailed, as well as the place, date, and time of public bid opening.⁴³¹ All bids must be publicly disclosed at the advertised time and place of opening.⁴³²

When bid prices are reasonable (i.e., commensurate with the fair market value of the property) and independently arrived at in open competition, award must be made promptly to the bidder whose bid is in conformity with the IFBs and at an amount that will be most advantageous to the government considering price and other factors.⁴³³ The disposal agency may reject all offers if the rejection is in the public inter-

⁴²⁵ 40 U.S.C.A. § 484(k)(4) (West 1992).

⁴²⁶ 41 C.F.R. § 101-47.203-10 (1992).

⁴²⁷ *Id.* § 101-47.303-4. No appraisal is required when the property is classified and: is to be disposed as airport property; the property is suitable for historic monument purposes and is to be disposed of as such to a state or local government; or when the property will be sold through a competitive sale and its fair market value does not exceed \$10,000. *Id.*

⁴²⁸ *Id.* § 101-47.303-4.

⁴²⁹ *Id.* § 101-47.303-7.

⁴³⁰ *Id.*

⁴³¹ *Id.* § 101-47.304-7(a)(1).

⁴³² *Id.*

⁴³³ *Id.* § 101-47.305-1(a).

est.⁴³⁴ When the advertising does not result in the receipt of a bid at a price commensurate with the property's fair market value, the highest responsive and responsible bidder may, at the disposal agency's discretion, be given an opportunity to increase the offered price.⁴³⁵ The bidder may be given a maximum of fifteen working days to respond.⁴³⁶ The successful bidder is given a reasonable period of time to consummate the transaction.⁴³⁷

The disposal agency has the discretion to determine whether to allow the highest responsive and responsible bidder to increase its bid or to reject all bids and reoffer the property for sale on a publicly advertised competitive basis, to dispose of it by negotiation, or to offer it for disposal under other provisions of the FPMRs.⁴³⁸

Should the disposal agency decide to reject all bids submitted in response to a sale by advertisement because the bids were not reasonable or independently arrived at in open competition, and thereafter decide that a negotiated sale would better protect the public interest than would disposal by readvertising or other available method, the agency must reject all bids and dispose of the property by negotiated sale.⁴³⁹ However, no negotiated disposal under these circumstances may be made unless

- (1) Notification of the intention to negotiate and reasonable opportunity to negotiate is given by the agency to each responsible bidder who submitted a bid in response to the advertising;
- (2) The negotiated price is higher than the highest rejected bid price offered by any responsible bidder in response to the advertising; and
- (3) The negotiated price is the highest negotiated price offered by any responsible prospective buyer.⁴⁴⁰

(2) *Negotiated Sales*—Negotiated disposals of surplus property must "obtain such competition as feasible under the circumstances" and may be used as follows:

- (1) When the estimated fair market value of the property involved does not exceed \$15,000;

⁴³⁴ *Id.*

⁴³⁵ *Id.* § 101-47.305-1(b).

⁴³⁶ *Id.*

⁴³⁷ *Id.* § 101-47.305-1.

⁴³⁸ *Id.*

⁴³⁹ *Id.* § 101-47.306-1.

⁴⁴⁰ *Id.*

(2) When bid prices after advertising therefor are not reasonable (either as to all or some part of the property) or have not been independently arrived at in open competition;

(3) When the character or conditions of the property or unusual circumstances make it impractical to advertise publicly for competitive bids and the fair market value of the property and other satisfactory terms of disposal can be obtained by negotiation;

(4) When the disposals will be to states, Commonwealth of Puerto Rico, possessions, political subdivisions thereof, or tax-supported agencies therein, and the estimated fair market value of the property and other satisfactory terms of disposal are obtained by negotiation; or

(5) When negotiation is otherwise authorized by the Act [FPASA] or other law.⁴⁴¹

Negotiated sales to public bodies will be considered only when the disposal agency determines that a public benefit from the negotiated sale will result in a benefit that would not otherwise be realized from a competitive sale disposal.⁴⁴²

The agency must document and justify the factors for disposal by negotiation of surplus real and related personal property.⁴⁴³ Additionally, the disposal agency must prepare an explanatory statement of specific proposed disposals by negotiation that will be submitted through the GSA to the appropriate House and Senate Committees, including the Committees on Government Operations. If there is no negative congressional committee or subcommittee comment, the agency may consummate the deal thirty-five or more days after the date of the GSA's transmittal letters to the committees.⁴⁴⁴

(3) Advertising for Competitive Bids and Negotiated Sales— Disposal agencies must widely publicize all surplus real property and related personal property that become available for disposal.⁴⁴⁵ Proposed sales of surplus real property by advertising for competitive bids, except

⁴⁴¹ *Id.* § 101-47.304-9(a); 40 U.S.C.A. § 484(e)(3) (West 1993).

⁴⁴² 41 C.F.R. § 101-47.304-9(c) (1992).

⁴⁴³ *Id.* § 101-47.304-11.

⁴⁴⁴ *Id.* § 101-47.304-12. Negotiated disposals requiring explanatory statements include those involving real property with an estimated fair market value in excess of \$1,000,000; real property disposed of by lease for a term of five years or less if the estimated fair annual rent exceeds \$1,000,000 for any year; real property disposed of by lease for a term exceeding five years if the total estimated rent over the lease terms exceeds \$1,000,000; or "any real property or real and related personal property disposed of by exchange, regardless of value, or any property any part of the consideration for which is real property." *Id.*

⁴⁴⁵ *Id.* § 101-47.304-1.

when the property's estimated fair market value is less than \$2500, must be submitted for publication in the *Commerce Business Daily*.⁴⁴⁶ The disposal agency also may enlist the aid of local groups in publicizing the proposed property disposal.⁴⁴⁷ On request of bona fide potential purchasers and lessees, the disposal agency must supply adequate information regarding the property.⁴⁴⁸

(4) *Terms of Sale and Sale Proceeds*—Unlike personal property sales where the sales price must be paid in full before property is removed from federal custody, real and related personal property sales over \$2500 may be on credit terms. These credit sales, on terms specified in the FPMRs, are permitted when the disposal agency has determined that the sale of specific property on credit is necessary to avoid retarding the salability of the property and the price obtainable.⁴⁴⁹ Credit sales may be necessary when a buyer of related personal property ERCs cannot obtain financing from a lender wary of the value of ERCs. These credit purchases require the buyer to furnish a promissory note secured by a purchase money mortgage or deed of trust on the property, whichever the government determines to be appropriate.⁴⁵⁰

All credit sales must incorporate in the disposal instruments provisions that the purchaser will not resell or lease any part of the property or any interest in the property without prior written authorization from the disposal agency.⁴⁵¹ In negotiated sales to public bodies, the offer to purchase and conveyance document must contain an excess profits covenant.⁴⁵² The covenant runs with the land for a period of three years from the date of conveyance, and provides, in part, that

if at any time within a 3-year period from the date of transfer of title by the Grantor, the Grantee, or its successors or assigns, shall sell or enter into agreements to sell the property, either in a single transaction or in a series of transactions, it is covenanted and agreed that all proceeds received or to be received in excess of the Grantee's or a subsequent seller's actual allowable costs will be remitted to the Grantor. In the event of a sale of less than the entire property, actual allowable costs will be apportioned to the property based on a fair and reasonable determination by the Grantor.⁴⁵³

⁴⁴⁶ *Id.*

⁴⁴⁷ *Id.*

⁴⁴⁸ *Id.* § 101-47.304-3.

⁴⁴⁹ *Id.* § 101-47.304-4(a).

⁴⁵⁰ *Id.*

⁴⁵¹ *Id.* § 101-47.307-2.

⁴⁵² *Id.*

⁴⁵³ *Id.* § 101-47.4908.

To verify compliance with the terms of the covenant, the grantee and its successors and assigns must submit an annual report to the grantor.⁴⁵⁴ The disposal agency must monitor the property involved and inspect related records to ensure compliance with the terms and conditions of the sale and may take any actions that it may deem reasonable and prudent to recover any excess profits realized through the resale of the property.⁴⁵⁵ Both the credit sale covenant and excess profits covenant would impact a buyer's decision to sever from the realty and sell related personal property ERCs.

Proceeds from any sale, lease, or other disposition of surplus real property and related personal property generally must be placed in the Land and Water Conservation Fund in the Treasury of the United States. Exceptions include the three special situations discussed earlier regarding the proceeds from agency to agency transfers,⁴⁵⁶ and amounts obligated, credited, or paid under authority of the Independent Offices Appropriation Act of 1963 or in any later appropriation act.⁴⁵⁷ Under the provisions of the statutes governing defense base realignment and closure, the proceeds from the transfer and disposal of property at affected installations are deposited in base closure accounts at the Treasury.⁴⁵⁸ Proceeds are applied to the Treasury's general account or wherever the appropriations that originally bought the property specify.

(5) *Miscellaneous Issues*—As with the personal property disposals of the same dollar value, awards of sales contracts to any private interest of real and related personal property with an estimated fair market value of \$3,000,000 or more require an antitrust review by the Attorney General.⁴⁵⁹ The disposal agency must notify the Attorney General of the probable terms and conditions of the proposed disposal and must obtain the Attorney General's advice as to whether the proposed disposal would "tend to create or maintain a situation inconsistent with antitrust laws."⁴⁶⁰ Property may not be disposed of until the agency receives that advice.⁴⁶¹

d. Interim Use and Management of Property—Holding agencies may, with the approval of the disposal agency, grant a lease or permit for nonfederal interim use of surplus property.⁴⁶² The lease or permit

⁴⁵⁴ *Id.*

⁴⁵⁵ *Id.* § 101-47.304-9(c).

⁴⁵⁶ See *supra* notes 384-386 and accompanying text.

⁴⁵⁷ 41 C.F.R. § 101-47.307-8 (1992).

⁴⁵⁸ 1988 BRAC Act, *supra* note 43, § 204(4)(A); 1990 Defense BRAC Act *supra* note 43, § 2096(2)(c).

⁴⁵⁹ 41 C.F.R. § 101-47.301-2 (1992).

⁴⁶⁰ *Id.*

⁴⁶¹ *Id.*

⁴⁶² *Id.* § 101-47.312.

period must not exceed one year and must be revocable within thirty days of notice.⁴⁶³ This use and occupancy must not interfere with, delay, or retard property disposal.⁴⁶⁴ Similar grants may be made for interim use of excess property.⁴⁶⁵

Regarding the management of excess and surplus real property, the Administrator of General Services has established as policy:

(1) That the management of excess real property and surplus real property, including related personal property, must provide only those minimum services to preserve the Government's interest in the property, considering the realizable value of the property;

(2) To place excess and surplus real property in productive use through interim utilization if such temporary use and occupancy will not "interfere with, delay, or retard its transfer to a Federal agency or disposal"; and

(3) "That excess and surplus real property which is dangerous to the public health or safety shall be destroyed or rendered innocuous."⁴⁶⁶

The holding agency must retain custody and accountability for excess and surplus real property, including related personal property, and must protect and maintain the property pending its transfer to another federal agency or its disposal.⁴⁶⁷ The maintenance and protection guidelines are outlined in 41 C.F.R. § 101-46.4913. Maintenance is defined as

The upkeep of property only to the extent necessary to offset serious deterioration; also such operation of utilities, including water supply and sewerage systems, heating, plumbing, and air-conditioning equipment, as may be necessary for fire protection, the needs of interim tenants, and personnel employed at the site, and the requirements for preserving certain types of equipment.⁴⁶⁸

Generally, protection and maintenance expenses are the responsibility of the holding agency for the first year; if the property is not transferred or disposed of during that period, the expenses may be paid by the disposal agency if Congress appropriates sufficient funds to the disposal agency for that purpose. Otherwise, the holding agency is responsible

⁴⁶³ *Id.*

⁴⁶⁴ *Id.*

⁴⁶⁵ *Id.* § 101-47.203-9.

⁴⁶⁶ *Id.* § 101-47.401-1.

⁴⁶⁷ *Id.* § 101-47.402-1.

⁴⁶⁸ *Id.* § 101-47.401-2(a).

for all expenses.⁴⁶⁹ The guiding principle in protecting and maintaining surplus property is "calculated risk," which means "the expected losses and deteriorations in terms of realizable values are anticipated to be less in the overall than expenditures to minimize the risks."⁴⁷⁰ The determination applied flexibly, on a case-by-case basis, considering listed factors.⁴⁷¹ Responsibilities regarding utilities and mechanical systems could impact an agency's duty to maintain permits or obtain ERCs to maintain utility and boiler operations.

e. Abandonment, Destruction, or Donation to Public Bodies—Federal agencies having control of real property that has no commercial value,⁴⁷² or of which the cost of continued care and handling would exceed the estimated proceeds of its sale, are authorized to: (1) abandon or destroy government-owned improvements and related personal property located on privately owned land; (2) destroy government-owned improvements and related personal property located on government-owned land ("abandonment of such property is not authorized"); or (3) donate to public bodies any real property (land or improvements and related personal property), or interest therein, owned by the government.⁴⁷³

Before a federal agency may abandon, destroy, or donate property, an authorized official of the agency must make written findings, either that this property has no commercial value, or that the estimated cost of the property's continued care and handling would exceed its estimated sales proceeds.⁴⁷⁴ When all the property proposed for abandonment, destruction, or donation at any one location at any one time had an original cost of more than \$1000, a reviewing authority must approve the written findings before disposal.⁴⁷⁵

Public bodies eligible for donations include "any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, or any political subdivision, agency or instrumentality of the foregoing."⁴⁷⁶ No improvements on land or related personal property having an original cost exceeding \$25,000, and no land, regardless of cost, shall be donated to public bodies without prior concurrence of the GSA.⁴⁷⁷ Public bodies receiving improvements on land or related per-

⁴⁶⁹ *Id.* § 101-47.402-2.

⁴⁷⁰ *Id.* § 101-47.4913.

⁴⁷¹ *Id.*

⁴⁷² Property with no commercial value means real property, including related personal property, that has no reasonable prospect of being disposed of at a consideration. *Id.* § 101-47.501(a).

⁴⁷³ *Id.* § 101-47.501-2.

⁴⁷⁴ *Id.* § 101-47.501-4.

⁴⁷⁵ *Id.*

⁴⁷⁶ *Id.* § 101-47.501-1(a).

⁴⁷⁷ *Id.* § 101-47.502-1.

sonal property under this subpart must pay disposal costs incident to the donation.⁴⁷⁸

A federal agency may not abandon or destroy any improvements on land or related personal property unless an authorized official of the agency finds in writing that donation of the property in accordance with this subpart is not feasible.⁴⁷⁹ Abandonment or destruction must not be made in a manner that is detrimental or dangerous to public health or safety or that will cause infringement on the rights of others.⁴⁸⁰ The federal agency must obtain GSA concurrence prior to the abandonment or destruction of improvements of land or related personal property that had an original cost exceeding \$50,000 or are of permanent construction or where their retention would enhance the value of the underlying land, if the land were to be made available for sale or lease.⁴⁸¹ Before abandoning or destroying property, federal agencies also must give public notice of the proposed destruction or abandonment in the area where the property is located, and include in the notice an offering of the property for sale.⁴⁸²

Abandonment or destruction may be made without public notice if an authorized agency official finds in writing and the finding is approved by a reviewing authority that: the property had an original cost of \$1000 or less; its value is so low or its care and handling cost is so great that the posting of public notice is "clearly not economical; health, safety, or security considerations require immediate abandonment or destruction; or the agency's assigned mission might be jeopardized by the delay."⁴⁸³

These provisions on abandonment, destruction, and donation may provide a basis for arguments on the "abandonment" by federal agencies of surplus emissions reductions to the AQMD. A more formal transfer, using the personal property donation program, may be required so as not to run afoul of these provisions.

IV. Conclusion

Federal agency disposal of emission reduction credits is a topical issue. The realignment and closure of federal facilities have given federal agencies opportunities to create and dispose of a significant number of ERCs. Likewise, the recent movement in environmental law to use

⁴⁷⁸ *Id.* § 101-47.502-2. This subpart contemplates costs of dismantling, removal, cleaning (i.e., physical acts).

⁴⁷⁹ *Id.* § 101-47.503-1.

⁴⁸⁰ *Id.*

⁴⁸¹ *Id.*

⁴⁸² *Id.* § 101-47.503-2.

⁴⁸³ *Id.* § 101-47.503-3.

more market-based programs that employ rights and allowances make the procedures by which federal agencies dispose of ERCs all the more relevant.

The particulars of federal agency disposal of any property, including ERCs, are fact dependent. Whether the property is excess or surplus, real or personal, which agency owns the property, how the agency paid for the property, and who wants the property all impacts how the property will be disposed through the federal property system. The *Federal Property Management Regulations* are surprisingly flexible. With built in discretion and opportunities for grants of deviations and waivers, ERCs can effectively be disposed of within the system. This allows federal agencies to actively participate in emissions trading and other market-based pollution control programs.

THE FIRST ANNUAL HUGH J. CLAUSEN LEADERSHIP LECTURE: TRANSFORMATIONAL LEADERSHIP TEACHING THE JAG ELEPHANT TO DANCE*

BRIGADIER GENERAL (RET.) DULANEY L. O'ROARK JR.**

I. Transformational Leadership

There are always new "in" ideas on leadership that define the mood and circumstances of the times. In the 1990s, Tom Peters's book, *Thriving On Chaos*, best depicts the environment for today's leaders of public and private organizations. Correspondingly, a new leadership personality has been discovered; the "Type C" leader who is successful in resolving chaos. The overall label that best captures this defining issue of the 1990s is "Transformational Leadership."

* This essay is an edited transcript of a lecture delivered by Brigadier General (Ret.) Dulaney L. O'Roark Jr. to members of the Staff and Faculty, their distinguished guests, and officers attending the 43d Judge Advocate Officer Graduate Course and the 136th Judge Advocate Officer Basic Course, at The Judge Advocate General's School, Charlottesville, Virginia, on February 22, 1995, commemorating the dedication of the Hugh J. Clausen Academic Chair of Leadership. The chair is named after Major General Clausen, who served as The Judge Advocate General, United States Army, from 1981 to 1985. General Clausen served over thirty years in the United States Army before his retirement in 1985. His distinguished military career included assignments as the Executive, Office of The Judge Advocate General; Staff Judge Advocate, III Corps and Fort Hood; Commander, United States Army Legal Services Agency and Chief Judge, United States Army Court of Military Review; The Assistant Judge Advocate General; and, finally, as The Judge Advocate General. On his retirement from active duty, General Clausen served for a number of years as the Vice President for Administration and Secretary to the Board of Visitors at Clemson University.

** Judge Advocate General's Corps, United States Army. Brigadier General O'Roark served two tours of duty at The Judge Advocate General's School. He was the Chief of the School's Administrative and Civil Law Division from 1973 to 1976, and returned as the Commandant from June 1985 until his promotion to the rank of Brigadier General in September 1985. His distinguished military career included tours of duty in Vietnam; the 8th Infantry Division (Mechanized), United States Army Europe; III Corps and Fort Hood; Executive, Office of The Judge Advocate General; Commander, United States Army Legal Services Agency and Chief Judge, United States Army Court of Military Review; and The Judge Advocate, United States Army Europe and Seventh Army. General O'Roark retired from active duty in June 1989 and currently works with the Kentucky Bar Association and local bar groups providing continuing legal education programs on professional responsibility and risk management. He also writes a continuing column on professional responsibility in the *Bench and Bar*, the Kentucky Bar Association's quarterly magazine. His observations on the judge advocate's role in developing the command climate of the future are the direct product of correspondence from and discussions with the recently retired President of the Center for Creative Leadership, Lieutenant General (Ret.) Walter F. Ulmer Jr. The author expresses his sincere thanks to General Ulmer for generously sharing his insightful analysis and, as always, profound thinking. The author extends a special thanks to Dr. Ann Marie O'Roark, a psychologist specializing in leadership, who, as she often has done in the past, provided him with ideas, resources, and encouragement.

Transformational leadership is a fresh concept for talking and thinking about the dramatic changes—political, social, and technical—occurring throughout the world and how leaders must have the vision to make crucial changes to their organizations. Few people in leadership positions need to be told that we live in a watershed period of history. What is rare is for this to be so evident to us all. It is intuitively obvious that our society in general, and the military in particular, is undergoing a sea change.

Transformational leadership holds that a leader first must recognize the magnitude of this change. Then that leader must create a vision of the future for the organization and a strategy for achieving that vision which allows the organization to survive chaos and continue to serve its purpose. What is vision? Vision is a graphic and compelling description of the organization in the future. It is *graphic* in the sense that members of an organization can literally conceptualize what the future organization will look like and *compelling* because it incorporates the values and inspiration for the future organization that motivates people to want to be part of that vision and help to achieve it. The transformational leader's role is to develop that vision and teach its worth to the organization.

II. So What's the Problem? Just Do It!

Unfortunately, as they say, the devil is in the details. The truth is that it is extremely difficult for either individuals or organizations to change.

On an individual basis, while we often know change is on the horizon, it is hard to believe that tomorrow will be much different from today. So we do not do much today. The classic example is the buggy whip companies of the early part of this century whose leaders thought that the automobile would never replace the horse. This lack of vision led to the rapid disappearance of those companies which failed to transform their operations to a new reality. Another inhibitor is that not every person in a leadership position is a good visionary. In our military history the court-martial of General Billy Mitchell, whose vision for air power was not recognized by his leaders, is a symbol of the frustrated visionary's fate. Individuals with talent for creativity, adaptability, and innovative application are more rare than many think. They are an organizational treasure.

Regrettably, it is harder to get a large organization to change than an individual. James A. Belasco's book, *Teaching the Elephant To Dance—The Manager's Guide To Empowering Change*, captures organizational inertia best with this analogy:

In India, where an elephant is a beast of burden, a baby elephant is tethered to a stake with a short rope attached to a metal band on one of the baby's hind legs. The young elephant quickly learns that it has a range of the short rope and no more. After the elephant is grown, at the end of a day's work a metal band is once again put on a hind leg, but the elephant is not tethered with a rope to a stake because no rope and stake can hold a grown elephant. Fascinatingly, the elephant free to go any where it wants will range no farther than a short rope's length because that is as far as it thinks it can go with a metal band on a hind leg.

Much the same thing happens in organizations. "We have always done it that way," the "not invented here" syndrome, tunnel vision, and resistance to change by those comfortable with the current situation are just a few of the symptoms of a moribund organization. John Maynard Keynes said it best when he commented that "[t]he difficulty lies not in the new ideas, but in escaping from the old."

The upshot is that the organization does not realize its strength and flexibility and remains tethered far short of its potential. The challenge for leaders in today's environment is to overcome this self-limiting, elephant mindset that exists in all organizations, including our military institutions. The transformational leader must provide the vision that will teach the organization how strong it really is and how to range and even dance at a distance far beyond anything believed possible in the past.

III. Some Thoughts on Teaching the JAG Elephant to Dance by Practicing Transformational Leadership

The following observations are in no way intended to be prescriptive. Instead, they are my best effort to demonstrate how a vision for the future of the Judge Advocate General's Corps (JAGC) might be developed. These ideas do not concern specifics (such as what a division staff judge advocate's table of organization and equipment should be in the next century). Every day many smart people are working hard on that vision of the future of the JAGC. The three ideas I offer are more philosophical in nature, but may be worth exploring as the JAGC expands its vision of the future for legal services in the Army. Should some of my examples be out of step, do not let that divert attention from the importance of transformational leadership that is the point of this essay.

A. What Role Should Military Lawyers Have in Shaping the Command Climate of the Future?

We have a unique confluence of societal and international events

that are placing extraordinary demands on our military institutions. Military leaders are expected simultaneously to downsize and yet respond to multiple diverse missions. Technological change adds enormous stress as machines give us new combat options, increase demands for precision, and alter command relationships by simultaneously passing information in a multitude of directions. All of this requires the military to "smarten up, not dumb down." The military needs to recruit Peter Drucker's knowledge worker who also can meet the physical demands of a combat soldier. In short, the "grunt is dead" and we must recruit the highest quality force in our nation's history.

It is in this context that the military must come to grips with the worldwide trend in democratized countries to make the work environment more humane. In the years to come the American military will undergo intense scrutiny from a number of sources to include budget cutters, isolationists, special interest groups, and antihierarchy advocates. Everything about the military will be examined. Unfortunately, those who examine the military will do it somewhat naively because that time we all knew was coming—when the public we serve would be profoundly ignorant of military science, skills, and values—is here. They simply do not know how hard it is to do. Moreover, we must never forget that an antimilitary sentiment exists in this country that is alive and malignant.

While young Americans are still capable of patriotism and commitment to national service, they have increasing expectations of fair treatment and good leadership. If they find this lacking, they will "vote with their feet" and quickly take us back to the hollow army of the mid-1970s. The totality of this situation will put commanders on edge and on the defensive as they are expected to carry out complex operations flawlessly with what may seem diminished command control and inferior forces.

What is the answer to this exceedingly difficult situation? Who in the military will mediate the stresses that this combination of factors presents? One answer is the judge advocates of the services. Military lawyers are uniquely qualified to take on the role of mediators and rationalizers within the system. In this role judge advocates will seek to link the commander's traditional requirements for discipline, loyalty, and obedience with the legitimate expectations of fair treatment by modern soldiers. Military lawyers, by developing confidence in the fairness of military justice, personnel policies, and in the overall fairness of military institutions, can strike the balance in a new era of authority relationships.

What vision should the JAGC have to innovate change in military law and in service to our clients to accommodate the need for a disciplined force that meets soldiers' expectations of fair and humane treatment? In this context the questions that occur to me are as follows:

During peacetime in garrison why is it not feasible to:

- (1) Give military judges sentencing authority similar to their civilian counterparts—for example, suspended sentences, shock probation, community service?
- (2) Develop a form of random jury selection that does not compromise seniority?
- (3) Require a unanimous jury vote for conviction by court-martial instead of a two-thirds vote (what a civilian is entitled to in almost all states)?

Is the table of maximum punishments too severe? A criminal class does not exist in the military—most crimes involve very young, inexperienced people. Is it not time to review the military punishment scale for fairness and equity with civilian standards?

What is the vision for the role of women in the military? Surely this role will expand—will personnel policies be in place to assure women fair treatment when it does?

What should our vision be for the role of the military lawyer in shaping the command climate of the next century?

B. What Doctrine is Necessary for the Legal Education and Professional Development of the Judge Advocates of the Next Century?

The civilian bar has made a stunning discovery. The legal profession is the only profession in which you can get a license to practice without knowing how. Any staff judge advocate could have told the civilian bar that.

The current high interest in lawyer competence stems from the American Bar Association's (ABA) study entitled, *Legal Education and Professional Development—An Educational Continuum* (known as the MacCrate Report). It is a massive study looking at a legal education spectrum of law school, new lawyer transition programs, and continuing legal education. The MacCrate Report found serious deficiencies in teaching lawyer skills and values in all lawyer professional development programs with law schools receiving particularly low marks.

The MacCrate Report identified ten key lawyer skills including investigation, communication, counseling, negotiation, and resolving ethical problems. It further identified a number of professional values—competent representation, professional self-development, promotion of justice, fairness and morality, and improvement of the profession. Based on this evaluation, the ABA recommended that all state bars perform a review of the legal education programs for lawyers in their jurisdictions to determine whether these programs adequately develop the MacCrate Report skills and values considered essential to lawyer competence.

Led by Virginia, several states have responded to this recommendation by conducting a Legal Education Conclave. The conclave process recognizes shared responsibility among legal educators, the judiciary, and the practicing bar for legal education. It is intended to lead to a common vision for the future of the legal profession and the education programs required throughout a lawyer's career to achieve it. Kentucky's Conclave is typical of how state bar reviews are being conducted. It considers the spectrum of legal education including law school, transition programs, and continuing legal education. The Kentucky Conclave's three-part mission is to:

- (1) Evaluate the ABA's MacCrate Report recommendations on lawyer skills and values for application to Kentucky legal education;
- (2) Analyze resources available to pursue change; and
- (3) Analyze legal education doctrine in Kentucky to determine what subjects and programs will best prepare Kentucky lawyers to meet the requirements of the public and the profession in the twenty-first century.

If the civilian bar is concerned about lawyer professional development and perceives a need to review the entire process, perhaps the military bar should do the same. Thanks to the instruction provided to the Basic and Graduate Courses at The Judge Advocate General's School, United States Army (TJAGSA), judge advocates are well ahead of the civilian bar in developing Army lawyers, at least early in their careers (and assuming the JAGC is teaching the "right" things). Applying the ABA's MacCrate Report recommendations on lawyer skills and values to military legal education would allow the JAGC to determine whether it is.

While considering MacCrate Report issues, judge advocates also should address the question of whether the JAGC should have mandatory continuing legal education requirements. Most states require mandatory annual continuing legal education for members of their bar. The military bar must have the same need. In the Army JAGC, the Graduate Course is the last mandatory program for lawyer skills and values professional development. Ohio is looking at a career time-line approach for continuing legal education. What should the focus of continuing legal education be in the first five years of a lawyer's career, the next ten, and so on? This approach could work well for Army lawyers. Currently, while judge advocates receive voluntary continuing legal education throughout a career, state licensing requirements dictate the amount that a judge advocate must obtain each year. This unstructured, "ticket-punch" approach to judge advocate professional development is behind the times.

While TJAGSA's leadership constantly reviews the School's programs and modifies them as needed, the last comprehensive review of the JAGC's legal education and professional development doctrine oc-

curred ten years ago. *Why not hold an Army JAGC Legal Education Conclave to develop the vision of what the professional judge advocate of the twenty-first century should be and what it will take to get there?*

C. *The Judge Advocate in Cyberspace*

The pace of acceleration of the use of computers in the delivery of legal service is breathtaking. The transformational leader must recognize that how law is practiced is profoundly changing. Many lawyers see the use of computers simply as a matter of efficiency and law office economics. They must understand that much more than that is happening. Fundamental practice skills bearing directly on legal method are undergoing a change that is central to how law will be practiced in the future.

The first rule of professional responsibility is competence. Competence requires the legal knowledge, skill, thoroughness, and preparation reasonably necessary for representation. These qualifications center on research, writing, negotiation, litigation skills, and organization and management of legal work. This is how law is practiced and it is all changing as a result of technology. Lawyers who do not keep up with technological change will one day literally be incompetent to practice.

The JAGC has worked hard to automate Army legal service and in many respects is ahead of the civilian bar. What follows are some selected recent developments in automating legal method that are "pressing the envelope" of how law is practiced. My hope is that these ideas will add incrementally to the creative thinking already being done to envision the electronic staff judge advocate office.

1. *Computer Assisted Legal Research*

a. *Law library On-line Services*—On-line law library services have been available for years. What is new is that this service industry is undergoing its own transformation. It is in a period of merger, buyouts, and new service startups. Similar to cable television companies, service is more extensive and more options are offered at less cost. For example, LEXIS now offers a service of Military Law Library Materials. They call this service LEXIS MVP, The Most Valuable Part of LEXIS for Small Firms. Civilian lawyers practicing outside military installations can now have a military law library on par with the post legal office and one that always will be more up to date. *Perhaps it is time for the JAGC to study whether this is the future for the Army Law Library Service? Do we make or buy? Whatever is done, there is a better way than the laborious, expensive, and slow system that the current paper law library service dictates.*

b. *CD ROM Law Office Library*—From an economic and pro-

fessional standpoint, it seems clear that the future law library will be a CD ROM system. Such a system makes more extensive holdings feasible and reduces space and utility costs. Many civilian lawyers use a hybrid of CD ROM for basic research and on-line service to make sure that they have the most recent authority. *This state-of-the-art research is a technique ideal for a military law office.*

c. Public Domain Law Libraries—The manner in which the law is reported is in a state of flux. The technology exists to place all state and federal laws, regulations, and case decisions in an indexed data base. All that needs to be done is to agree on a uniform citation system. The core principles of this country call for easy public access to legal authority. Automation provides the process to open the legal system more than ever before in our history. *The implication of public domain law libraries for military legal service is enormous. Consider the affect that inexpensive, on-line access to all state law, regulations, and case decisions will have on the Legal Assistance Program alone.*

2. Electronic Filing and Document Retrieval—A key issue for law practice is whether to convert paper files to electronic files. It sounds like office efficiency again, but it is much more. Law practice experts cite the "80-20 Rule" in support of such a conversion. This rule holds that eighty percent of work done in most law firms is not new. If this is true, then there is a legal research gold mine in law office paper files that are pertinent to new matters if only they can be located. Automation's answer is "work product retrieval." Work product retrieval uses computer global search techniques to determine whether documents on point for a new matter exist in office electronic files. *With the high turnover of personnel in military law offices, automated work product retrieval is an even more valuable research tool for judge advocates than it is for lawyers in more stable civilian law offices with long-term institutional memory. How do we get there?*

3. Automating the Litigation Process

a. Machine Readable Transcripts (MRT)—Legal documents prepared in MRT are becoming more common. A typical example is a pretrial deposition. Instead of providing only a paper transcription of testimony, the reporter also provides the deposition on a computer "floppy" disk. The lawyer is then able to put the deposition into a computer with a program by which it is automatically indexed and immediately retrievable in a data base. In addition to the obvious uses this technique has for analysis of the testimony, the deposition can easily be copied in whole or part as well as transmitted quickly and inexpensively by electronic mail. *The improved legal method and cost savings that MRT offers for transcription of courts-martial records of trial, posttrial*

review, appellate review, and records maintenance are immense. How do judge advocates capitalize on this technology?

b. Real Time Courtroom Testimony Transcription—If you have noticed what appear to be television monitors on the judge's bench and counsels' table at the O.J. Simpson trial, that is exactly what they are. The court reporter's transcription of testimony as it is recorded verbatim is instantly shown on screens before the judge and opposing counsel. It is automatically indexed and immediately retrievable in a data base by using key phrases—such as "bloody glove." At the end of each day, the lawyers receive floppy disks containing the day's testimony that they may use for research and analysis in preparation for the next day's proceedings. *We need to import this courtroom technology to the court-martial system.*

c. Computerized Exhibits—The "Forrest Gump Effect"—While people marveled at the movie industry's ability to realistically place Forrest Gump in historical settings, the truth is that this technology is commonplace. As a result, more and more programs are available to lawyers to demonstrate to juries how the facts of a case unfolded. One example is a program used by plaintiffs' counsel in medical malpractice cases called Animated Dissection of Anatomy for Medicine (or A.D.A.M.). Although expensive, the program can recreate an entire operation to show the jury how the medical misadventure occurred. *Judge advocates need to develop these computerized litigation skills just as their civilian counterparts are currently doing.*

d. Use of Computer Notepads for Big-Screen Depiction of Crime Scenes, Accident Sites, Charts, and Diagrams—Gone is the day when lawyers have to rely on rudimentary and awkward cardboard and pen techniques to enable witnesses to show the jury a crime scene or how an accident developed. Using computer notepads and big-screen technology, witnesses can mark a computer notepad from the witness stand which then will instantly be clearly displayed on a large screen, and in easy view of the jury and public. *If this technique works for civilian trials, it obviously will work well in the court-martial system.*

What is our vision of the future for maintaining judge advocate competence through skillful use of automation? How should this technology be applied to the court-martial system, litigation skills, legal research, work product retrieval, and function and size of military law offices? What will the electronic staff judge advocate office of the next century look like?

IV. Conclusion

In preparing the lecture on which this essay is based, it struck me how fitting it was to focus on transformational leadership and vision in the dedication of the Hugh J. Clausen Leadership Chair. This is true because General Clausen was so good at it on so many levels. His work in developing the Senior Officer Legal Orientation Program, establishing the Friends of The Judge Advocate General's School—which has contributed so much to military legal education—and directing a major expansion of The Judge Advocate General's School are only a few examples of how his vision has been realized to the continuing benefit of military lawyers and the Army.

My final thought is, rather than using this newly created academic chair to solely sponsor an annual lecture on leadership, why not an annual Hugh J. Clausen Leadership Conclave? Make it inclusive by inviting line officers as well as judge advocates. Call on the array of talent available to the JAGC from our reserve and retired ranks. Schedule it for two days so that there will be time for thoughtful analysis and hard recommendations. What would be the purpose of such a conclave? To teach the JAG elephant to dance and to build for the future of military legal service in the worthy cause of our national defense.

BOOK REVIEWS

NO FIRE THIS TIME: FALSE ACCUSATIONS OF AMERICAN WAR CRIMES IN THE PERSIAN GULF*

REVIEWED BY KEITH D. BARBER**

I. Introduction—Ramsey Clark and *The Fire This Time*

"In the exploitation of other peoples, no empire ever matched America"¹ wrote former United States Attorney General² Ramsey Clark in his strident attack on American intervention in the Persian Gulf War. In Clark's book, *The Fire This Time*, the United States was at fault for the Persian Gulf War and Saddam Hussein was blameless.³ Clark claimed that the United States deliberately provoked the Iraqi invasion of Kuwait⁴ as a pretext to establish a United States presence in the Persian Gulf.⁵ The United States frustrated every effort to negotiate a peaceful settlement.⁶ The United States conducted a brutal assault against a defenseless Iraq⁷ that violated numerous provisions of international law.⁸ In response, Clark formed the Coalition to Stop United States Intervention in the Middle East⁹ and from this organization developed the Com-

* RAMSEY CLARK, *THE FIRE THIS TIME: U.S. WAR CRIMES IN THE GULF* (Thunder's Mouth Press, 1992) 384 pages, \$21.95 (hardcover), \$13.95 (softcover).

** Written as a second-year law student while attending the University of Houston Law School. The reviewer previously served in the United States Army Medical Corps for eleven years.

¹ RAMSEY CLARK, *THE FIRE THIS TIME: U.S. WAR CRIMES IN THE GULF* 227 (1992).

² Clark served as United States Attorney General during the Lyndon Johnson administration. See John B. Judis, *The Strange Case of Ramsey Clark: How Far Left Can You Go?*, *THE NEW REPUBLIC*, Apr. 22, 1991, at 23.

³ See Jim Hoagland, *Ramsey Clark Wrong Again*, *WASH. POST*, Mar. 23, 1993, at A21. See also CLARK, *supra* note 1, at 3 ("a careful look at American involvement in the region reveals that the U.S. government, not Iraq, bears prime responsibility for the war.") *Id.*

⁴ See CLARK, *supra* note 1, at 227.

⁵ See *id.*

⁶ See *id.* at 215. See also *infra* notes 176-81 and accompanying text (discussing allegations that President Bush broke a promise to King Hussein of Jordan to allow 48 hours to negotiate a solution).

⁷ See *id.* at 207. See also *infra* notes 235-38 and accompanying text (discussing Clark's argument that there was no real combat during this war).

⁸ See *infra* notes 239-314 and accompanying text (for Clark's reasoning on how United States forces broke international law and the actual appropriate application of international law).

⁹ Ramsey Clark, *Price of War Too High; End it or No One Wins*, *USA TODAY*, Feb. 15, 1991, at 8A.

mission of Inquiry for the International War Crimes Tribunal.¹⁰ This twenty-two member tribunal investigated allegations of war crimes and unanimously found President Bush, Vice President Quayle, Secretary of Defense Cheney, Chairman of the Joint Chiefs of Staff Colin Powell, and General Norman Schwarzkopf guilty on all nineteen charges.¹¹

Some dismiss Clark's allegations as an anti-establishment extremist,¹² but others acknowledge his status as a former United States Attorney General and give his allegations credibility.¹³ On January 15, 1991 (the date of the United Nations (U.N.) deadline for Iraq to withdraw from Kuwait or face force¹⁴), United States Representative Henry B. Gonzalez held a joint news conference with Ramsey Clark¹⁵ and the next day introduced five articles of impeachment against President Bush.¹⁶

This book review analyzes Clark's numerous allegations by comparing them with the facts and international law and addresses the issue of Ramsey Clark's credibility.

II. A Survey and Analysis of the Applicable International Law

An understanding of international law is critical to determine whether the United States breached international law during the Persian Gulf War. The U.N. Charter establishes the circumstances under which a

¹⁰ See Clark, *supra* note 1, at 186.

¹¹ See *id.* at 75-101. See also *infra* notes 92-118 and accompanying text (for details of the accusations made by the Tribunal and a discussion on the merits of the accusations).

¹² See e.g. Judis, *supra* note 2 ("today Clark . . . inhabits the furthest reaches of the fevered swamps of American politics. He has become not simply a critic of American administrations, but the best of hope of foreign adversaries, from the Libyans to the Iraqis."); Hoagland, *supra* note 3 ("Once right about Vietnam and civil rights, Ramsey Clark has been wrong about most other big issues since he left government. After reading his recent "Report on United States War Crimes Against Iraq," you have to wonder if the former attorney general has lost his marbles or has merely misplaced them in service of a cause . . . Clark serves as honorary chairman of the anti-establishment establishment that thinks and portrays American intervention abroad as evil per se. Caught in a Vietnam-era time warp, Clark acts as if Lyndon Johnson . . . were still president, with Richard Nixon and Watergate waiting in the wings.")

¹³ See e.g. Tom Harpur, *More Proof Media Duped on Persian Gulf War*, TORONTO STAR, Aug. 30, 1992, at B7 ("Several personal letters from readers, and some of those published on letters to the editor pages, have tried to ridicule the War Crimes Tribunal on the grounds . . . that former U.S. attorney-general Ramsey Clark . . . is not to be taken seriously. . . . Ramsey Clark led one of the most distinguished careers in the history of the office of the U.S. attorney-general. . . . He drafted the Civil Rights Act arguably the pivotal piece of U.S. civil liberties legislation in the 20th century.")

¹⁴ See Res. 678, U.N. Sec. Council (1990) in JOHN N. MOORE, CRISIS IN THE GULF: ENFORCING THE RULE OF LAW 420-21 (1992). See also *infra* notes 193-209 and accompanying text (for further discussion of U.N. Resolution 678).

¹⁵ Press Conference with former United States Attorney Ramsey Clark and Representative Henry Gonzalez, FED. NEWS SEAV., Jan. 15, 1991.

¹⁶ Clark, *supra* note 1, at 159-60.

nation may use force.¹⁷ The Geneva Conventions of 1949 are the primary guidelines of humanitarian law for conduct of international armed conflict.¹⁸ Additionally, all nations are bound by "customary laws of war."¹⁹

A. *The United Nations Charter*

"What may be the single most important fundament of world order is reflected in Article 2(4) of the U.N. Charter."²⁰ This provision requires great restraint by member states in using force to settle disputes.²¹ The same article mandates that U.N. members settle disputes in a peaceful manner.²² This charter also establishes national sovereignty as a sacrosanct principle.²³

The U.N. Charter describes at least two situations when nations may lawfully use force against another country. One circumstance is when the U.N. Security Council determines that the U.N. should use force to advance world peace. The Security Council should try less severe methods first,²⁴ but if the Security Council finds lesser measures inadequate then it may authorize force.²⁵ Article 43 provides the U.N. authority to call upon member states to contribute armed forces to advance international peace.²⁶

Secondly, nations may lawfully use of force against each other when they react in self defense to an outside attack. Under Article 51, member nations may act unilaterally in either individual or collective self defense when any U.N. member is attacked by another.²⁷

¹⁷ See, e.g., U.N. CHARTER art. 2 (affirming the principle of sovereignty for its members and requiring that member nations refrain from force and settle disputes peacefully); *id.* art. 33 (requiring that disputes be settled by negotiation or other peaceful means); *id.* art. 42 (permitting the U.N. to use force to promote international peace and security); *id.* art. 51 (permitting member states to use armed force in individual or collective self defense).

¹⁸ Thomas Fleiner-Gerster & Michael A. Meyer, *New Development in Humanitarian Law: A Challenge to the Concept of Sovereignty*, 34 INT'L & COMP. L.Q. 267 (1985).

¹⁹ See Robert K. Goldman, *The Legal Regime Governing the Conduct of Operations Desert Storm*, 23 U. TOL. L. REV. 363, 364 (1992).

²⁰ Moore, *supra* note 14 at 22.

²¹ "All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence. . . ." U.N. CHARTER, art. 2 ¶ 4.

²² "All members shall settle their international disputes by peaceful means in such a manner that international peace and security and justice are not endangered." *Id.* art. 2 ¶ 3.

²³ "The Organization is based on the principle of the sovereign equality of all its Members." *Id.* art. 2 ¶ 1.

²⁴ Article 41 outlines measures not involving force such as economic and diplomatic sanctions. See *id.* art. 41.

²⁵ "Should the Security Council consider that measures provided for in Article 41 would be inadequate or proved to be inadequate, it may take such action by air, sea, or land forces as may be necessary to maintain or restore international peace and security. Such action may include demonstrations, blockade, and other operations by air, sea, or land forces of Members of the United Nations." *Id.* art. 42.

²⁶ See *id.* art. 43.

²⁷ "Nothing in the present Charter shall impair the inherent right of individual or collective self-defense if an armed attack occurs against a member of the United Nations. . . ."

B. The Geneva Conventions of 1949

The four Geneva Conventions of 12 August 1949²⁸ are the principal international humanitarian law applicable to international armed conflict.²⁹ One of the basic provisions of the Geneva Conventions is the principle that the attacker and the defender share responsibility for minimizing collateral damage.³⁰

To revise the law of warfare, international negotiations culminated in 1977 and proposed additional protocols for the Geneva Conventions called "Protocol I" and "Protocol II."³¹ Protocol II applies only to the Protection of Victims of Noninternational Armed Conflicts (e.g., internal conflicts such as revolution or civil strife within a nation) and has no bearing on international conflicts such as the Persian Gulf War.³² Although Protocol I applies to international armed conflicts like the Persian Gulf War,³³ it was *not* directly applicable.³⁴ "Iraq and several Coalition members, including the United States, Great Britain, and France are not parties to Protocol I: therefore it was not applicable during the Persian Gulf War."³⁵ Authorities, except Ramsey Clark, concur with this point.³⁶ The International Court of Justice (ICJ), the "principle judicial organ of the

Id. art. 51. See also *infra* notes 197-202 and accompanying text (discussing Article 51's direct applicability to the Persian Gulf War and Ramsey Clark's failure to even discuss this key provision).

²⁸ The Geneva Conventions consist of four treaties: Geneva Convention I for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field; Geneva Convention II for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of the Armed Forces at Sea; Geneva Convention III Relative to the Treatment of Prisoners of War; and Geneva Convention IV Relative to the Protection of Civilian Persons in Time of War. Geneva Convention IV was the first international agreement to focus solely on the protection of civilians. See Danielle L. Infeld, *Precision Guided Munitions Demonstrated Their Pinpoint Accuracy in Desert Storm: But Is a Country Obligated to Use Precision Technology to Minimize Collateral Civilian Injury and Damage?*, 26 GEO. WASH. J. INT'L L. & ECON. 109, 116-17.

²⁹ Fleiner-Gerster & Meyer, *supra* note 18.

³⁰ See Infeld, *supra* note 28, at 117. An example of this principle is the requirement in Article 18 of Geneva Convention IV that hospitals be distinctively marked and located as far as possible from military objectives. See Geneva Convention Relative to the Protection of Civilian Persons in Time of War, opened for signature Aug. 12, 1949, 6 U.S.T. 3516, 3530, art. 18 [hereinafter Geneva Convention IV].

³¹ See William G. Schmidt, *The Protection of Victims of International Armed Conflicts: Protocol I Additional to the Geneva Conventions*, 24 A.F.L. REV. 189, 189-90 (1984).

³² Rosemary Abi-Saab, *Humanitarian Law and Internal Conflicts: The Evolution of Legal Concern*. in HUMANITARIAN LAW OF ARMED CONFLICT: CHALLENGES AHEAD 209 (Astrid J.M. Delissan & Gerard J. Tanja eds., 1991).

³³ *Id.* See also Goldman, *supra* note 19, at 363 ("The recently concluded hostilities between the allied coalition and Iraq were a classic example of international, i.e., interstate, armed conflict.").

³⁴ *Id.* at 364.

³⁵ United States Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress 606* (1992) [hereinafter Pentagon Final Report].

³⁶ E.g., "Neither the United States nor Iraq elected to become a party to Protocol I . . . Therefore, it was not applicable to the Persian Gulf War." Infeld, *supra* note 28, at 118.

United Nations,³⁷ found that the 1977 Protocols were not applicable to the United States during its military and paramilitary activities against Nicaragua.³⁸ Instead, the court held the United States to standards enumerated in the 1949 Geneva Conventions.³⁹

The scope of Protocol I is significant because Ramsey Clark's contention that the United States violated the Geneva Conventions depends on his erroneous conviction that the United States and Iraq are bound by Protocol I.⁴⁰ Clark states that "[b]oth Iraq and the United States are signatories" to Protocol I.⁴¹ Regarding the United States, this might be technically correct, but it is misleading. The United States representatives to the Protocol signed it when the Conference concluded, but the United States Senate did not ratify the treaty.⁴² Although Clark supports strict adherence to the constitutional requirements for going to war,⁴³ he ignores the constitutional requirement that a treaty be ratified by the United States Senate to be effective.⁴⁴ Not only does Clark fail to inform his readers that the United States is not actually a party to Protocol I, but he also extensively quotes Protocol I and holds the United States to this treaty by directly comparing alleged atrocities of the United States to various provisions of Protocol I.⁴⁵

C. Customary International Law

1. *Customary International Law and Protocol I*—All nations are bound by customary international law founded on the general practice of nations.⁴⁶ Customary international law governed during the Persian Gulf

³⁷ Statute of the International Court of Justice, June 26, 1945, art. I, 59 Stat. 1031. "The jurisdiction of the Court comprises all cases which the parties refer to it and all matters specially provided for in the Charter of the United Nations or in treaties and conventions in force." *Id.* art. 36.

³⁸ Theodor Meron, *The Geneva Conventions as Customary Law*, 81 AM. J. INT'L L. 348, 348-50 (1987).

³⁹ *Id.* at 352.

⁴⁰ See Clark, *supra* note 1, at 174.

⁴¹ *Id.*

⁴² See W. Hays Parks, *Air War and the Law of War*, 32 A.F.L. 1, 86 (1990).

⁴³ See *infra* notes 230-233 and accompanying text (discussing Clark's accusation that President Bush's use of force in the Persian Gulf violated the United States Constitution).

⁴⁴ See U.S. CONST. art. II, § 2.

⁴⁵ See Clark, *supra* note 1, at 174-78. Additionally, Clark devotes a large segment of an appendix to a reprint of selected parts of Protocol I. *Id.* at 282-88. Clark's failure to advise his readers that this treaty was not applicable to the Persian Gulf War because the Senate rejected it, coupled with his efforts to apply this treaty as if it were the appropriate international law in the Persian Gulf War, can only be characterized as extremely misleading to the point of being a major disservice to his readers. His application of the wrong law to his arguments is perhaps best characterized as a legal blunder.

⁴⁶ See Goldman, *supra* note 19, at 111 n.18. The notion of customary international law also is expressed in the Hague Convention of 1907, which provides that the Hague Conventions rule apply even to belligerents who are not parties to the treaty "as they result from

War.⁴⁷ The United States accepts customary international law as binding upon all nations.⁴⁸ Protocol I is binding on all nations regardless of ratification to the extent that it reflects or codifies pre-existing customary international law.⁴⁹ Parts of Protocol I apply to the United States and all other nations because they are customary international law.⁵⁰

2. *The Principle of Discrimination as Customary International Law*—The principle of discrimination requires that civilian populations not be made the targets of attack.⁵¹ The United States accepts the notion of discrimination,⁵² but rejects Protocol I's definition since it shifts "the responsibility for the protection of the civilian population away from the host nation . . . almost exclusively onto an attacker."⁵³ The United States views this as a change from the traditional and customary rule that the host nation has the principal responsibility for protecting its civilians.⁵⁴ Protocol I requires that attackers employ all feasible precautions to minimize loss of civilian life and property.⁵⁵ The members of the diplomatic conference that drafted Protocol I intended "to shift entirely to the attacker the responsibility for civilian casualties incidental to a lawful attack upon a legitimate military objective."⁵⁶ Protocol I places responsibility on the attacker even if the defender violates other provisions that deliberately place the civilian population at risk.⁵⁷ This is a deviation from customary international law.⁵⁸ Under the customary law of war, the attacker, defender, and the civilian population all share in the responsibility to differentiate military objectives from civilian objects with the defender and the individual civilian bearing the primary responsibility.⁵⁹

the usages established among civilized peoples, from the laws of humanity, and the dictates of public conscience." Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, 36 Stat. 2277, 2280.

⁴⁷ Goldman, *supra* note 19, at 111.

⁴⁸ See Pentagon Final Report, *supra* note 35, at 606.

⁴⁹ See Goldman, *supra* note 19, at 364.

⁵⁰ L. Lynn Hogue, *Identifying Customary International Law in Protocol I: A Proposed Restatement*, 13 L.A. INT'L & COMP L.J. 279, 303 (1990).

⁵¹ See Goldman, *supra* note 19, at 367.

⁵² See *id.*

⁵³ Parks, *supra* note 42, at 112.

⁵⁴ *Id.*

⁵⁵ See *id.* Protocol I also "places civilian property on the same level as the protection of civilian lives." *Id.* at 147 (construing Protocol I, arts. 48-58).

⁵⁶ *Id.* at 163.

⁵⁷ See *id.* at 163-64, 164 n. 489.

⁵⁸ *Id.* at 164.

⁵⁹ Infeld, *supra* note 28, at 123. The Hague Conventions of 1907 provide an illustration of this principle. Hague requires an attacker during bombardment to take "all necessary steps" to "spare as far as possible" various designated civilian targets such as hospitals and historic monuments but the same article also requires the "besieged to indicate the presence of such buildings or places by distinctive and visible signs, which shall be notified to the enemy beforehand." Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, art. 27, 36 Stat. 2277, 2303.

The customary rules of law impose "little or no responsibility upon the attacker" for preventing collateral civilian losses.⁶⁰ This is justified because the attacker is often unaware of the civilians' location, and the defender is better able to control and direct civilian movement.⁶¹

Placing the responsibility for protecting civilians on the attacker subverts the law of war by allowing the defender to gain advantage by placing military targets in civilian areas.⁶² Iraq did this during the Persian Gulf War.⁶³

3. *The Principle of Proportionality as Customary International Law*—Another principle of customary international law is proportionality.⁶⁴ Under this principle, incidental damage to property or injury to civilians cannot be disproportionate to the military advantage achieved by the attack.⁶⁵ The United States accepts proportionality as customary international law,⁶⁶ but not the representation of proportionality found in Protocol I.⁶⁷ "By the American domestic law standards, the concept of proportionality contained in Protocol I would be constitutionally void for vagueness."⁶⁸ Vagueness invites argument and makes proportionality "the weakest of all international law norms."⁶⁹ In addition, measuring proportionality is impossible if nations value the lives of their own citizens more than the lives of those residing in the nation they are fighting.⁷⁰ International law does not address the question of whether the United States has any obligation to suffer more losses to prevent a greater loss of Iraqi life.⁷¹ However, military operations are "not subject to some sort of 'fairness doctrine,' and neither the law of war in general nor the concept of proportionality in particular imposes a legal or moral obliga-

⁶⁰ Parks, *supra* note 42, at 153.

⁶¹ *See id.*

⁶² *See* Infeld, *supra* note 28, at 123.

⁶³ *See* Pentagon Final Report, *supra* note 35, at 613. For example, Iraq placed two fighter planes adjacent to the historical Ur Temple. The United States chose not to risk damaging the temple by attacking these military aircraft even though such an attack was fully permitted by the laws of war. *See* Infeld, *supra* note 28, at 137. Additionally, after the liberation of Kuwait, Coalition forces found Silkorm missiles in a school within a populated area. *See* Pentagon Final Report, *supra* note 35, at 613.

⁶⁴ *See* Infeld, *supra* note 28, at 118.

⁶⁵ *Id.* Attacks must provide a direct military advantage, even if they have an indirect purpose of ending the conflict. *Id.* at 120. A common example of disproportionate action is destroying an entire village to kill one enemy sniper. *See id.* at 119.

⁶⁶ *Id.*

⁶⁷ *See* Parks, *supra* note 42, at 173.

⁶⁸ *Id.*

⁶⁹ Paul W. Kahn, *Lessons for International Law from the Gulf War*, 45 STAN. L. REV. 425, 434 (1993).

⁷⁰ *See id.* at 435.

tion on a nation to sacrifice superior manpower, firepower, or technological superiority over an opponent."⁷²

4. *The Perils of Viewing Protocol I as Customary International Law*—Because Protocol I is vague, its purpose can be frustrated.

Protocol I suffers from intentional ambiguities of language, which places combatants carrying out lawful combat operations at an increased risk from spurious allegations of violations of war if captured. This in turn could result in a repetition of the American experience in Korea and Vietnam where United States military men were denied fundamental prisoner of war protections to which they were legally entitled. . . . The ambiguities of Protocol I will greatly facilitate similar illicit efforts in future conflicts, while its limitations on reprisals will undermine a nation's ability to ensure respect for the law of war where breaches occur or are threatened.⁷³

Abuse by the enemy of the vague provisions of Protocol I is not the only reason for caution when its provisions were broken. With amazing precision, at least one author writing before the Persian Gulf War mentioned Ramsey Clark to suggest that critics of United States policy could gain credibility for their propaganda by exploiting the vague provisions of Protocol I.⁷⁴

III. Ramsey Clark's War Crimes Tribunal

A. *The Formal Charges from Clark's International War Crimes Tribunal*

Any analysis of the charges upon which the International War Crimes Tribunal "convicted" President Bush⁷⁵ and others is complicated by the fact that the nineteen charges presented in Clark's book are vague and fail to provide any guidance as to what specific provision of international law was violated.⁷⁶ These charges are so devoid of any specific reference to international law that restatement is justified to apprise the reader of the magnitude by which the conviction on these charges breached any legal standard.

⁷¹ See *id.*

⁷² Parks, *supra* note 42, at 169-70.

⁷³ *Id.* at 218-19.

⁷⁴ See *id.* at 179 & n.534. "Protocol I would offer such groups [Ramsey Clark and other left wing critics of United States's foreign policy] increased credibility by providing them legal authority, but in the type of vague, ambiguous language that can be easily exploited in propaganda allegations. . . ." *Id.*

⁷⁵ See *supra* notes 9-11 and accompanying text.

⁷⁶ See Clark, *supra* note 1, at 264-65.

The Nineteen Charges Against Bush, Cheney, et al.

1. The United States engaged in a pattern of conduct beginning on or before 1989 intended to lead Iraq into provocations justifying United States military action against Iraq and permanent United States military domination in the Gulf.
2. President Bush from August 2, 1990, intended—and acted to prevent any interference with his plan—to destroy Iraq economically and militarily.
3. President Bush ordered the destruction of facilities essential to civilian life and economic productivity throughout Iraq.
4. The United States intentionally bombed and destroyed civilian life, commercial and business districts, schools, hospitals, mosques, churches, shelters, residential areas, historical sites, private vehicles, and civilian government offices.
5. The United States intentionally bombed indiscriminately throughout Iraq.
6. The United States intentionally bombed and destroyed Iraqi military personnel, used excessive force, killed soldiers seeking to surrender and in disorganized individual flight, often unarmed and far from any combat zones, and randomly and wantonly killed Iraqi soldiers and destroyed material after the cease fire.
7. The United States used prohibited weapons capable of mass destruction and inflicting indiscriminate death and unnecessary suffering against both military and civilian targets.
8. The United States intentionally attacked installations in Iraq containing dangerous substances and forces.
9. President Bush ordered United States forces to invade Panama, resulting in the deaths of 1000 to 4000 Panamanians and the destruction of thousands of private dwellings, public buildings and commercial structures.
10. President Bush obstructed justice and corrupted the United Nations functions as a means of securing power to commit crimes against peace and war crimes.
11. President Bush usurped the Constitutional power of Congress as a means of securing power to commit crimes against peace, war crimes, and other high crimes.
12. The United States waged war on the environment.
13. President Bush encouraged and aided Shiite Muslims and

Kurds to rebel against the government of Iraq causing fratricidal violence, emigration, exposure, hunger and sickness and thousands of deaths. After the rebellion failed, the United States invaded and occupied parts of Iraq without authority in order to increase division and hostility within Iraq.

14. President Bush intentionally deprived the Iraqi people of essential medicines, potable water, food, and other necessities.

15. The United States continued its assault on Iraq after the cease fire, invading and occupying areas at will.

16. The United States has violated and condoned violations of human rights, civil rights, civil liberties and the United States Bill of Rights in the United States, in Kuwait, Saudi Arabia, and elsewhere to achieve its purpose of military domination.

17. The United States, having destroyed Iraq's economic base, demands reparations which will permanently impoverish Iraq and threaten its people with famine and epidemic.

18. President Bush systematically manipulated, controlled, directed, misinformed, and restricted press media coverage to obtain support in the media for his military and political goals.

19. The United States has by force secured a permanent military presence in the Gulf, the control of its oil resources, and geopolitical domination of the Arabian Peninsula and Gulf region.⁷⁷

B. Analysis of the Tribunal's Charges and Methodology

1. *The Vagueness of the Charges*—It is difficult to fathom what international law is violated, for example, by Charge 18's accusation that an American politician manipulated the press.⁷⁸ Clark provides none and there is no basis for any kind of international tribunal to have jurisdiction over such a charge.⁷⁹ The demand for reparations found in Charge 17

⁷⁷ *Id.*

⁷⁸ If manipulation of a free press is to be considered grounds for international criminal allegations then a great many politicians are undoubtedly international criminals to include the current President of the United States. See Thomas B. Rosentel, *In Politics the Defense Never Rests*, L.A. TIMES, at A1 (discussing how both the Bush and Clinton Presidential campaigns used "spin doctors" and "war rooms" to manipulate the media); See Michael Kelly, *David Gergen, Master of the Game*, N.Y. TIMES, sec. 6, at 64 (discussing how President Clinton's staff manipulates the press on a daily basis in an effort to get his message across—"the Administration's thematic message is reinforced by leaks and plants and massaged through the care and feeding of the press. It is adjusted by spin patrol and corrected through damage control when mistakes are made or gaffes are committed . . .").

⁷⁹ Clark never makes any charges against Iraq and one is left to wonder how Saddam Hussein, who has dictatorial control over his own press, would fare if held to the same

is not directed from the United States, but rather from the U.N.⁸⁰ However reprehensible corrupting the U.N. (Charge 10) sounds, the specific provision of international law that this violates is a mystery.

Failure of the charges to state the specific provisions of international law violates the notification requirements of the Geneva Conventions. Thus, Clark and his Tribunal ironically violated the Geneva Conventions. Article 146 of Geneva Convention IV discusses mechanisms for enforcing the Convention provisions.⁸¹ Article 146 requires that anyone accused of violating an Article of the Conventions have the safeguards of a proper trial at least as favorable as those afforded prisoners of war. Article 104 of Geneva Convention III requires that accused prisoners of war be given notification which contains "[s]pecification of the charge or charges on which the [accused] is to be arraigned, giving the legal provisions applicable."⁸² Clark's charges fail to provide the required specific legal provisions, thus violating the Geneva Conventions.⁸³

2. *What the Tribunal Did Not Do*—Most noteworthy about the final result of this War Crimes Tribunal is what the Tribunal did not do. The Tribunal did not find Iraq guilty of any charges. The Tribunal did not even *investigate* any allegations against Iraq.⁸⁴ Clark claims that "[t]he Commission focused on the United States because it was begun there by United States citizens and because the growing evidence revealed that the United States was the real transgressor, provoking Iraq."⁸⁵ Clark's claim that the Commission focused solely on the United States because of its origins in the United States contradicts his own efforts to legitimize the Commission by portraying it as an international body.⁸⁶ Clark boasts that the Commission had hearings in over twenty different na-

standard. See Moore, *supra* note 14 at 192-99 (for a detailed discussion of the massive disinformation campaign waged by Iraq in association with the Persian Gulf War).

⁸⁰ See Res. 687, U.N. Sec Council (1991), in MOORE, *supra* note 14, at 424, 431.

⁸¹ Geneva Convention Relative to the Protection of Civilian Persons in Time of War, opened for signature Aug. 12, 1949, art. 146, 6 U.S.T. 3516, 3616.

⁸² Geneva Convention Relative to the Protection of Prisoners of War, opened for signature Aug. 12, 1949 art. 104 ¶ 3, 6 U.S.T. 3316, 3394.

⁸³ This author will leave it to higher authorities to decide whether a Commission providing proper notification under the rules should be convened to prosecute Clark and his Tribunal for this breach of the Geneva Conventions.

⁸⁴ See Clark, *supra* note 1, at 187.

⁸⁵ *Id.* Clark's constant portrayal of the United States as the only party to blame for the war and its conduct completely ignores the vast and diverse character of the international coalition that actively participated in the assault on Iraqi forces. The coalition's 33 members were made up of the following countries: Argentina, Australia, Bahrain, Bangladesh, Belgium, Canada, China, Czechoslovakia, Denmark, Egypt, France, Germany, Greece, Hungary, Italy, Kuwait, Morocco, Netherlands, New Zealand, Niger, Norway, Oman, Pakistan, Poland, Qatar, Saudi Arabia, Senegal, South Korea, Spain, Syria, United Arab Emirates, United Kingdom, and United States. See Moore, *supra* note 14, at 399. Additionally, Japan sent medical teams and Turkey allowed coalition force members to use its air bases. *Id.*

⁸⁶ See Clark, *supra* note 1, at 187.

tions.⁸⁷ While Clark claims that the foreign hearings often indicted the host nation's role in supporting the attack on Iraq,⁸⁸ the Tribunal's convictions were limited solely to the United States. Clark boasts that the twenty-two judges for the Tribunal, (who unanimously voted for conviction on all charges⁸⁹) hail from eighteen different countries.⁹⁰ Of these twenty-two judges, only four were from the United States.⁹¹

Clark's failure to subject Iraq or any other nation to his Commission's investigation contradicts his desire to hold the powerful and powerless equally accountable for war crimes.⁹² Clark laments that the Nuremberg Tribunal at the end of World War II failed to uphold this principle of universal application of the rules of war because it held only the vanquished Axis forces accountable.⁹³ Yet Clark's selective enforcement of the rules of war renders his own declaration that the "highest commitment of the law to peace must be in their faithful, equal, and fair enforcement"⁹⁴ little more than rhetoric.

Clark's failure to hold Iraq accountable sweeps aside documented allegations of extensive atrocities and rules of war violations by Iraqi occupation forces in Kuwait.⁹⁵ Completely ignored is that under international law the war began with the Iraqi invasion of Kuwait and not with the Coalition bombing campaign against Iraq.⁹⁶ Clark's analysis neglects the holding of civilian hostages from a variety of nations as "human shields," the indiscriminate Scud missile attacks on the civilian cities in Israel, and the scorched earth environmental terrorism by igniting hundreds of Kuwaiti oil wells⁹⁷ (which Clark blames on United States military forces⁹⁸). Unlike the allegations made by Clark, Iraq's war crimes were recognized by responsible international authorities including the U.N.⁹⁹ Arguably, Iraq's war crimes are so severe that the United States

⁸⁷ See *id.* at 187-94. Clark includes Canada, England, Turkey, Germany, India, Iraq, Pakistan, Malaysia, the Philippines, Egypt, Australia, Belgium, and Italy in the list of nations that participated in his Commission's hearings. *Id.*

⁸⁸ See *id.* at 189.

⁸⁹ *Id.* at 195.

⁹⁰ *Id.*

⁹¹ See *id.* at 270-72.

⁹² See *id.* at 163.

⁹³ See *id.* at 164.

⁹⁴ See *id.* at 163.

⁹⁵ See Moore, *supra* note 14, at 52-82; Pentagon Final Report, *supra* note 35, at 622-26; Chris Patsilelis, *The Gulf War Americans Weren't Allowed to See*, SAN FRANCISCO CHRONICLE, Nov. 23, 1992, at D4; R. Peter Masterson, *The Persian Gulf War Crimes Trials*, ARMY LAW., Jun. 1991, at 8-14.

⁹⁶ Kahn, *supra* note 14, at 426.

⁹⁷ See Moore, *supra* note 112, at 80.

⁹⁸ See Clark, *supra* note 1, at 102-05.

⁹⁹ United Nations recognition of Iraqi war crimes includes not only numerous Security Council Resolutions, but also a General Assembly Resolution and two resolutions from the United Nations Commission on Human Rights. The Security Council resolutions include:

has a "constitutional imperative" to prosecute Iraq under international law.¹⁰⁰

With contradiction and charges that fail to specify an applicable legal provision as required by the Geneva Conventions, it is not surprising that commentators have labeled Clark's Tribunal a "kangaroo court."¹⁰¹

IV. Allegations That the United States Actually Caused the War

A. *Provoking Iraq into Invading Kuwait*

A central thesis to Clark's analysis is that the "U.S. government used the Kuwaiti royal family to provoke an Iraqi invasion that would justify a massive assault on Iraq to establish U.S. dominion in the Gulf."¹⁰² Clark's conviction that the United States was responsible for the Iraqi invasion was a justification for his War Crimes Tribunal to not investigate any allegations against Iraq or any other nation.¹⁰³

Clark believes that it is easy for the United States to manipulate Iraq into attacking its neighbors because he also blames the United States for the Iraqi invasion of Iran ten years earlier.¹⁰⁴ According to Clark, when

Resolutions 660 (condemning the Iraqi invasion of Kuwait); 662 (concerning loss of human life and material destruction in occupied Kuwait); 665 (deploring the loss of innocent life from the Iraqi invasion and imposing economic sanctions); 667 (expressing outrage at Iraqi violations of diplomatic premises); 670 (condemning Iraqi treatment of Kuwaiti nationals); 688 (expressing grave concern for the repression of Iraqi Kurds), U.N. Sec. Council, in MOORE, *supra* note 14, at 403-37. The General Assembly Resolution is *The Situation of Human Rights in Occupied Kuwait*, U.N. G.A. Res. 45/170 (Dec. 18, 1990) [hereinafter G.A. Res. 45/170] (condemning Iraq for "serious violations of human rights against the Kuwaiti people and third-State nationals," and in particular, "the continued and increasing acts of torture, arrests, summary executions, disappearances and abduction in violation of the Charter of the United Nations, the International Covenants on Human Rights, and other relevant human rights instruments and the relevant instruments of humanitarian law.") *Id.* at 457-59. The resolution from the United Nations Commission on Human Rights is: U.N. Human Rights Commission Res. 67 (1991) (noting with grave concern abductions in Kuwait and treatment of Prisoners of War in violation of international law, strongly condemning torture, arbitrary arrests, summary executions and disappearances in violation of various norms of international law) *Id.* at 461-63. The General Assembly Resolution passed by a vote of 144 in favor with only one against. The one "no" vote was from Iraq, there were no abstentions. *Id.* at 459. The Commission on Human Rights Resolution passed by a vote of 41 in favor with only one against. Again, the only "no" vote was from Iraq and there were no abstentions. *Id.* at 466. It is difficult to imagine a more broadly based international recognition for intolerable levels of international law violation. Even so, Clark's international commission completely ignored all allegations against Iraq.

¹⁰⁰ Louis Rene Beres, *Prosecuting Iraqi Crimes Under International Law: An American Constitutional Imperative*, 15 HOUS. J. INT'L L. 91 (1992).

¹⁰¹ E.g., *Kangaroo Courts to Convene*, ATLANTA CONST. J., Apr. 3, 1991, at A12; Jonathan S. Shapiro, *Who Bears the Blame for the Gulf War?*, LEGAL TIMES, Mar. 22, 1993, at 54 ("The commission filed an initial complaint against President Bush and others setting out 19 criminal charges. The Kangaroo court had its first meeting in New York in May 1991. . . . Not surprisingly the tribunal convicted everybody.") *Id.*

¹⁰² Clark, *supra* note 1, at 3.

¹⁰³ See *supra* note 85 and accompanying text.

¹⁰⁴ See Clark, *supra* note 1, at 5-6.

the Iran-Iraq war failed to give the United States the excuse it wanted for a military presence in the Gulf, the United States turned to "the Western-manufactured image of a militarily strong Iraq to provide the excuse."¹⁰⁵ Clark does not cite a specific provision of international law that this violates except to label the alleged provoking of Iraq into invading Kuwait a "crime against peace."¹⁰⁶ If the allegation is true, it might be viewed as a violation of U.N. Charter provisions that commit member nations to peaceful resolutions of disputes¹⁰⁷ as well as violating agreements that renounce war as an instrument of national policy.¹⁰⁸ For this reason, Clark presents a legally credible allegation, presuming the facts support his case. However, the evidence provided by Clark to support the conclusion that the United States provoked Iraq into invading Kuwait is flimsy. What follows are Clark's specific claims that ostensibly support this conclusion.

1. *The United States Prepared Militarily for This War*—Clark contends that the United States made extensive military preparations to do just what it did in the Persian Gulf War.¹⁰⁹ This does not support the conclusion that the United States provoked Iraq into invading Kuwait. To prove these extensive military preparations, Clark cites a plan developed by Central Command (CENTCOM) Commander General Norman Schwarzkopf known as War Plan 1002-90 that substituted Iraq (previously it was the Soviet Union) as the enemy for a war in the Gulf.¹¹⁰ Clark also references a war game computer exercise called "Internal Look" as proof that "far from being a surprise, Iraq's invasion of Kuwait had actually been the scenario for intense U.S. planning."¹¹¹

The facts regarding War Plan 1002-90 and Internal Look are more humble than Clark portrays them. Schwarzkopf describes the switch to viewing Iraq as the likely opponent for CENTCOM as a natural shift resulting from the break up of the Soviet Union.¹¹² His focus was to envision the worst case scenario, and the picture of Iraq's fourth largest army in the world—sitting astride the oil fields necessary for the industrial-

¹⁰⁵ *Id.* at 8.

¹⁰⁶ *Id.* at 109.

¹⁰⁷ See *supra* notes 20-23 and accompanying text.

¹⁰⁸ Treaty Providing for the Renunciation of War as an Instrument of National Policy, Aug. 27, 1928, 46 Stat. 2343. Both the United States and Iraq are parties to the agreement. See Dep't of State, Pub. 9433, *Treaties in Force: A List of Treaties and Other International Agreements of the United States in Force on January 1, 1993*, at 891-92 (June 1993).

¹⁰⁹ See Clark, *supra* note 1, at 8-12.

¹¹⁰ See *id.* at 11. Clark never considers the obvious inconsistency that the previous war plans dealt with the Soviet Union and that the United States never fought a war with them. The United States also made far more extensive military preparations to fight a major war against the old Soviet Union in Europe, but never did. Arguably preparations for conflict are a deterrent to war and not a cause.

¹¹¹ *Id.*

¹¹² H. NORMAN SCHWARZKOPF, *IT DOESN'T TAKE A HERO*, 286 (1992).

ized world—provided Schwarzkopf his answer.¹¹³ American planners wondered why, if Saddam's intentions were peaceful, Iraq needed such a large force.¹¹⁴ More importantly, War Plan 1002-90 was only a defensive plan¹¹⁵ with no offensive component.¹¹⁶ The deployment plan was so new that the Pentagon had not determined if it was transportation feasible.¹¹⁷ Central Command did not have any permanent troops assigned to it.¹¹⁸ Central Command was headquartered in Florida "half a world away from the threat it was intended to counter."¹¹⁹ When Iraq invaded Kuwait the nearest American forces were in Diego Garcia, about 2500 miles away.¹²⁰

The decision to deploy military forces, at least early on, was risky. In the early phases of the deployment, an Iraqi attack would have a decisive advantage over the American defenders in Saudi Arabia, so that the 82d Airborne Division regarded itself as little more than a "speed bump."¹²¹ For the first three weeks American forces could not have stopped an Iraqi attack on Saudi Arabia.¹²² The entire notion that the United States could have planned Iraq's invasion is contrary with the intrinsic unpredictability and risk of many factors.

Had Saddam gone only part of the way into Kuwait, had the Bush administration failed to garner U.N. support for condemning the invasion, had Americans absorbed several hundred casualties in the days immediately after the invasion—any one of these events, and others later, could have changed the outcome of the conflict dramatically.¹²³

2. Iraq Had Legitimate Claims to Kuwait—Another element in establishing blame on the United States for initiating the war is Clark's effort to legitimize Iraqi claims over Kuwaiti territory. Clark describes Kuwait's origins as an artificial product of British Colonialism asserting that the British gave Kuwait independence even though it had been historically controlled by Iraq.¹²⁴ In truth, "Iraq was just as much an artifi-

¹¹³ *Id.*

¹¹⁴ U.S. NEWS & WORLD REP., TRIUMPH WITHOUT VICTORY, THE HISTORY OF THE PERSIAN GULF WAR 29 (1993) [hereinafter TRIUMPH WITHOUT VICTORY].

¹¹⁵ *Id.* at 51.

¹¹⁶ *Id.* at 31.

¹¹⁷ Tom Mathews, *War in the Gulf: The Road To War*, NEWSWEEK, Jan. 28, 1991, at 54.

¹¹⁸ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 43.

¹¹⁹ *Id.*

¹²⁰ Mathews, *supra* note 117.

¹²¹ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 67, 101.

¹²² Mathews, *supra* note 117.

¹²³ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 101.

¹²⁴ See Clark, *supra* note 1, at 12-13. With complete sympathy to the Iraqi claim, Clark declares that "Iraq was deprived of its coastal lands, now called Kuwait, by the British." *Id.* at 313.

cial creation as Kuwait.¹²⁵ Iraq was arbitrarily formed from three former provinces of Turkey by the same British partitioning of the Ottoman Empire that created Kuwait.¹²⁶ By Iraq's reasoning Turkey has as legitimate a claim to Iraq and Kuwait as Iraq has to Kuwait.

Even if Iraq was arbitrarily denied the province of Kuwait, Clark's argument still has no validity under international law. No matter what historical interest Iraq may have had in Kuwaiti territory "any Iraqi claim to Kuwait is simply inconsistent with the action of the United Nations in admitting Kuwait to the United Nations."¹²⁷ National sovereignty is the foundation for international law.¹²⁸ The U.N. Charter declares that the basis of the organization is "the principle of the sovereign equality of all its Members."¹²⁹

The merit of any Iraqi claim to Kuwait must also be viewed in light of a 1963 agreement signed by Iraq and Kuwait in an "atmosphere rich in fraternal amity" in which "The Republic of Iraq recognized the independence and complete sovereignty of the State of Kuwait."¹³⁰ Ramsey Clark does not discuss the Iraqi recognition of sovereignty in 1963, nor does he address the fact that under international law any questions of Kuwait's sovereignty are resolved by U.N. recognition of Kuwait.

Whatever Iraq might have said about Kuwait being a province of Iraq, no one can deny that sending the Iraqi army across the internationally recognized border of Kuwait was a violation of the first and most evident principle of modern international law. This principle is set down in Article 2(4) of the U.N. Charter: "All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state."¹³¹

Greed is a more plausible motive for Iraq's invasion of Kuwait. Iraq demanded that Kuwait forgive \$10 billion worth of Kuwaiti loans given Iraq to help it fight Iran.¹³² Saddam Hussein's advisers stated that they could combine the OPEC quotas of Iraq and Kuwait, force the price of oil

¹²⁵ PIERRE SALINGER & ERIC LAURENT, *SECRET DOSSIER: THE HIDDEN AGENDA BEHIND THE GULF WAR* 13 (1991).

¹²⁶ *Id.* at 12-13.

¹²⁷ Moore, *supra* note 14, at 203. Kuwait was admitted to the U.N. by acclamation. "Importantly, no votes were cast against admission of Kuwait in the Security Council or in the General Assembly." *Id.*

¹²⁸ See Kahn, *supra* note 69, at 436.

¹²⁹ U.N. CHARTER, art. 2 ¶ 1.

¹³⁰ Agreed Minutes Between the State of Kuwait and the Republic of Iraq Regarding the Restoration of Friendly Relations, Recognition and Related Matters, Oct. 4, 1963, 495 U.N.T.S. 326-28 (1964), in Moore, *supra* note 14, at 204-07.

¹³¹ Kahn, *supra* note 69, at 426.

¹³² Mathews, *supra* note 117.

up to \$30 a barrel and profit \$60 billion a year.¹³³ This would allow Iraq to pay off its debts in four years and give Iraq a deep water port.¹³⁴ Another disturbing motive for the invasion is that Iraq had to keep its million man army occupied.¹³⁵ Under this theory, Saddam Hussein could not demobilize this force because there were no civilian jobs, so he challenged the army through another military adventure.¹³⁶

3. *Iraq Provided Plenty of Warning of Its Intent to Invade Kuwait*—Another example of Clark's effort to portray Iraqi actions as reasonable was his contention that Iraq gave clear warnings of its intentions. Clark claims Iraq warned of its intentions to invade Kuwait in public accusations by Saddam Hussein that the United States conspired with Kuwait to destroy the Iraqi economy. Clark contends a speech by Saddam Hussein in which he said "something must be done" and concluded "we have warned them" suffices as another signal. Finally, the massing of troops on the border the next day constituted clear warning.¹³⁷ None of these examples constitute a legitimate warning under international law. The Hague Conventions require that before hostilities commence, there be a "previous and explicit warning, in the form either of a reasoned declaration of war or of an ultimatum with conditional declaration of war."¹³⁸

The merit of this warning is questionable because "Iraq and Kuwait had been playing cat and mouse for 30 years: Iraq clawed periodically, then Kuwait bought it off."¹³⁹ Even in this case, as Iraq's forces massed at Kuwait's borders, the Kuwaitis seemed ambivalent because another bribe to Saddam Hussein would forestall any invasion.¹⁴⁰ The Kuwaitis confidence that Iraq would not invade was demonstrated by the leave of the small, three-brigade force that normally defended positions just north of Kuwait City.¹⁴¹

4. *The United States and Kuwait Waged Economic Warfare on Iraq*—Clark claims that the United States and Kuwait waged economic war against Iraq. Clark argues that the United States sponsored embargoes and Kuwait initiated breaches of OPEC production quotas that drove

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ See TRIUMPH WITHOUT VICTORY, *supra* note 114, at 134.

¹³⁶ See *id.*

¹³⁷ See Clark, *supra* note 1, at 17. Clark quotes the speech from Saddam Hussein as saying "If words fail to protect Iraqis, something effective must be done to return things to their natural course and to return usurped rights to their owners . . . O God Almighty, be witness that we have warned them." *Id.*

¹³⁸ Hague Convention III Relative to the Opening of Hostilities, Oct. 18, 1907, 36 Stat. 2259, 2271.

¹³⁹ Mathews, *supra* note 117.

¹⁴⁰ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 20-21.

¹⁴¹ See *id.* at 12.

the price of oil down so that Iraq could not finance its debts from its war with Iran.¹⁴² This accusation is partially true. Kuwait did breach OPEC quotas.¹⁴³ Clark presents a link between the Kuwaiti oil quota breach and the United States. He quotes a memo, supposedly captured by Iraqi soldiers, that recounts a meeting between United States CIA director William Casey and a Kuwaiti official where the parties agree to "take advantage of the deteriorating economic situation in Iraq in order to put pressure on that country's government to delineate our common border."¹⁴⁴ Clark admits that the memo's authenticity is disputed but then treats it as true.¹⁴⁵ These types of disputes between Iraq and Kuwait were common and had not previously justified an Iraqi invasion.¹⁴⁶

However, the United States did not impose any sanctions on Iraq. After a speech by Saddam Hussein, in which he threatened to exterminate Israel with chemical weapons, the United States considered but later rejected sanctions.¹⁴⁷ Clark contradicts himself on the issue of United States sanctions. First, he criticizes the United States for carrying on a propaganda campaign against Iraq while simultaneously selling the country equipment with civilian and military applications.¹⁴⁸ Then Clark criticizes the United States for imposing "defacto sanctions" against Iraq that allowed it to buy nothing but wheat.¹⁴⁹

It is not considered an act of war to sell more oil than agreed on originally. If Iraq believed that the United States and Kuwait were waging "economic warfare," then the appropriate step would be a formal request that the U.N. mediate and resolve the dispute.¹⁵⁰ Clark never suggests that Iraq tried such a route.

5. The United States Tricked Iraq into Invading Kuwait by Predictions of the United States Reaction to an Iraqi Invasion of Kuwait—

¹⁴² See Clark, *supra* note 1, at 13-14.

¹⁴³ See Salinger & Laurent, *supra* note 125, at 2.

¹⁴⁴ Clark, *supra* note 1, at 16.

¹⁴⁵ *Id.*

¹⁴⁶ See *supra* notes 139-141 and accompanying text.

¹⁴⁷ See Salinger & Laurent, *supra* note 125, at 20-22.

¹⁴⁸ See Clark, *supra* note 1, at 20.

¹⁴⁹ See *id.* at 21. It is obvious from Clark's analysis that he will not allow the United States to win. If the United States imposes sanctions, then Clark claims that the United States is waging economic warfare against Iraq. If the United States avoids sanctions then the United States is responsible for creating what ever kind of monster that the United States subsequently claims Iraq has become. See *id.* at 20-21.

¹⁵⁰ "The parties to any dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall, first of all, seek a solution by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice." U.N. CHARTER, art. 33. Any Member of the United Nations may bring any dispute . . . to the attention of the Security Council or of the General Assembly." *Id.* art. 35. "Should parties to a dispute of the nature referred to in Article 33 fail to settle it by the means indicated in that Article, they shall refer it to the Security Council." *Id.* art. 37.

According to Clark, Saddam Hussein attempted to gauge the United States reaction to a proposed Iraqi invasion of Kuwait and received tacit approval. On July 24, 1990, Saddam Hussein summoned the United States ambassador, April Glaspie, to a meeting when she told him that the United States had "no opinion on Arab-Arab conflicts, like your border disagreement with Kuwait."¹⁵¹ Clark claims that the State Department specifically cabled Glaspie with instructions to inform Saddam Hussein that the United States had no position on Arab-Arab conflicts.¹⁵² Glaspie stated that the United States had no opinion on Arab-Arab conflicts¹⁵³ and that the State Department sent her a cable with those instructions.¹⁵⁴ However, Clark's presentation of the facts is incomplete. The State Department cable also told her to give Iraq some significant warnings; Glaspie apparently presented the conciliatory parts of the message, but failed to deliver the warnings.¹⁵⁵ On July 19, 1990 a State Department cable told Glaspie to:

stress friendship with Iraq but also say the U.S. was "committed to ensure free flow of oil from the gulf and to support the sovereignty and integrity of the gulf states. . . . We will continue to defend our vital interests in the gulf. . . [we are] strongly committed to supporting the individual and collective self-defense of our friends in the gulf. . . ."¹⁵⁶

These facts stress that the policy of the United States government was to give a more stern warning than Glaspie carried. Apparently the United States ambassador to Iraq made a mistake.¹⁵⁷ However, her error does not mean that the United States government wanted to dupe Saddam Hussein into invading Kuwait. The United States Department of State intended to give stronger warnings and so directed its ambassador.

Stronger warnings were also not issued because United States policymakers were convinced that Iraq's deployment of forces on the Kuwaiti border "was a bluff to bully Kuwait into a more compliant oil policy."¹⁵⁸ When the United States warned Kuwait, Egypt, and Saudi Arabia

¹⁵¹ Clark, *supra* note 1, at 23.

¹⁵² *Id.*

¹⁵³ See Salinger & Laurent, *supra* note 125, at 58 (Pages 46-63 in this book contain the entire transcript of this meeting and it is interesting reading. Glaspie provides incredibly cool and tame responses to very strong threats made by Saddam Hussein that included threatening terrorist attacks against the United States.).

¹⁵⁴ Leslie H. Gelb, *Mr. Bush's Fateful Blunder*, N.Y. TIMES, July 17, 1991, at A21.

¹⁵⁵ *Id.*

¹⁵⁶ *Id.* Another cable on July 24th reiterated "no position on Arab border disputes" but also said to warn that using force to settle disputes was "contrary to the U.N. Charter principles." *Id.*

¹⁵⁷ About the only excuse for this blunder is that Glaspie was summoned to her meeting with Hussein with only an hour's notice and she had no opportunity to ask the State Department for specific instructions for this meeting. See Salinger & Laurent, *supra* note 125, at 45.

¹⁵⁸ Mathews, *supra* note 117.

of the Iraqi army deployment (via satellite photos) the Arab leaders dismissed the notion of an invasion, convinced that Iraq was trying to extort Kuwait into concessions.¹⁵⁹

Another reason that the United States failed to react more strongly is that United States policymakers were not paying close attention to Iraq. During this time, President Bush and Secretary of State Baker focused on expanding relations with the Soviet Union and the surprising growth of democracy in Eastern Europe.¹⁶⁰

The United States was not the only country lulled into believing that Iraq would not invade Kuwait. Even allies of Iraq made this mistake. When Iraq invaded Kuwait, Secretary of State Baker was in the Soviet Union.¹⁶¹ When Baker expressed concerns about Saddam Hussein's intentions, Soviet counterpart Eduard Schevardnadze said, "He's a client of ours, I trust him. I don't think he's planning an invasion."¹⁶² The invasion was underway even as Schevardnadze uttered these words.¹⁶³

No nation warned Iraq of the consequences of invading Kuwait, because the world was convinced that Saddam Hussein was bluffing. If the United States is to be vilified for this mistake then so should the Soviet Union and the Arab League. If the United States allowed Iraq to choose its own course, the United States is not responsible for Iraq's actions.

Clark's argument is contradictory. He is generally critical of the United States for meddling in Gulf Politics¹⁶⁴ but in this case faults United States intervention.

6. *Ignoring Iraq's Reason—Helping a Kuwaiti Revolution?*—Arguments that the Iraqi invasion of Kuwait was legitimate are flawed because they do not consider the reason advanced by Iraq immediately following the invasion. Iraq justified its military commitment in response to a revolutionary uprising in Kuwait.¹⁶⁵ On August 2, 1990, Sabah Talat Kadrat of Iraq spoke to the U.N. Security Council:

¹⁵⁹ Salinger & Laurent, *supra* note 125, at 86.

¹⁶⁰ *Id.* at 5.

¹⁶¹ *See id.* at 81.

¹⁶² *Id.*

¹⁶³ *Id.* Schevardnadze was not the only world leader providing the United States with faulty information. Only a week before the invasion, Egyptian President Hosni Mubarak told Washington and Kuwait that Saddam Hussein had promised him that Iraq would not attack Kuwait. This was a truncated version of what Saddam Hussein actually said to Mubarak. Saddam said to Mubarak that he would not invade "as long as negotiations last." However, Mubarak omitted this in his communications with both Kuwait and Washington. *Id.* at 145. Under the circumstances there can be little doubt that both the United States and Kuwait were caught completely by surprise by Iraq's invasion.

¹⁶⁴ *See Clark, supra* note 1, at 4-5.

¹⁶⁵ *See The Kuwait Question, Letter Addressed by H.E. Tariq Aziz, Deputy Prime Minister and Foreign Minister of the Republic of Iraq to The Ministers of Foreign Affairs of all Countries of the World (Sept. 4, 1990), in Gulf War Legal and Diplomatic Documents, 13*

"The events taking place in Kuwait are internal matters which have no relation to Iraq." The "Free Provisional Government of Kuwait" asked Iraq to assist it to establish security and order "so that Kuwaitis would not have to suffer." Iraq, which desired amicable relations with Kuwait, provided assistance "solely on that basis."¹⁶⁶

In a war where Iraqi lies were rampant,¹⁶⁷ this blatant fraud was among the most bold.

There is not a shred of evidence that any legitimate—or even defacto—Kuwaiti claimant group invited Iraq into Kuwait. Apparently Saddam Hussein is still searching for a single Kuwaiti alleged to have invited him. Moreover this claim is inconsistent with the almost immediate Iraqi annexation of Kuwait, and it is also inconsistent with Iraq's argument prior to the invasion to the effect that its "dispute" primarily related to levels of Kuwaiti oil production and its arguments subsequently that the invasion was about a territorial "dispute" or the Arab-Israeli conflict.¹⁶⁸

Iraqi efforts to convince the world of this sham established how "blatant a fraud"¹⁶⁹ was the Iraqi justification. When Iraq presented the Kuwaiti student revolutionaries to the world, they spoke with Iraqi accents.¹⁷⁰ On August 8, 1990, when Iraq announced the new "provisional government" of Kuwait, all of the new ministers were Iraqi.¹⁷¹ Iraq claimed that a "Colonel Ali" was the leader of the "young revolutionaries" in Kuwait.¹⁷² Colonel Ali turned out to be Ali Hassan Al Majid, Saddam Hussein's son-in-law.¹⁷³

Clark never mentions this false Iraqi claim, although it was the primary justification presented by Iraq immediately following its invasion of Kuwait.

HOUS. J. INT'L L. 281, 292 (1991). Iraq claimed that it was responding to an "historic appeal made by the free interim government of Kuwait." Dep't of Information, Ministry of Information and Culture, Kuwait and its Historical and Legal Relations with Iraq (Baghdad 1990), *in Gulf War Legal and Diplomatic Documents*, 13 HOUS. J. INT'L L. 281, 286 (1991). Iraq's initial claim to the world community was that it "extend[ed] military assistance to young revolutionaries in Kuwait and their uprising on 2 August 1990." *Id.*

¹⁶⁶ United Nations Dep't of Public Information, UN CHRONICLE, Dec. 1990, at 10.

¹⁶⁷ See Moore, *supra* note 79.

¹⁶⁸ *Id.* at 200.

¹⁶⁹ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 102.

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

¹⁷² Salinger & Laurent, *supra* note 125, at 176-77.

¹⁷³ *Id.*

B. The United States Caused the War by Deliberately Blocking a Negotiated Solution

Clark contends that the United States deliberately frustrated a negotiated solution.¹⁷⁴ Clark portrays Iraq's position and Saddam Hussein as flexible, reasonable, and seeking principled negotiation while characterizing the United States and George Bush as inflexible, unreasonable, and obstructive.¹⁷⁵ According to Clark, the United States and President Bush blocked a likely Arab solution, lied to Saudi Arabia about the danger of an Iraqi invasion of their country, bribed the U.N. Security Council into authorizing force, foreclosed any meaningful negotiations, and violated the United States Constitution by deploying forces in Saudi Arabia with the intention of going to war. These allegations will be analyzed individually.

1. *The United States Blocked a Likely Arab Solution to the Crisis.*—Saddam Hussein promised King Hussein of Jordan that if the Arab states did not condemn Iraq then Iraq would start withdrawing from Kuwait on August 5, 1990. Saddam Hussein told King Hussein that if the Arabs condemned the invasion that Iraq would maintain "that Kuwait is part of Iraq and annex it."¹⁷⁶ Clark then asserts that Bush promised King Hussein the forty-eight hours needed to negotiate a solution under these conditions.¹⁷⁷ President Bush made this promise but Assistant Secretary of State Kelly then pressured Egypt into introducing a resolution at an Arab League Conference that produced an early condemnation of Iraq.¹⁷⁸

The facts are essentially as Clark presents them¹⁷⁹ but he eliminates key elements. Clark's citation for much of his information is Pierre Salinger's book *Secret Dossier: The Hidden Agenda Behind the Gulf War*.¹⁸⁰ While Salinger confirms Clark's principal facts, Salinger also says that:

The great mystery is whether the State Department was ever informed of the details of the conversation between President Bush and King Hussein when the U.S. President had agreed not to intervene with any Arab nations for forty-eight hours. If the State Department had not received this information, it was

¹⁷⁴ See Clark, *supra* note 1, at 35.

¹⁷⁵ See, e.g., *id.* at 215 (describing President Bush's position as an "absolute refusal to negotiate" and Saddam Hussein as someone who "wanted to negotiate."). But see *infra* notes 226-229 and accompanying text (showing Saddam Hussein's own refusal to negotiate with the Kuwaitis).

¹⁷⁶ *Id.* at 25.

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ See Salinger & Laurent, *supra* note 125, at 112-13.

¹⁸⁰ See *id.*; see also Clark, *supra* note 1, at 25.

logically following the orders given by Bush to Brent Scowcroft at 5 a.m. on August 2, telling the State Department to put pressure on the Arab states to condemn Saddam Hussein's invasion of Kuwait.¹⁸¹

Clark fails to inform the reader of this part of Salinger's recounting of events. A miscommunication in the midst of a crisis is not the same as a deliberate effort to subvert a peaceful solution.

Salinger provides other details that Clark fails to report as well. There were other pressures on the Arab League to condemn Iraq. The Gulf states were furious over the delay in the condemnation even before Kelly's message was sent to Egypt.¹⁸² The frustration of the Arab League members increased when the Iraqi delegate declared that "[t]he situation in Kuwait is not negotiable."¹⁸³ This questions Clark's fundamental assumption that Iraq would have withdrawn from Kuwait and that King Hussein would have negotiated a solution with Saddam Hussein if not for the early Arab League condemnation. Even Clark's version of Saddam Hussein's promise to King Hussein to withdraw from Kuwait starting on August 5, 1990, contained a key condition. Saddam said he would "begin withdrawing troops on August 5 *if negotiations that day proved fruitful*."¹⁸⁴ That condition nearly extinguishes the promise because of the Iraqi delegate's statement to the Arab League that the issue was not negotiable.

Clark never questions the reasonableness of the Iraqi demand that the Arab nations support Iraq's unexpected invasion of their fellow Arab League member. A more cynical view is that Saddam Hussein presented an unreasonable demand with the expectation of violation to be the pretext to annex Kuwait.

2. *The United States Lied to Saudi Arabia About the Threat of an Iraqi Invasion*—According to Clark, the United States convinced Saudi Arabia that an Iraq invasion was imminent, with satellite photographs of Iraqi forces massed on the Saudi Arabian border, to gain permission to deploy United States troops on Saudi soil. Clark states that the mission to convince the Saudis of the Iraqi threat succeeded on August 5, but during "the same week Cheney was steamrolling the Saudis into letting U.S. troops land, a U.S. intelligence officer reported from Kuwait that Republican Guard troops were actually withdrawing from southern Kuwait back into Iraq."¹⁸⁵ Clark's use of the phrase "the same week" is deceptive. The withdrawal of the Iraqi Republican Guard did not start until

¹⁸¹ See Salinger & Laurent, *supra* note 125, at 112.

¹⁸² *Id.* at 104.

¹⁸³ *Id.* The speech provided no trace of any kind of concession. See *id.*

¹⁸⁴ See Clark, *supra* note 1, at 25 (emphasis added).

¹⁸⁵ See *id.* at 27-28 (emphasis added).

about August 9,¹⁸⁶ or four days after Saudi Arabia gave permission for the United States deployment. The United States did not deceive the Saudis. It is possible that the Republican Guard began its withdrawal in response to the American deployment. Additionally, intelligence showed that the "Republican Guard could return to an attack formation with as little as twenty-four hours' notice."¹⁸⁷

The threat to Saudi Arabia must be evaluated in the context of other events. Before the invasion, Iraq threatened Saudi Arabia as it threatened Kuwait, saying: "[w]e know perfectly well how to get the money we need from you [Kuwait] and the Saudis."¹⁸⁸ This could reasonably lead the Saudis to believe that Iraq intended the same fate for them as Kuwait. Iraq had actively plotted against Saudi Arabia. President Hosni Mubarak of Egypt says that Saddam Hussein once suggested that Iraq, Egypt, Syria and Jordan "pool their weapons and carve up Kuwait and Saudi Arabia."¹⁸⁹ On other occasions Saddam Hussein offered two Saudi Arabian provinces to Yemen and the western part of the Saudi Peninsula to Jordan's King Hussein.¹⁹⁰ An Iraqi defector in Egypt produced a map showing an Iraqi invasion plan for Saudi Arabia.¹⁹¹

Even if Iraq was unlikely to invade Saudi Arabia, "with an unpredictable character like Saddam making the decision, no one could be sure. More to the point, after the invasion of Kuwait, no one wanted to be wrong."¹⁹²

3. The United States Bribed the Security Council into Authorizing Force—On November 29, 1990 the U.N. Security Council passed a resolution by a twelve-to-two vote authorizing member states to use force to remove Iraq from Kuwait.¹⁹³ Cuba and Yemen opposed the resolution, while China abstained.¹⁹⁴ Clark contends that this "fig leaf of U.N. approval was a fraud. The Security Council resolutions were secured by what would constitute criminal bribes, coercion, and extortion in any

¹⁸⁶ See TRIUMPH WITHOUT VICTORY, *supra* note 114, at 97.

¹⁸⁷ SCHWARZKOPF, *supra* note 112, at 317-18.

¹⁸⁸ Salinger & Laurent, *supra* note 125, at 75.

¹⁸⁹ Mathews, *supra* note 117.

¹⁹⁰ *Id.*

¹⁹¹ SCHWARZKOPF, *supra* note 129, at 313-14. Schwarzkopf was not sure of the map's authenticity, but the plan seemed militarily sound and, unsure that the map was not authentic, Schwarzkopf moved his forces to defend the invasion routes that the map portrayed. *Id.* at 314.

¹⁹² TRIUMPH WITHOUT VICTORY, *supra* note 114, at 98.

¹⁹³ See Salinger & Laurent, *supra* note 125, at 198. "The key paragraph in the resolution authorized 'member states cooperating with the government of Kuwait' to use 'all necessary means' to implement UN resolution 660, which called for the complete withdrawal of Iraq from Kuwait. The date set for the withdrawal under Resolution 678 was 'on or before' January 15, 1991." *Id.*

¹⁹⁴ *Id.*

system of government desiring integrity in voting."¹⁹⁵ Clark cites to various aid packages that the United States gave nations, in exchange for their Security Council vote.¹⁹⁶

The fundamental flaw in this argument is that the United States need not bribe anyone. As a matter of international law, the United States was free to act under the collective defense provisions of Article 51 of the U.N. Charter.¹⁹⁷ "From the perspective of creating an effective international legal regime, the United States' action with respect to Iraq is particularly praiseworthy because a strong argument could be made in support of unilateral action under Article 51 of the Charter."¹⁹⁸ The collective defense provision of Article 51 is satisfied by Kuwait's request, under the provisions of Article 51, for the assistance of the United States.¹⁹⁹ The U.N. resolution authorizing force against Iraq did not specifically address what paragraph of the U.N. Charter was invoked, it only stated that the action "was under Chapter VII of the Charter,"²⁰⁰ which includes both Article 42 and Article 51.²⁰¹ Clark never discusses Article 51 of the U.N. Charter. Clark's failure to take into account Article 51 of the U.N. Charter is a major omission; the United States informed the U.N. that it was responding to requests from Kuwait and Saudi Arabia and acting pursuant to Article 51 when the United States started deploying forces in the Gulf.²⁰²

Clark also claimed that "Resolution 678 was itself utterly lawless" because "the Security Council invoked war powers under Article 42 without real consideration to whether its sanctions had been inadequate."²⁰³ Clark is wrong on two points. First, U.N. Resolution 678 did not specifically invoke Article 42 but instead referred only to the authority to act

¹⁹⁵ Clark, *supra* note 1, at 169.

¹⁹⁶ See *id.* at 164-65.

¹⁹⁷ See *supra* note 27 and accompanying text (discussing the right of nations to react unilaterally in either individual or collective self defense).

¹⁹⁸ Kahn, *supra* note 68, at 430.

¹⁹⁹ See Moore, *supra* note 14, at 151. On August 12, 1990, the exiled Emir of Kuwait wrote to President Bush requesting "on behalf of my government and in the exercise of the inherent right of individual and collective self defense as recognized in Article 51 of the UN Charter that the United States Government take such military or other steps as are necessary to ensure that economic measures designed to fully restore our rights are effectively implemented. Further . . . I request that the United States of America assume the role of coordinator of international force that will carry out such steps." Letter from his Excellency Sheik Jabar al-Ahmed al-Sabah, Amir of Kuwait (Aug. 12, 1990), *in id.* at 152.

²⁰⁰ Security Council Resolution 678 authorized "all necessary means" to implement previous resolutions on the subject. See *id.* at 420-21.

²⁰¹ See U.N. CHARTER, ch. VII. See also *supra* notes 24-25 and accompanying text (discussing how Article 42 allows the U.N. Security Council to authorize use of force).

²⁰² See UN CHRONICLE, *supra* note 166, at 6.

²⁰³ Clark, *supra* note 1 at 155. Article 42 requires that the Security Council first determine that lesser measures such as economic sanctions "would be inadequate or have proved inadequate." See *supra* notes 24-25 and accompanying text.

under Chapter VII, of the Charter which contains both Article 42 and Article 51.²⁰⁴ Second, Resolution 678 indicated that the Security Council considered its sanctions inadequate, as the Resolution specifically noted that "despite all efforts by the United Nations, Iraq refuses to comply with its obligation to implement resolution 660 (1990) [demanding unconditional Iraqi withdrawal from Kuwait²⁰⁵] . . . in flagrant contempt of the Security Council."²⁰⁶

Clark also contended that Resolution 678 was illegal because it had no reporting requirements.²⁰⁷ Clark claims the "Security Council did not even ask to know what was done on its authority and in its name."²⁰⁸ This accusation is also false. Resolution 678 specifically requested "the states concerned to keep the Security Council regularly informed of the progress of actions undertaken pursuant to [the paragraphs of the resolution authorizing force]."²⁰⁹

Clark also suggests that the United States placed the issue before the more easily controlled twelve-member Security Council to block any meaningful role by the General Assembly.²¹⁰ Clark's implication that Iraq would have been treated better by the General Assembly ignores the fact that on December 18, 1990, the General Assembly in a unanimous declaration (excepting for Iraq's sole dissenting vote) passed General Assembly Resolution 45/170 condemning the Iraqi invasion and human rights violations committed by Iraq.²¹¹ "This vote, in which every member State of the United Nations cast a vote, truly portrayed 'Iraq against the world.'"²¹²

4. *The United States and the U.N. Assumed a "No Negotiations"*

²⁰⁴ Resolution 678 provided that the Security Council: "Acting under Chapter VII of the Charter of the United Nations, (1) Demands that Iraq comply fully with resolution 660 (1990) and all subsequent relevant resolutions, and decides while maintaining all its decisions, to allow Iraq one final opportunity, as a pause of goodwill, to do so; (2) Authorizes Member States cooperating with the government of Kuwait, unless Iraq on or before 15 January 1991 fully implements . . . the foregoing resolutions, to use all necessary means to uphold and implement resolution 660 (1990) and all subsequent relevant resolutions and to restore international peace and security in the area." [hereinafter Res. 678] Res. 678. *in* Moore, *supra* note 14.

²⁰⁵ "The Security Council . . . [d]emands that Iraq withdraw immediately and unconditionally all its forces to the positions in which they were located on 1 August 1990." Res. 660, U.N. Sec Council (1990). *in id.* [hereinafter Res. 660].

²⁰⁶ See Res. 678, *supra* note 204.

²⁰⁷ See Clark, *supra* note 1, at 156.

²⁰⁸ *Id.*

²⁰⁹ Res. 678, *supra* note 204. Clark's clear, multiple misrepresentations of Resolution 678 compels one to wonder if he ever bothered to read the Resolution. Neither Resolution 678 nor any other U.N. Resolution dealing with the issue is reprinted in Clark's 38 pages of appendices.

²¹⁰ See Clark, *supra* note 1, at 152.

²¹¹ See G.A. Res. 45/170, *supra* note 99.

²¹² Moore, *supra* note 14, at 459.

Stance—According to Clark, the United States, rather “than send negotiators to Baghdad . . . pursued a war course from the moment it received word of the Iraqi invasion of Kuwait.”²¹³ Likewise “[u]nder pressure from the United States, the Security Council completely failed in its duty to seek a peaceful settlement.”²¹⁴ On the other hand, Iraq is portrayed as willing to negotiate on all the relevant issues.²¹⁶

The United States and United Nations negotiating positions were always in accord with Security Council Resolution 660 which required Iraq's unconditional withdrawal from Kuwait.²¹⁶ United Nations Secretary-General Javier Perez, just before the January 15 deadline, asked that Iraq only “signal its readiness to comply with relevant Council resolutions,” saying that “a just peace with all its benefits, would follow.”²¹⁷ The only condition ever required by the United States and U.N. to prevent war was for “President Hussein to commence, without delay, the total withdrawal of Iraqi forces from Kuwait.”²¹⁸ Iraq's extended peace overtures, including final ones in February 1991, before the start of the ground war; all overtures had conditions attached such as the withdrawal from the West Bank by noncoalition member Israel and demands for reparations to rebuild Iraq.²¹⁹

The United States had no obligation to negotiate under the provisions of Article 51 of the U.N. Charter allowing collective self defense.²²⁰ “Nothing in the U.N. Charter requires a nation that has been attacked, and the nations that would assist it, to engage in diplomatic efforts *prior* to a defensive response.”²²¹ When hostilities started anew on January 16, Kuwait advised the Security Council that the Coalition attack was under the auspices Kuwait's self defense right and that Kuwait was acting in cooperation with friendly states.²²²

Iraq's actions were inconsistent with the notion that it ever intended to abandon Kuwait. A compelling example is Iraq's August 15, 1990, announcement that it was abandoning all claims in its dispute with Iran and that Iraqi troops would withdraw starting just two days later.²²³ This

²¹³ Clark, *supra* note 1, at 35.

²¹⁴ *Id.* at 153.

²¹⁵ “Saddam Hussein publicly stated repeatedly that every issue raised by the UN resolutions was negotiable . . . he wanted to negotiate.” *Id.* at 215.

²¹⁶ See Res. 660, *supra* note 205.

²¹⁷ United Nations Dep't of Public Information, UN CHRONICLE, June, 1991, at 8.

²¹⁸ *Id.*

²¹⁹ See Moore, *supra* note 14, at 166.

²²⁰ See *supra* notes 197-202 and accompanying text (discussing Article 51's collective defense provisions).

²²¹ Moore, *supra* note 14, at 157.

²²² See United Nations Dep't of Public Information, UN CHRONICLE, June, 1991, at 9.

²²³ Salinger & Laurent, *supra* note 123, at 176. “Saddam Hussein had wiped out the memory of hundreds of thousands of Iraqi dead and of a conflict considered the deadliest since the Second World War.” *Id.*

indicated that Saddam Hussein was preparing for a war with the Coalition by eliminating any chance of a third front with Iran.²²⁴ It also indicated that Saddam Hussein felt he could forfeit control of the Shatt al-Arab because his annexation of Kuwait would provide him access to the Gulf.²²⁵ By surrendering his only other access to the Gulf, Saddam Hussein proved that he would not abandon Kuwait.

Finally, Clark's portrayal of Saddam Hussein as a negotiator²²⁶ ignores the occasions when Saddam Hussein refused to confer with the Kuwaitis. For example, Hosni Mubarak, desperately seeking an Arab solution, organized an Arab summit in Cairo on August 10, 1990.²²⁷ However, even though Yasser Arafat and other Palestinian leaders personally implored Saddam Hussein to attend, he refused if the Emir of Kuwait was present at the summit.²²⁸ Saddam Hussein told Arafat that the "monarchy and its representatives have simply ceased to exist."²²⁹

5. *President Bush Violated the United States Constitution*—Clark claimed that Bush violated the United States Constitution by deploying troops in August 1990 to Saudi Arabia without approval from Congress.²³⁰ Clark also references a January 9, 1991, statement when Bush asserted that he had the "constitutional authority" to act without Congressional approval.²³¹ Regardless of Clark's concern about this Presidential statement, "the debate about this element of presidential war powers in the Gulf crisis has become wholly moot in light of the explicit prior authorizing resolution passed by Congress on January 12, 1990."²³² Furthermore, President Bush acted with a powerful tripartite of authority consisting of the usual Presidential powers, the Congressional Resolution authorizing force and the U.N. Security Council Resolutions.²³³

²²⁴ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 124.

²²⁵ Salinger & Laurent, *supra* note 125, at 176.

²²⁶ See *supra* note 175.

²²⁷ See Salinger & Laurent, *supra* note 125, at 156.

²²⁸ *Id.* at 158.

²²⁹ *Id.*

²³⁰ See Clark, *supra* note 1, at 169.

²³¹ *Id.*

²³² Moore, *supra* note 14, at 331. The joint resolution by Congress entitled, "Authorization for Use of Military Force Against Iraq Resolution" authorized the President to use the Armed Forces pursuant to United Nations Security Council Resolution 678. The joint resolution specifically provided that it is intended to satisfy the requirements of the War Powers Act. See Pub. L. No. 102-01, 105 Stat. 3 (1991).

²³³ "[T]he combination of the President's powers as Commander-in-Chief, strengthened by the Authorization for Use of Military Force Against Iraq Resolution, combined with the Security Council resolutions on the Gulf crisis, particularly resolutions 665 and 678, gave President Bush the strongest claim to competent authority to employ armed force of any American President since Franklin Roosevelt." William V. O'Brien, *Desert Storm: A Just War Analysis*, 66 ST. JOHN'S L. REV. 797, 806-07 (1992).

V. Allegations That the United States Conduct in the War Violated International Law

Clark claimed that the United States armed forces committed numerous breaches of international law during the war. Although the coalition had thirty-three nations participate in the attack on Iraq,²⁸⁴ Clark directs his criticisms regarding the conduct of the war solely at the United States.

A. *The United States Attacked a Defenseless Iraqi Military Force*

Clark claimed that the war was actually a "turkey shoot" against an Iraqi military that was "essentially defenseless against United States technological warfare and offered no real resistance."²⁸⁵ Clark claims that "[t]here was virtually no risk to U.S. troops, as real ground combat did not even occur."²⁸⁶ Clark concludes by saying that "[w]hat happened in the Gulf was an assault, not a war. There was no combat, no resistance, and few skirmishes. Iraq had no capacity to either attack or defend." Clark claimed that even "Iraqi units with operational tanks and the will to resist were helpless."²⁸⁷ Clark's version of events does not mirror the experience of the soldiers. American soldiers provided vivid descriptions of intense combat.²⁸⁸

²⁸⁴ See *supra* note 85.

²⁸⁵ Clark, *supra* note 1, at 38.

²⁸⁶ *Id.*

²⁸⁷ *Id.* at 50.

²⁸⁸ "Suddenly the enemy was everywhere. . . . The Iraqis were returning fire vigorously. Within seconds the brief encounter had turned into a full-blown firefight. Davie's soldiers had no place to retreat. . . . Less than 200 meters away, an Iraqi T-72 began firing. Davie's soldiers could see the tank rounds from the T-72 just missing the top turrets of their Bradleys, and machine gun rounds were whipping past. . . . A T-72 tank round hit near Sneed's vehicle knocking him to the ground. . . . Staff Sergeant Gentry, Alpha 24's gunner, was badly wounded . . . two medics, Sergeant Tifari Houston and Specialist Bryan Moore, worked on Gentry as Iraqi tracer rounds whizzed past. Gentry would die within fifteen minutes, however. . . . Davie realized that his lightly armored Bradleys were up against the best of the Iraqi tank corps. . . . Before he could issue orders to move, another of Davie's Bradleys, Alpha 33, was hit by a 14.5mm round from an Iraqi machine gun. It penetrated the turret of the Bradley and wounded its commander, Sergeant James Strong, badly in the hip. . . . With the battle growing increasingly desperate, Davie ordered the 1st Platoon, which until now had been his reserve, up onto the flight line. . . . Alpha 36 was hit, first by small arms fire that disabled the transmission and stopped it dead, then by a Sagger anti-tank rocket. Alpha 31 came forward rescued the crew of Alpha 36, but as Alpha 31 was withdrawing, it was hit by two tank rounds, and suddenly more men were wounded. Seconds later, Alpha 22 was hit by a tank round. The blast killed Sergeant Edwin Kurtz, Alpha 22's gunner. . . . His soldiers tried to remove Kurtz's body from the turret but they were unable to do so. . . . they drove to the rear, masking their withdrawal with smoke grenades." TRUMPET WITHOUT VICTORY, *supra* note 114, at 351-55. This kind of encounter with Iraqi forces was not unique: "the battalion scouts crept along in lightly armored Bradley fighting vehicles. . . . Suddenly, the first scout was lit up by a violent explosion—it had been hit. In Martin's tank chaos reigned. . . . The gunner swung his thermal sights onto the Bradley. He could see it burning and then, incredibly, he could see its latches open and men stumble out and fall to the ground. To Ritter, all this was a horror movie. Here he was, barely half an hour into battle, and Bradley number HQ-232

B. The Casualty Imbalance Depicts War Crime

Another key part of Clark's strategy to portray the United States as the demon in this war is his exaggeration of Iraqi military casualties. Clark claims that "Iraq lost between 125,000 and 150,000 soldiers."²³⁶ This estimate is not supported by objective observers who place the Iraqi military deaths from the war at a maximum of 25,000, and more likely between 8,000 to 18,000 and possibly even lower.²⁴³ Clark's representations that "fewer than 250,000 Iraqi troops remained in the region"²⁴¹ at the start of the coalition offensive is difficult to reconcile with his casualty estimate. Coalition forces captured about 85,000 Iraqis.²⁴² If Clark's casualty figures are accurate then only 15,000 to 65,000 Iraqis escaped alive.²⁴⁵ In reality, 60,000 Iraqis escaped from the Republican Guard divisions alone.²⁴⁴ The ability of these retreating soldiers to subsequently inflict damage was demonstrated by their use to brutally suppress the Iraqi Shi'a and Kurds.²⁴⁵

Clark presents the low American casualties of only 148 in combat as proof of war crimes.²⁴⁶ Clark claims that the "death toll alone—125,000 Iraqi deaths to 148 American—reveals the defenselessness of the Iraqis and the dimension of the crime."²⁴⁷ Clark does not estimate the number of Americans that should have died to justify the higher level of Iraqi casualties.

Clark describes battles when the United States forces had techno-

had gone up in a sickening flash. My God, he thought. I've just had five soldiers killed. . . . Burnham was so calm on the radio net as he maneuvered Ritter forward that ten minutes passed before Ritter realized something was wrong with Burnham's voice; then it dawned on Ritter: Burnham was hit too. When Burnham had turned left to move toward Bradley 232, his gun was still facing to the right. Just then, a heavy machine-gun round crashed through the left rear of Burnham's turret. The round went in, through gunner Sergeant David Douthit's back and neck, came out his chest, slammed into the turret drive, and smashed Burnham's leg. Douthit was killed instantly . . . the Iraqis of the Republican Guard were not simply surrendering, like those they had encountered at the breach. Many of them wanted to fight, and would fight to the death." *Id.* at 368-69.

²³⁶ See Clark, *supra* note 1, at 38.

²⁴⁰ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 406-08. This source provides a convincing accounting for its methodology in reaching these figures. Clark does not. See *infra* notes 241-45 and accompanying text (for a discussion on the inconsistency in Clark's casualty figures).

²⁴¹ See Clark, *supra* note 1, at 39.

²⁴² See Pentagon Final Report, *supra* note 35, at 578.

²⁴³ This analysis attempts to provide every benefit to Clark's argument by treating the total Iraqi troop figure as 250,000 even though Clark says it was "fewer than 250,000." *Supra* note 241 and accompanying text. Other sources place the total Iraqi troop strength figure as low as 200,000 which would make Clark's already implausible estimates mathematically impossible. See TRIUMPH WITHOUT VICTORY, *supra* note 114, at 405.

²⁴⁴ See *id.* at 406.

²⁴⁵ O'Brien, *supra* note 233, at 820.

²⁴⁶ See Clark, *supra* note 1, at 38.

²⁴⁷ *Id.* at 178.

logical superiority and easily defeated Iraqi forces.²⁴⁸ Combat, however, is "not subject to some sort of 'fairness doctrine,' and neither the law of war in general nor the concept of proportionality in particular imposes a legal or moral obligation on a nation to sacrifice superior manpower, firepower, or technological superiority over an opponent."²⁴⁹

The American war plan reduced casualties on both sides. The plan's intent was to "confuse and terrorize the Iraqis and to force them to surrender or flee, while avoiding battles where possible. In conception and execution, the Allied war plan did just that."²⁵⁰ Clark was disgusted by the Allied ability to fight the war from a safe distance; he complained that "there was no fighting up-close in this war."²⁵¹ Brute force, however, is the most violent fighting technique and produces the greatest casualties.

C. *The Burying of Iraqi Troops in Their Trenches*

Clark presents as "perhaps the most horrifying story of all" the undisputed fact that United States forces mounted plows on their tanks and used combat earth movers to bury Iraqi soldiers as they fought in their trenches.²⁵² The United States military acknowledges that this incident did happen.²⁵³

First, the Iraqis were not trying to surrender. Clark's own account of the incident describes "defiant [Iraqi] soldiers still firing their weapons."²⁵⁴ Nor was this a case when the United States forces refused to allow Iraqis to surrender.²⁵⁵ According to Clark's own source, 2000 Iraqis surrendered during the operation and the burying tactic was designed to "terrorize the Iraqis into surrendering."²⁵⁶ The tactic avoided the even more bloody approach of sending troops into the trenches to "clean them out with bayonets."²⁵⁷ The tactic was successful in causing the surrender of many Iraqis producing a "hands-up in many places."²⁵⁸ Most of the

²⁴⁸ See *id.* at 48-51.

²⁴⁹ *Supra* note 72 and accompanying text.

²⁵⁰ TRIUMPH WITHOUT VICTORY, *supra* note 114, at 409.

²⁵¹ See Clark, *supra* note 1, at 47.

²⁵² See *id.* at 51-52.

²⁵³ See Pentagon Final Report, *supra* note 35, at 630.

²⁵⁴ See Clark, *supra* note 1, at 52.

²⁵⁵ The Hague Conventions prohibit any declaration that "no quarter shall be given" or the killing or wounding of "an enemy who, having laid down his arms, or having no longer means of defence, has surrendered." Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, art. 23, 36 Stat. 2277, 2301-02.

²⁵⁶ See Sloyan, *Buried Alive; U.S. Tanks Used Plows To Kill Thousands In Gulf War Trenches*, NEWSDAY, at 1.

²⁵⁷ *Id.*

²⁵⁸ *Id.*

Iraqis either surrendered or ran, and only a small number stayed and fought.²⁵⁹

No matter how "horrifying" Ramsey Clark considers this tactic, it did not violate any rules of warfare.

Tactics involving the use of armored vehicles against dug-in infantry forces have long been common since the first use of armored vehicles in combat. The tactic of using armored vehicles to crush or bury enemy soldiers was briefly discussed in the course of the UN Conference on Certain Conventional Weapons, conducted in Geneva from 1978 to 1980 and attended by the United States and more than 100 other nations. It was left unregulated, however, as it was recognized by the participants to be a common long-standing tactic entirely consistent with the law of war.²⁶⁰

Ramsey Clark never cites any international code that prohibits the use of this tactic. However, he does reference Articles 16 and 17 of the 1949 Geneva Conventions²⁶¹ which require parties to keep records on the dead and wounded²⁶² and to, where possible, inter the enemy dead with honor and in accordance with the rites of their religion.²⁶³ It is difficult to challenge this argument. Clark claimed that the United States violated the Geneva Convention by not counting, recording and performing religious rituals on soldiers who resisted attack in the midst of a combat operation. It is unlikely that the Geneva Conventions require soldiers to fulfill these provisions in the midst of combat. Article 16 provides that "[p]arties to the conflict shall record as soon as possible, in respect of each wounded, sick or dead person of the adverse party falling into their hands."²⁶⁴ Article 17 references a formalized burial procedure conducted after battle rather than a burial that occurs as a consequence of battle.²⁶⁵ Clark's view would lead to the absurd conclusion that anytime an artillery shell buried an enemy in the rubble of a building, the artillery crew

²⁵⁹ See TRIUMPH WITHOUT VICTORY, *supra* note 114, at 312.

²⁶⁰ Pentagon Final Report, *supra* note 35, at 630.

²⁶¹ See Clark, *supra* note 1, at 178.

²⁶² See Geneva Convention For the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, *opened for signature* Aug. 12, 1949 art. 16, 6 U.S.T. 3115, 3126.

²⁶³ See *id.* art. 17.

²⁶⁴ See *supra* note 262 (emphasis added).

²⁶⁵ "Parties to the conflict shall ensure that burial or cremation of the dead, carried out individually as far as circumstances permit, is preceded by careful examination, if possible by a medical examination. . . . They shall further ensure that the dead are honourably interred, if possible according to the rites of the religion to which they belonged, that their graves are respected, grouped if possible according to the nationality of the deceased, properly maintained and marked. . . ." See Geneva Convention For the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, *opened for signature* Aug. 12, 1949, art. 17.

has breached these conventions (or, even more absurdly, that an explosion which burned an enemy to death has violated Article 17's prohibition against cremating bodies).²⁶⁶

D. *The Highway of Death*

As an example of the massacre of the helpless Iraqi army, Clark references the "highway of death."²⁶⁷ On February 27, 1991, the United States forces attacked a large Iraqi convoy heading north, towards Iraq, out of Kuwait City.²⁶⁸ Television pictures depicted a scene of such devastation that public opinion supporting the war effort began to waver.²⁶⁹ While calling it an atrocity,²⁷⁰ Clark never cites any specific provision of international law violated by the attack on this convoy. Clark objects to the characterization of the Iraqis attempting to escape along the highway as looters but his own cited representation of the events describes the Iraqi soldiers as carrying "large quantities of goods they had looted from Kuwait."²⁷¹

The law of war is clear. It is permissible to attack enemy forces, even those in disorganized retreat. "The law of war permits the attack on enemy combatants and enemy equipment at any time, wherever located, whether advancing, retreating, or standing still."²⁷²

Central Command, although not required by international law, attempted to reduce Iraqi casualties during the attack. Central Command barricaded the road with mines at the front and rear of the convoy, which stopped the convoy causing most Iraqi soldiers to abandon their vehicles and flee into the desert.²⁷³ Even the decision on where to attack the convoy avoided needless deaths. Central Command observed the convoy forming in Kuwait City and deliberately allowed it to depart the populated area before being engaged by United States forces.²⁷⁴

E. *The Effort to Assassinate Saddam Hussein*

Clark described the United States development of two 5000-pound bombs which were dropped on a bunker with the hope that Saddam

²⁶⁶ "Bodies shall not be cremated except for imperative reasons of hygiene or for motives based on the religion of the deceased." *Id.*

²⁶⁷ See Clark, *supra* note 1, at 52-53.

²⁶⁸ See Pentagon Final Report, *supra* note 35, at 631.

²⁶⁹ See SCHWARZKOPF, *supra* note 112, at 468.

²⁷⁰ See Clark, *supra* note 1, at 179.

²⁷¹ *Id.* at 52.

²⁷² Pentagon Final Report, *supra* note 35, at 632.

²⁷³ See *id.* at 631. "[T]he so-called highway of death west of Kuwait City was really more of a highway of destruction and panic. . . . When the lead and rear vehicles came under attack, most of the drivers and passengers fled. . . . 'There weren't that many bodies.'" TRIUMPH WITHOUT VICTORY, *supra* note 131, at 409.

²⁷⁴ Pentagon Final Report, *supra* note 35, at 632.

Hussein would be in it.²⁷⁵ Clark quoted Article 23 of the Hague Convention, claiming that such assassinations violated international law.²⁷⁶ Again, Clark had the basic facts correct but misstated the law. The United States did develop these two bombs with the intent of dropping them on the bunker.²⁷⁷ However, Clark misrepresented the contents of the Hague Convention. Article 23 of the Hague Convention states it is forbidden to "kill or wound *treacherously* individuals belonging to the hostile nation."²⁷⁸ In omitting the word "treacherously" Clark misstated the actual rule according to this Convention.²⁷⁹ The operation involved the bombing of a command and control center at an airbase that was an otherwise legitimate military target²⁸⁰ (even Clark's version of the events acknowledged that it was a "hardened bunker at the al-Taji air base"²⁸¹); there was no violation of international law.²⁸²

F. *The Use of Helicopters Disguised with Iraqi Markings*

Clark asserted that a United States Special Operations force used Soviet helicopters with Iraqi markings to fly secret mission in Iraq to plant homing devices for smart bombs.²⁸³ Clark, without authority, claimed a violation of the Geneva Convention.²⁸⁴

Clark applied the provisions of the 1979 Protocol I of the Geneva Conventions that the United States did not ratify rather than the binding provisions of the 1949 Geneva Conventions.²⁸⁵ Generally, the laws of land warfare permit the use of enemy insignia to deceive the enemy before or

²⁷⁵ See Clark, *supra* note 1, at 46.

²⁷⁶ See *id.* at 170.

²⁷⁷ See TRIUMPH WITHOUT VICTORY, *supra* note 114, at 3-6.

²⁷⁸ Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, art. 23(b), 36 Stat. 2277, 2301-02 (emphasis added).

²⁷⁹ Customary international law requires deceit to fulfill the treachery element. If there is no deceit, such as using a trusted aide of the leader to carry out the assassination, then there is no treachery and no breach of international law. See Patricia Zengel, *Assassination and the Law of Armed Conflict*, 134 MIL. L. REV. 123, 131-33 (1991).

²⁸⁰ See TRIUMPH WITHOUT VICTORY, *supra* note 114, at 390-91 (establishing that the bunker was a command and control center); See also Infeld, *supra* note 37, at 122 (establishing that "command and control centers, are always legitimate targets").

²⁸¹ See Clark, *supra* note 1, at 46.

²⁸² See Leslie C. Green, *What One May Do In Combat—Then and Now*, in HUMANITARIAN LAW OF ARMED CONFLICT, CHALLENGES AHEAD 269, 280 (Astrid J.M. Delissen & Gerald J. Tanja eds., 1991). Clark also claims that the attempt to bomb Hussein's bunker violated Executive Order 12,333 which he claims prohibits assassinations. See Clark, *supra* note 1, at 170. Again, Clark misstates the law. Executive Order 12,333 explicitly applies only to intelligence activities and does not apply to military operations. See Zengel, *supra* note 279, at 147-48.

²⁸³ See Clark, *supra* note 1, at 141.

²⁸⁴ *Id.*

²⁸⁵ See *supra* notes 31-39 and accompanying text (discussing the nonapplicability of Protocol I to the Persian Gulf War).

after an armed engagement.²⁸⁶ However, Protocol I creates a blanket prohibition against using enemy insignia even preparatory to actual attack.²⁸⁷ The United States objected to this provision because the rule was impractical; some enemies use this tactic and the United States wanted to reserve the option as well.²⁸⁸ The only unlawful deceptions, or "perfidy," are those designed to fool the enemy into believing that "he is entitled to, or obliged to accord protected status under the law of armed conflict."²⁸⁹ Examples of perfidy include feigning surrender as a lure to trap the enemy and deceptions using symbols like the Red Cross or Red Crescent that indicate an object is beyond legal attack.²⁹⁰ Such symbols may only be used to identify those things that are actually entitled protective status.²⁹¹

Clark's example of the helicopters with Iraqi markings would be a violation under the provisions of Protocol I. Because Iraq and the United States are not parties to Protocol I, it does not apply.²⁹² Under customary laws of warfare, the use of such deceptions is allowed to prepare for attack.²⁹³ Clark's version is that helicopters were used to place homing markers,²⁹⁴ an activity which is preparatory to attack.

G. The Bombing of Civilian Targets in Iraq

1. *The Bombing of Cities and Infrastructure*—Clark claimed that the United States bombing of Iraq violated the principle of discrimination by targeting civilians to destroy the "essential facilities and support systems of the entire society . . . to cripple a developing Third World country."²⁹⁵ Clark asserted that "[t]housands of civilians were victims of indiscriminate bombing by B-52s."²⁹⁶ Examples of the illegal objects of the bombing include "communications systems, oil refineries, electric generators, water treatment facilities, dams and transportation centers."²⁹⁷

²⁸⁶ The Hague Convention prohibits "improper use . . . of the military insignia and uniform of the enemy." Hague Convention IV Respecting the Laws and Customs of War on Land, Oct. 18, 1907, art. 23, 36 Stat. 2277, 2302. However, the same convention also says that "Ruses of war . . . are considered permissible." *Id.* art. 24.

²⁸⁷ See J. Ashley Roach, *Ruses and Perfidy: Deception During Armed Conflict*, 23 U. Tol. L. Rev. 395, 415 (1992).

²⁸⁸ See *id.* at 415-16.

²⁸⁹ *Id.* at 400.

²⁹⁰ See *id.* at 400-01.

²⁹¹ See *id.* at 407.

²⁹² See *supra* notes 31-39 and accompanying text.

²⁹³ See *supra* note 285 and accompanying text.

²⁹⁴ See *supra* note 282 and accompanying text.

²⁹⁵ See Clark, *supra* note 1, at 59. Again, Clark cites the inappropriate provisions of Protocol I of the 1977 Geneva Conventions to defend this thesis. See *id.* at 174-76.

²⁹⁶ *Id.* at 74.

²⁹⁷ *Id.* at 62.

Customary law dictates that civilians may not be the object of attack.²⁹⁸ However, "economic targets such as power sources, industry, transportation, and command and control centers, are always legitimate targets."²⁹⁹ Command and control, electrical production, communications, nuclear and biological and chemical warfare facilities, ports, oil refineries, railroads, bridges, and military storage sites are legitimate targets which are subject to attack.³⁰⁰ Despite Clark's objections to the "bombing of industrial and other priority sites,"³⁰¹ it is an accepted practice in the law of warfare.

Clark also objected to the United States bombing of Iraqi cities, stating that "[t]here is no way to bomb densely populated cities day after day and not kill civilians." Civilian losses are allowed by the law of war provided the civilians are not the object of the attack.³⁰² By the customary rules of war, the attacker, the defender, and the civilian population all share responsibility for avoiding civilian casualties.³⁰³ Iraq failed to take steps required by the rules of war to protect its civilian population.³⁰⁴

Even a Middle East Watch report critical of the United States actions in the Gulf admits that the allies generally did everything they feasibly could to prevent civilian casualties.³⁰⁵

2. *Bombing Nuclear and Chemical Sites*—Clark also references United States attacks on Iraqi nuclear and chemical warfare sites claiming that such attacks violated Article 56 of Protocol I's prohibition against attacking installations containing dangerous forces.³⁰⁶ If Protocol I applies, Article 56 only pertains if the attack may release the dangerous forces and cause severe civilian casualties.³⁰⁷ Clark never contended that

²⁹⁸ See *supra* note 51 and accompanying text.

²⁹⁹ Infeld, *supra* note 26, at 122.

³⁰⁰ See *id.* at 134-35.

³⁰¹ See Clark, *supra* note 1, at 62.

³⁰² See Infeld, *supra* note 26, at 135.

³⁰³ See *supra* notes 59-61 and accompanying text.

³⁰⁴ The actions of Iraq during Desert Storm were a leading cause of collateral civilian casualties and damage to civilian objects. The government of Iraq was required under applicable law of war to protect its civilian population by initiating evacuation procedures, providing adequate air shelter, and by not placing legitimate military targets in or around heavily populated areas. Unfortunately, Iraq did not live up to its own obligations under the applicable law of war. The Iraqi government chose not to invoke evacuation procedures for its civilian population when it was well aware of the threat of attack by Coalition forces once the January 15, 1991, deadline passed.

Infeld, *supra* note 26, at 136.

³⁰⁵ O'Brien, *supra* note 233, at 821.

³⁰⁶ See Clark, *supra* note 1, at 176-77.

³⁰⁷ See Parks, *supra* note 42, at 202. Article 56 of Protocol I is very clear in this regard. "Works or installations containing dangerous forces, namely dams, dikes, and nuclear generating stations shall not be made the objects of attack . . . if such attack may cause the

there was any release of dangerous forces from the attacks. Furthermore, the provision is designed only to apply to those installations devoted to peaceful purposes³⁰⁶ and therefore cannot be considered applicable to chemical weapons and nuclear bomb research sites.

3. *The Amariyah "Bomb Shelter"*—Finally, Clark cited the attack on the Amariyah "bomb shelter" where he contended that "1,500 civilians, mostly women and children, were killed."³⁰⁷ There is evidence that this facility was a command and control bunker in which the Iraqi government, in violation of the rules of warfare, invited civilians to stay.³¹⁰ To afford Clark's arguments maximum latitude, assume that the shelter was used exclusively by civilians at the time of the bombing. Then determine whether the bombing was a reasonable mistake that often occurs in war when information is imperfect,³¹¹ or a deliberate effort to murder civilians. Clark contended that the United States knew that the facility was used by civilians because civilians had been using the shelter for weeks and the area was under frequent air surveillance.³¹² However, that is a flimsy basis for contending that those who ordered the bombing actually knew the shelter was used by civilians. The United States surveillance showed a facility that was camouflaged, ringed with barbed wire and had armed guards at the doors.³¹³ These signs do not indicate an air

release of dangerous forces and consequent severe losses among the civilian population." MICHAEL BOOTHE ET AL., *NEW RULES FOR VICTIMS OF ARMED CONFLICTS*, 56 (1982) (emphasis added). Additionally, the list of the types of installations (dams, dikes, and nuclear generating stations) is all inclusive and other types of installations cannot be added to this list. See *id.* at 352. For this reason, Clark's complaints regarding chemical warfare sites have absolutely no basis under Article 56.

³⁰⁶ See BOOTHE ET AL., *supra* note 307, at 351. The specific words of Article 56 also apply only to nuclear generating stations and for that reason nuclear bomb research facilities have no protection under Article 56. See *id.*

³⁰⁷ Clark, *supra* note 1, at 70.

³¹⁰ See Alberto R. Coll, *Just and Unjust Wars: The Future of U.S. Policy*, 6 *TEMP. INT'L & COMP. L.J.* 55, 64 (1992).

³¹¹ A tragic illustration that faulty information in war often leads to accidental attacks and deaths is found in the high rate of "friendly fire" deaths amongst United States forces in the Persian Gulf. By Clark's own account, 37 of the 145 American combat deaths were from friendly fire. See Clark, *supra* note 1, at 38. Even when there is not active combat, confusion can lead to accidental attacks. In spite of redundant and sophisticated safeguards to protect against mistaken identity, on April 13, 1994 American F-15C fighters enforcing the postwar "no fly zone" over Iraq shot down two American Black Hawk helicopters killing 26 people. The helicopters were on legitimate United Nations business. See Bruce G. Auster, *The Perils of Peacekeeping—A Tragic Blunder in the Skies of Iraq Is a Reminder That the First Law of War Is Murphy's*, U.S. NEWS & WORLD REP., Apr. 25, 1994, at 28. These examples suggest that if we can attack our own people by accident, then we also may sometimes bomb civilians without the malicious intent the Clark ascribes to the bombing of the Amariyah shelter.

³¹² See Clark, *supra* note 1, at 71. Yet Clark does not contend that American combat deaths by friendly fire were deliberate even though the United States also had much better sources of information for where our own troops were. See *supra* note 311 and accompanying text.

³¹³ See Steven Keever, *Lawyer in the War Room* 77 A.B.A.J. 52 (1991).

raid shelter.³¹⁴ If this truly was an air raid shelter, then the Iraqi government shares responsibility for the deaths.³¹⁵

4. *The Unparalleled Commitment by the United States to Avoid Civilian Casualties*—"[t]he destruction of civilian and nonstrategic targets in Iraq fell far short of the pounding of such targets by American and British strategic bombing in World War II."³¹⁶ "The evidence is clear that the United States went to unprecedented lengths to avoid harm to civilians."³¹⁷ "Operation Desert Storm was the most discriminate campaign in history, and Coalition forces took risks with their own airmen that they were not obligated to take in order to minimize civilian casualties and damage to civilian objects."³¹⁸

Based on the available evidence it is clear that the U.S./U.N. coalition forces intended to and did observe the principle of discrimination to a greater degree than any belligerents in major contemporary wars. That they may not and should have tried better may be conceded without vitiating this judgment.³¹⁹

VI. Ramsey Clark's Credibility

The preceding analysis places Ramsey Clark's credibility in question because he misapplied the rules of war against the United States. The charges by which his Tribunal "convicted" prominent United States citizens were sufficiently vague as to violate the Geneva Conventions. He misrepresented the relevant U.N. Security Council resolutions, and either misstated the facts or the applicable international law. Why would a renowned person so viciously attack his own nation to the exclusion of all others?

A possible answer to this question is also found in Ramsey Clark's book. Clark's real agenda has nothing to do with specific conduct of the United States in the Persian Gulf War. The final chapters of his book establish that he is motivated by a concept of a one-world government to redistribute wealth from the rich nations to the poor ones.

Clark expressed his contempt for American wealth and consumption as follows:

After World War II and into the 1960s the United States, with

³¹⁴ *Id.*

³¹⁵ Recall that the traditional rules of warfare place dual responsibility for protecting civilians on the attacker and defender, and that the Hague Conventions require the defender to clearly identify protected structures. See *supra* note 59 and accompanying text.

³¹⁶ Russell F. Weigley, *Keynote Address: Just Wars and Unjust Means*, 6 *TEMP. INT'L & COMP. L.J.* 7 (1992).

³¹⁷ Coll, *supra* note 310, at 61.

³¹⁸ Infeld, *supra* note 28, at 141.

³¹⁹ O'Brien, *supra* note 283, at 822.

5 percent of the world's population, consumed more than half its product. Within the United States, the concentration of wealth and difference in conditions between rich and poor far exceeds that of any other developed country. . . . The American people outconsume any in history, seemingly as an end in itself and almost oblivious to the effect on their physical and moral health or on the planet and all its people. . . . Millions of people in other countries have been infected by the contagion of U.S. materialism and its glorification of violence shrouded in the cloak of freedom, democracy, good will, friendship, and multiethnic harmony peddled by American propaganda and cultural imperialism.³²⁰

Clark contradicts himself by declaring the "belief that governments will solve our problems may be the most dangerous opiate of the people"³²¹ but then proposes a "federal system of international governance, delegating to the U.N. powers to secure peace, regulate international economic activity, and provide social justice for all."³²² This body would have broad powers including the authority to tax nations³²³ and achieve many goals, which include redistribution of wealth from rich countries to poor ones.³²⁴ Additionally, Clark's world government would have its own army.³²⁵

Clark's utopian vision of the world as one people in government and society has merit but it has nothing to do with the conduct of the United States in the Persian Gulf War. Clark's accusations of United States war crimes in the Gulf are motivated by nothing his multifarious agenda for global government and wealth redistribution. This is an intellectually dishonest approach.

VII. Conclusion

The United States fought the Persian Gulf War with a concern for the laws of warfare that is unprecedented. Lawyers assisted tactical commanders in every phase of the operation and their advice altered meth-

³²⁰ Clark, *supra* note 1, at 227-28.

³²¹ *Id.* at 233.

³²² *Id.* at 237.

³²³ *Id.* at 238.

³²⁴ *Id.* at 243-44. This powerful world government would have the mandate and the power to institute global control of world health systems, food production and distribution, labor (to prevent rich nations from continuing their exploitation of labor markets in poor countries), education, birth control, financing for national housing programs, general resource development, the environment and the economic exploitation of poor countries. *Id.* at 237-43.

³²⁵ See *id.* at 235.

ods and tactics.³²⁶ The United States exceeded the requirements of the rules of war to avoid unnecessary suffering. This desire affected decision making at the most fundamental level. For example, the maneuver plan for the ground campaign was selected for its avoidance of populated areas.³²⁷ This decision to move the center of the ground war to the desert greatly increased the discriminatory nature of the campaign, reducing civilian casualties.³²⁸

The bias in Clark's numerous allegations is established by making the United States the sole villain in the war and presenting an unrelated agenda for global wealth distribution. Clark's charges have no merit in international law. In the end, Clark allowed his political convictions to contaminate his judgment. At best one could view his book and the results of his Tribunal as a brief by a partisan party. However, this is a brief that lacks credibility.

In war, the "suffering permitted within the rules of international law is stunning. Unfortunately, Clark has ignored this and imposed on the United States his preferred rules of warfare that have no relation to international law.

Whether the hellish nature of war can be overcome is a worthy question for all to pursue. But the issue of whether the United States committed war crimes in the Persian Gulf involves specific questions of law and fact that generally are ascertainable.

³²⁶ See generally Keeva, *supra* note 313 (for an excellent discussion of the pervasive influence of "Lawyers in the War Room").

³²⁷ Pentagon Final Report, *supra* note 35, at 612.

³²⁸ See O'Brien, *supra* note 233, at 821.

STARS IN THEIR COURSES: THE GETTYSBURG CAMPAIGN JUNE-JULY 1863*

REVIEWED BY CAPTAIN GREGORY T. BALDWIN**

In *Stars In Their Courses: The Gettysburg Campaign June-July 1863*, Shelby Foote demonstrates that he is the finest narrative historian in American literature. Foote's ability to combine character, personality, and fate into a narrative describing the mosaic of history sets the standard for historical writing. The title of this book, taken from Debraoh's biblical victory song in the Book of Judges, explains Foote's theme: the stars in their courses fought Robert E. Lee at Gettysburg in July 1863.

After the victories at Fredericksburg and Chancellorsville, Lee felt that his troops were invincible. "They will go anywhere and do anything, if properly led." Foote asserts that this belief, combined with the aura surrounding Lee and the death of Stonewall Jackson at Chancellorsville, sealed the Confederate's defeat at Gettysburg. According to Foote, Jackson's death was of particular significance. It forced a complete reorganization of the army from two corps, of four divisions each, to three corps, each with three divisions. It also forced the promotion of men who were not ready for the increased responsibilities. The leadership of Lee's invincible troops at Gettysburg proved far different from that at the previous Confederate victories.

Foote also asserts that politics motivated Lee to advocate a northern invasion. Lee argued, at a series of meetings with President Jefferson Davis and the Confederate cabinet, that the invasion would accomplish the following objectives. First, an invasion would encourage Northerners who favored arbitration over war. Second, a successful campaign would hasten foreign recognition and intervention in the war. Finally, a decisive defeat of the Union Army would possibly result in a fall of the northern capital. The last two arguments appealed to President Davis because he believed that they were the keys to victory over the superior Union forces.

The march into Pennsylvania began with a fatal disagreement between Lee and the commander of the Confederate First Corps, Lieuten-

* SHELBY FOOTE, *STARS IN THEIR COURSES: THE GETTYSBURG CAMPAIGN JUNE-JULY 1863* (The Modern Library 1994); 290 pages.

** Judge Advocate General's Corps, United States Army. Written when assigned as a student, 43d Judge Advocate Officer Graduate Course, The Judge Advocate General's School, United States Army, Charlottesville, Virginia.

ant General James Longstreet. Longstreet, who was opposed to a northern invasion, preferred defensive tactics. Lee, like Jackson, was an offensive strategic and tactical commander. This disagreement is the foundation of Foote's central proposition: Lee's offensive temperament—coupled with his desire to end the Civil War—led to Pickett's charge and inevitable defeat. Foote masterfully supports this proposition with an engrossing narrative style and liberal use of quotes from participants in the battle. Foote clearly believes that human foibles, timing, and unintentional intangible events play a significant role in military history.

In organizing the northern march, Lee's order to Major General J.E.B. Stuart, the Confederate cavalry commander, was an early omen of the disaster that lay ahead in Gettysburg. This order directed Stuart to cross the Potomac and place the cavalry on the right flank of the Confederate Second Corps, commanded by Lieutenant General Richard Ewell. The cavalry would act as a screen and keep the invading army informed of Union movements. However, Lee modified this order, at Stuart's suggestion, to allow the cavalry to move east and around the rear of the Union Army. Lee conditioned this modification with a note of caution: "Be watchful and circumspect in all your movements." Stuart's failure to follow this order resulted in Lee moving blindly into Pennsylvania without any tactical intelligence on Union Army movements.

The Army of the Potomac had worse problems. In the ten months preceding Gettysburg, the Union Army had fought under four different commanders: Second Manassas under Pope; Antietam under McClellan; Fredericksburg under Burnside; and Chancellorsville under Hooker. Lee could claim unquestioned success in three out of the four battles. According to Foote, the best that the Union commanders could claim was that they had survived. President Lincoln, facing a fifth major battle, again changed commanders and appointed George Meade. Foote thoroughly analyzes the political pressure on the Union Army leadership, focusing particularly on the lack of trust and confidence in Hooker. Foote insightfully concludes that, even though Meade had more command independence, the Union Army now faced an enemy moving north of the Potomac.

However, that enemy faced a problem that has plagued commanders throughout the history of warfare: lack of intelligence on the opponent's position. Foote skillfully places the reader in Lee's mind; a mind filled with anxiety because of the "sound-proof curtain" that developed when Stuart did not provide any tactical information on the Union Army's movements. Stuart was in no position to assist Lee because the Army of the Potomac had moved between the cavalry commander and the Army of Northern Virginia. What Lee encountered in Pennsylvania would be a surprise, an unwelcomed prospect in war. Foote movingly writes as follows:

Coincidence refused to mesh for the general who, six weeks ago in Richmond, had cast his vote for the long chance. Fortuity itself, as the deadly game unfolded move by move, appeared to conform to a pattern of hard luck; so much so, indeed, that in time men would say of Lee, as Jael had said of Sisera after she drove the tent peg into his temple, that the stars in their courses had fought against him.

The three-day battle at Gettysburg began, as battles have throughout history, with an innocent action devoid of operational or tactical consideration. Foote describes Brigadier General Henry Heth's decision to send a Confederate brigade into Gettysburg to requisition a supply of shoes as an example of this type of action. This decision forced both Lee and Meade's hand as Heth's soldiers encountered Union cavalry commanded by the hard fighting John Buford. Thus, the unplanned engagement at Gettysburg caused the convergence of two armies onto ground not chosen by either Lee or Meade.

The heart of Foote's assessment of Gettysburg is that fate, rather than military calculation, chose this location as the pivotal battle of the Civil War. Foote demonstrates this assessment by recounting in riveting narrative the clash between Lee and Longstreet concerning campaign tactics. Foote believes that in Lee's mind, Gettysburg, regardless of the outcome, would decide the future course of the war. The author convincingly portrays Lee as a man directed by destiny rather than military reality.

The first of the three days at Gettysburg supports Foote's assessment of the battle. Ewell's failure to take Cemetery Hill, the high ground at the northern end of the "fishhook" shaped battlefield, resulted from an "strange paralysis of will." This was uncharacteristic of Ewell. The normally decisive Confederate commander possessed a sound grasp of strategy and tactics. This failure allowed Meade to reinforce this area during the night. It also forced Lee to focus on the southern end of the fishhook on the second day.

The attack at the southern end, Little Round Top, the Devils Den, and Cemetery Ridge, also evidences Foote's view that Gettysburg was decided more by circumstance rather than strategy and tactics. Lee decided on an assault northeast up the Emmitsburg Road to crush the Union left flank on Cemetery Ridge. Lee instructed Ewell to launch a simultaneous assault on the northern end against Culp's Hill and Cemetery Hill. Longstreet and his division commanders opposed this strategy. They advocated a movement around the Union left and an attack on Meade's flank and rear.

Lee refused to alter his decision. Foote asserts that the result was a disorganized attack with "no hard-core tactical plan to carry it through

the bungling." Foote's narrative depicting the plight of the Confederate and Union infantry is moving, crisp, and a wonderful blend of detail and emotion. As the sun set at the end of the second day, Foote again places the reader in Lee's mind. The Confederate commander decides to stake everything on an attack the next morning against the Union center. Lee decided this without consulting any of his subordinate commanders.

The opposite approach was occurring at the Union headquarters. Meade held a council of war that evening with his corps commanders. He put the tactical decision to a vote. The vote was to remain and wait for the next Confederate attack. Foote provides interesting details on the scene at the Union Army headquarters. The author notes that, notwithstanding the vote, Meade favored a withdrawal. History only can speculate the result if the vote had supported Meade's personal opinion. However, Foote states that Meade knew that Lee would attack the center because the previous attacks had failed to penetrate the Union flanks.

Foote's description of the third and final day at Gettysburg is the most moving narrative in the book. Foote begins by describing Longstreet's reaction to Lee's plan for an infantry assault on the Union center. The Confederate First Corps commander knew that an assault on this fortified position was going to fail. Longstreet told Lee that "it is my opinion that no 15,000 men ever arrayed for battle can take that position." Foote indicates that Longstreet passively accepted Lee's decision.

The final attack began with a Confederate artillery bombardment from more than 140 guns. Foote states that "this would be the greatest concentration of artillery ever assembled for a single purpose on the continent." It was designed to soften the Union center before the assault. It failed as most of the shots went long. After the bombardment, the Confederate infantry, commanded in part by Major General George Pickett, moved out from the wood line. The "well-dressed long grey lines" marched in formation and into history.

Foote's description of Pickett's charge is a brilliant narrative concerning men who fought with distinction and uncommon bravery in the face of unspeakable horror. The description is liberally interspersed with quotes from commanders and soldiers. Foote provides the reader with an intimate knowledge of the fighting that occurred in that open field just south of Gettysburg. The Confederate bewilderment in defeat and the Union elation leap from the page as Pickett's charge unfolds. After the assault, Foote follows Lee through the Confederate rear area as the army commander repeatedly apologizes. "It's all my fault. I thought my men were invincible." Foote concludes by tracing the long road back to Virginia for Lee and Meade's failure to take the initiative. The Union commander left that to Grant in the Wilderness and at Appomattox.

Foote's book is for the reader who desires an evocative account of Gettysburg based on documents produced by the participants. Foote includes excellent maps of the campaign. The author effortlessly blends narration, biography, and detail into a sweeping panoramic description of a battle which arguably changed the course of American history. The three-day battle produced more than 50,000 casualties. Foote convinces the reader that Gettysburg cost the Confederacy much more than just the lives of those soldiers in the long grey lines.

LENIN'S TOMB: THE LAST DAYS OF THE SOVIET EMPIRE*

REVIEWED BY CAPTAIN ED SHEERAN**

Author David Remnick has compiled a tremendous work on the collapse of the Soviet Union (USSR), witnessing it firsthand as a *Washington Post* correspondent from 1988 to 1992. During that time, he gained an insider's perspective on the revelations of Russia's tortuous history under Communism. In his book, he focuses on the latter days of the Gorbachev era—including the unsuccessful 1991 coup d'état, the rise of Boris Yeltsin, and the 1992 "trial of the old regime," at the end of which the Russian Constitutional Court ruled Communism illegal as a national entity.¹

The more interesting but depressing portions of this work, however, involve Remnick's journeys across the former USSR, interviewing people no longer afraid of voicing their opinions. Their revelations and insights could melt the hearts of even the coldest warriors. *Lenin's Tomb* is a heartbreaking tale about the collapse of the Soviet Union and the state to which it has sunk. Remnick paints a picture of terrible suffering, of a nation recently regarded as equal or superior to the United States because of its military strength, but at the same time a country that has Third World living conditions.

This book will educate both the ignorant and knowledgeable. One will better understand the monumental tasks awaiting Russian President Boris Yeltsin and his successors if Russia is ever to overcome its ruinous Communist legacy.

In a meeting with Stalin, George Bernard Shaw's traveling companion Lady Astor asked, "How long will you go on killing people?"

"As long as necessary," Stalin replied.²

....

Stalin is the leader under whose leadership the country built

* DAVID REMNICK, *LENIN'S TOMB: THE LAST DAYS OF THE SOVIET EMPIRE* (First Vintage Books ed. 1994).

** Judge Advocate General's Corps, United States Army. Written when assigned as a Student, 43d Judge Advocate Officer Graduate Course, The Judge Advocate General's School, United States Army, Charlottesville, Virginia.

¹ REMNICK, *supra* note *, at 530.

² *Id.* at 128.

socialism in terrible conditions. We are saying, "Look at how awful our lives were." Well, our lives were hard, but everyone had the belief that we would live better and our children and grandchildren would live better still. People with nothing could achieve something. And now what? Now do we have trust and faith in the future? I think in the four years of perestroika, they have undermined the trust of working people . . . because they have spit on our past.³

Russians today struggle with the legacy of their past, with opinions split between glorification and vilification. This debate was intensified by one of the themes Remnick weaves throughout the book: the "return of history" and truth. While this theme may not seem so momentous to Americans, it is overwhelming to the average Russian. The Communist leadership lied to the people for seventy-five years so that they became accustomed to it. Communist leaders concealed or exaggerated the truth. As authorities gradually lifted press restrictions during the Gorbachev era, however, the flood of truth began. Newspaper editors printed the secrets of the past as rapidly as possible. Part of the struggle that the Russians experience is exemplified by the release of repressed information, addressing the many questions which authorities never answered truthfully during the years of Communist rule. Many of the questions dealt with the whereabouts of loved ones who had "disappeared" over the years. The people initially reacted to these revelations with exhilaration, but later with exhaustion. One writer remarked, "People want a little pleasure. If they have to read about another concentration camp, they'll die."⁴

History, when it returned, was unforgiving.⁵ Remnick illustrates this theme throughout the book, beginning with a gruesome vignette about the "Katyn Forest Massacre" during the Second World War. The author tells of a colonel in the Soviet Military Prosecutor's office digging near the city of Kalinin in 1991. He finds bullet-shattered skulls, worm-eaten boots, and scraps of Polish military uniforms.⁶ Slowly he uncovers what the world has long expected but what the Russians until recently have never admitted: that the massacres of over fifteen thousand Polish officers near Kalinin, Katyn, and Starobelsk, Poland, were carried out not by the Germans in 1941, but by the Soviet Secret Police, the NKVD (the precursor to the KGB) in 1940.⁷

Interwoven with this onslaught of history and truth is a frank as-

³ *Id.* at 82.

⁴ *Id.* at 539.

⁵ *Id.* at 51.

⁶ *Id.* at 3.

⁷ *Id.* at 3-4.

assessment of the true impact of Communism in general (and of Joseph Stalin in particular) on the Soviet Union. Throughout the book, the reader can sense a "love-hate" relationship that the citizenry had with Communism and Stalin. The increased awareness of Stalin's impact on Soviet history, coupled with the accelerating breakdown in law and order that citizens are now experiencing, means that both emotions are increasing in intensity. Many still loathe him for the brutal tyranny he waged against his own people. Others, however, demonstrate for a return of Stalinist law and order to reverse the anarchy now gripping Russian society.

Vignettes stress that Communism simply crushed the Russian people. Stalin, or leaders under his direction rather than foreign enemies, committed some of the cruelest acts:

That smell you smell now was three times as bad; blood in the air. People would lean out their windows and puke all night and the dogs howled until dawn. Sometimes they'd find a dog with an arm or a leg walking through the graveyard.⁸

This passage describes the grounds of the Donskoi Monastery outside Moscow where the NKVD killed enormous numbers of victims during the "purges" of 1930 to 1942. Although many Americans know that Stalin conducted purges against his own people while he led the USSR, few appreciate the breadth. Substantial evidence only recently has become available:

See this gate? Well, every night trucks stacked with bodies came back here and dumped the dead in a heap. They'd already been shot in the back of the head—you bleed less that way—at the Lubyanka prison or at the Military Collegium. They stacked the bodies in old wooden ammunition crates. The workers stoked up the underground ovens . . . to about twelve hundred degrees centigrade. To make things nice and official they even had professional witnesses who countersigned the various documents. When the bodies were burned they were reduced to ash and some chips of bone, maybe some teeth. Then they buried the ashes in a big pit. . . . [T]he pit had been five yards deep and twenty feet square and when it was filled completely with ashes—hundreds and hundreds of pounds of ash—the secret police paved it over with asphalt. . . .

When the purges were at their peak, the furnaces worked all right and the domes of the churches and the roofs of the houses here were covered with ash. There was a fine dust of ash on the snow.⁹

⁸ *Id.* at 138.

⁹ *Id.*

At the same time, however, parts of Russia still yearn for the return of Stalinism, that is, the image of law and order that the USSR under Stalin represented. Some Russians still articulate Stalinist philosophy, strengthened in their conviction by worsening economic conditions:

The thing is, we may not need an iron hand, but in any state there must be order. . . . This is not a state we have now, it is like some anarchistic gathering. When there is such a gathering, there is no state, no order, no nothing. A state, above all, means order, order, order.¹⁰

As if the unfolding of the past was not troubling enough, the state of Russia today is even more appalling. The chapter entitled "Poor Folk" is one of the most gripping in the book.

There was also the sheer crumminess of the things that you could find: the plastic shoes, the sulfurous mineral water, the collapsible apartment buildings. The decrepitude of ordinary life irritated the soul and skin. Towels scratched after one washing, milk soured in a day, cars collapsed upon purchase. The leading cause of house fires in the Soviet Union was television sets that exploded spontaneously. All of it kept people in a constant state of misery.¹¹

Children fell sick for many reasons, but mainly they suffered from the effect of the cotton "monoculture," the obsession with a cotton crop at all costs. Working in the cotton fields, the children often drank from irrigation sources poisoned with pesticides and toxic minerals. In the regions near the Aral Sea, which had been ruined through a mad scheme to irrigate the cotton fields by diverting the rivers into the sea, the poisons in the drinking water were so intense that children were taking them in through their mother's breast milk. Even seeing a doctor proved dangerous at times. In the first year of their lives, Turkmenian children were given an average of two hundred to four hundred injections, compared to three to five for American children. It was nothing systematic. The doctors threw everything they had at the children. Within a few years the effect of the vaccines was close to zero.¹²

The sad tale of Magnitogorsk also is telling for its commentary on Soviet industrial life.

Magnitogorsk became a legend of the (Second World) [W]ar. Because it produced the steel for half of the tanks and one third of the artillery used to defeat the Nazis, people began

¹⁰ *Id.* at 78.

¹¹ *Id.* at 203.

¹² *Id.* at 205.

referring to the mills as "Hitler's grave." But Magnitogorsk never stopped running on a wartime mentality. The ultimate bosses, the ministers in Moscow, measured success in sheer quantity. Never mind that other countries were beginning to produce modern steel alloys that brought the weight of a refrigerator down to a hundred pounds, not four hundred; never mind that pollution got so bad that the clouds of poison above the city decreased sunlight 40 percent. But the Lenin Steel Works, the biggest mill in the world, kept churning on in ignorant isolation. And always the command was "More steel!"

Magnitogorsk is a classic Stalinist city. . . . We built an autonomous company town that pushed away every cultural, economic and political development in the civilized world. We existed, and still do exist, for the sake of a machine that doesn't even work. . . .¹⁵

I stayed a week in Magnitogorsk as a guest of the city coroner, Oleg Yefremov. Oleg was in his early forties, and he had a smoker's cough that plagued him without end. He did not smoke. He suffered, as did most of the citizens of Magnitogorsk, from the habit of breathing.

We woke early and drove to the top of a hill to get a sense of the biggest company town I'd ever seen. The Lenin Steel Works stretched seven miles along the left bank of Factory Lake. The plant was in full operation day and night, grinding out sixteen million tons of steel every year. The smokestacks never stopped pumping poison, a sickly mix of yellow, gray, green, and bluish smoke that shifted in color, depending on the light. According to a report by the local environmental protection committee, the city's industries dumped one million tons of pollution annually. Satellite pictures show that the mills have produced a zone of ruined air and soil 120 miles long and 40 miles wide. In winter, the snow was crusted black; in summer, the grass grew in sad, brownish tufts.

. . . .

[A]t one time or another in their lives, 90 percent of the children of Magnitogorsk suffered from pollution-related illnesses: chronic bronchitis, asthma, allergies, even cancers. . . . [B]irth defects doubled between 1980 and 1990. At the city morgue, Oleg surveyed the morning's corpses. A worker with collapsed lungs. A little girl dead from asthma, a weakened heart, or both.

¹⁵ *Id.* at 213-14.

Oleg lived on the "good side" of Magnitogorsk; the bad side being downwind from the plant, the "left bank." One of the worst neighborhoods in the city was one of the oldest, Hardware Square. The air there was especially foul and gassy; you could taste the dust on your tongue. In room after room in one of the barracks, old women stared blankly out of windows, children were as filthy as any street kid in the barrios of Lima. At eight o'clock in the morning at the health clinic on Hardware Square, groups of a dozen children got ultraviolet treatments and drank their daily "oxygen cocktails," a viscous soup of fruit juice, herbs, and sugar infused with pure oxygen. Older patients came in just to take a few pulls from an oxygen tank. . . .

The trap seemed inescapable, as inescapable as the system itself. For all the excitement in the big cities over glasnost and the new parliament, the great majority of the people in the Soviet Union felt trapped, cogs in a system that not only oppressed them, but also failed to provide a decent, minimal standard of living. "Our workers are soldiers, shock troops who serve a machine. . . . They wear the shoes the factory gives them. They kill themselves working and they go home. All the spirit is drained out of them. We created a city of robots."¹⁴

Communism impoverished virtually the entire Russian people for the foreseeable future. Yeltsin and his successors must substantially improve the desperate state in which an overwhelming number of Russian citizens find themselves.

Ten years have passed since the walls of the USSR began to crack open. Despite the breathtaking change enveloping Russia since that time, hope of positive change has dissipated. The liberal intelligentsia lament that Russia's changes have not been in the direction that they had hoped. The sudden influx of unrestrained capitalism has changed the priorities of the average Russian to making money over all else. Correspondingly, the decline of intellectual life in Russian society has proceeded apace. Given that it was the very ideas of the liberal intelligentsia that first allowed perestroika to flourish, thoughtful Russians find the current lack of pursuit of intellectual life among the populace a most alarming trend, especially since Russia has enjoyed a rich intellectual life for centuries. Despite the incredible suffering borne by its people, Russian achievements in literature are among the world's finest. Yet Remnick tells the reader that for the young, there is just no sense, no prestige, in pursuing intellectual life.¹⁵ At Moscow State University, gaining admission to the

¹⁴ *Id.* at 214-15.

¹⁵ *Id.* at 540.

humanities department is automatic; everyone wants to learn finance.¹³ One Russian journalist, dining with the author in a plush Italian restaurant in a new German-owned hotel (the *Kempinski*) across from the Kremlin commented sadly:

I am a cynic, maybe a realist, but there is no more moral authority in Russia. Russia is a country in the stage of primitive accumulation of capital. Look around you, at this restaurant. What will dinner cost? At least one hundred dollars, right? An average Moscow salary for a month. In the nineteenth century there were landlords and peasants and no thought of mixing them. But now everyone thinks he has a right to have dinner at the *Kempinski*. And everyone wants it. This is *all* anyone thinks about. They don't think about novels or plays or poetry. If it is true that everything in America is about dollars, it is even more true now in Russia. This is a hungry country and it wants to be fed.¹⁷

America credits former Soviet leader Mikhail Gorbachev, who came to power approximately ten years ago, with ushering in the era of glasnost (openness) and perestroika (restructuring) in the USSR. Many Russians, however, regard him as a traitor and blame him for at least some of their current ills.¹⁸ Crime has risen dramatically and violence is gnawing away at Russia's fringes.¹⁹ Many people are in despair.²⁰

The future of democracy or even stability in Russia is not promising. A stalemate between Yeltsin and his political opponents in the Russian parliament gradually hardened into gridlock between 1991 and 1993. This culminated in an attempted coup d'etat in October 1993 by Vice President Aleksandr Rutskoi and Parliament Speaker Ruslan Khasbulatov.²¹ Yeltsin was forced to call in the Army to violently suppress the coup. Both men were jailed, but freed five months later despite Yeltsin's protests.²²

Given current circumstances, the future of democracy in Russia appears on hold. Even Yeltsin's aides have admitted that the illusion of a smooth and swift transfer from a Communist dictatorship to a free-mar-

¹³ *Id.*

¹⁷ *Id.* at 541.

¹⁸ *10 Years On, Gorbachev's Dreams Are Dead or Unfulfilled*. REUTERS (Mar. 6, 1995) (available in LEXIS, Nexis Library, ALLNWS file).

¹⁹ *Id.*

²⁰ *Id.*

²¹ REMNICK, *supra* note *, at 537.

²² YELTSIN DOES PLAN FUTURE AFTER RELEASE UNDER AMNESTY. REUTERS (Feb. 27, 1994) (available in LEXIS, Nexis Library, ALLNWS file).

ket democracy is gone.²³ Russian author Aleksandr Solzhenitsyn, who returned to Russia in 1994 after a twenty-year exile told the Russian parliament in October 1994 that "there is no democracy in Russia, only suffering."²⁴ The rise of ultra-nationalist Vladimir Zhirinovskiy (whom, according to Remnick, Russia and the world cannot afford) has been in response to Yeltsin's relative inaction in building support for radical economic reforms that have proved painful to millions of people.²⁵ Russia's violent invasion of Chechnya in December 1994 and the ongoing war there frays world confidence that Russia means to sincerely embrace democracy as a long-term form of government.

The book closes with the author's interview of Solzhenitsyn just before he returned to Russia in 1994. Solzhenitsyn's quote, and the title of the afterword, "The Heart is Not Yet Joyful," is prophetic. Despite having shaken its crushing burden, Russia is "coming out of Communism on the most twisted, painful, and awkward path."²⁶ Perhaps the Russians' most daunting challenge is to not allow themselves to fall back under it. While contemplating this book's enormous portent for Russia's future, the reader—particularly the military reader—of *Lenin's Tomb* should consider that the future of United States national security will in large measure depend on whether the Russians successfully meet that challenge.

²³ REMNICK, *supra* note *, at 536.

²⁴ *Solzhenitsyn Blasts Government in Address to Russian Lawmakers*, AP, (Oct. 28, 1994) (available in LEXIS, Nexis Library, ALLNWS file) [hereinafter *Solzhenitsyn*].

²⁵ REMNICK, *supra* note *, at 536.

²⁶ *Solzhenitsyn*, *supra* note 24.

WAR AND ANTI-WAR: SURVIVAL AT THE DAWN OF THE 21ST CENTURY*

REVIEWED BY MAJOR SUSAN S. GIBSON**

The latest copy of *Army Focus*, entitled *Force XXI*, contains quotes from *War and Anti-War* to explain how the future battlefield will be influenced by "third wave" warfare. Speaker of the United States House of Representatives, Newt Gingrich, has one of the Tofflers' prior books, *The Third Wave*, on his reading list for freshman Congressmen. Alan and Heidi Toffler are influencing American political thought and shaping the debate about the future of warfare.

The Tofflers coined the term "third wave" and their innovative thinking and original terminology about third wave warfare permeate contemporary military doctrine. To know what all the hoopla is about read *War and Anti-War*.

The Tofflers theorize that "the way we make wealth is the way we make war." In their earlier book, *The Third Wave*, they argued that the world is moving into a third wave of economic development. History's first wave was agricultural. Then came the industrial second wave. Now society is moving into the information age: the third wave.

In *War and Anti-War*, the Tofflers examine the military side of the equation. They argue that modern warfare is moving into its third wave in response to economic development. In *War and Anti-War* the Tofflers not only classify the three "waves" of warfare, they also predict the future of third wave warfare. According to the Tofflers, the future anti-war (i.e., peace) cannot be fought unless the future of warfare is understood.

The three waves of warfare represent a historic progression. However, because all nations have not progressed at the same pace, warfare is currently being fought in all three forms. According to the authors, nations must recognize and compensate for these differences in economies and in warfare if they desire peace.

First wave warfare is based on an agrarian economy. It is fought for land—to accumulate wealth through agriculture. Second wave war-

* ALVIN & HEIDI TOFFLER, *WAR AND ANTI-WAR* (Little, Brown & Co. 1993), 302 pages, \$22.95 (hardcover).

** Judge Advocate General's Corps, United States Army. Written when assigned as a Student, 43d Judge Advocate Officer Graduate Course, The Judge Advocate General's School, United States Army, Charlottesville, Virginia.

fare is characterized by industrial-age war. The major second wave wars were fought over power shifts as the economy moved into the second wave. At its peak, second wave warfare was also epitomized by colonization: wars fought to acquire raw materials or to open markets. The Tofflers saw the American Civil War, among others, as a classic second wave struggle for power: a battle between the industrial (second wave) North, and the agrarian (first wave) South.

Third wave warfare is information warfare that has grown from the service-oriented, technologically centered economy. Desert Storm was the first major war to employ this new third wave technology. Smart bombs, satellite imagery, remotely piloted reconnaissance planes, networked computer communications: these are the weapons of third wave warfare.

Desert Storm was a war without a "front line" where information and knowledge were used by one side to destroy the enemy's ability to use its information and communications systems. The Tofflers characterize this progression in warfare as a movement from "brute force" to "brain force."

The Tofflers' assessment of third wave warfare is certainly thought provoking. Not only do they take a novel look at the history and future of warfare, they also *name* past and future trends. By identifying and naming these trends, the Tofflers have influenced the military and public debate.

Readers will be fascinated by their ability to find or create a word whenever a phenomenon is discussed. With the military penchant for jargon, these terms will appear again. "Mediatization" describes the "rising ubiquity and importance of the media." Global economies, worldwide computer networks, and multinational corporations are creating the "soft-edged state." "Diplo-dither"—describes the world's response to the beginning of hostilities in the former Yugoslavia.

War and Anti-War also is noteworthy for its inventive look at the future technology of warfare. In a chapter entitled "Da Vinci Dreams," a reference to Da Vinci's prescient drawings of flying machines, they describe the possible weapons of the future: synthetic telepathy to read the enemy's mind; an exo-skeletal suit that could walk for the soldier while he sleeps; the nano-machines that "would be small enough to operate like submarines in the bloodstream of humans;" weapons that could trigger earthquakes or volcanic eruptions with electromagnetic waves; and "dream mines" that could recognize a target by its acoustic signature and then pop up and fire a shaped charge at the appropriate target.

It is easy to dismiss these ideas as science-fiction, until Da Vinci and his sketches of flying machines are remembered. If anything, the past tells that predictions for future technology cannot be determined; however, creations cannot occur without dreams.

The Tofflers also look into their crystal ball to describe the breeding grounds for future wars. They see nuclear threats from drug cartels, "terror organizations, religious movements, corporations, and other nonnational forces" (which they term "global gladiators"). Alternatively, there could be a "world-wide meltdown of the money system" caused by a global depression of the new global economy.

The authors identify several nations where certain regions are moving into second and third wave economies while the remainder of the nation remains mired in first wave poverty. In places like China, India, and Brazil they warn that civil war could ensue when these developing regions rebel against financing the rest of the country. To support this argument, they point to the wealthier regions of the Soviet Union as the first to break away.

After looking at the smart weapons of Desert Storm and at future electronic and robotic warfare, the Tofflers also explore the possibility of "war without blood." In many ways, this is the essence of their anti-war theory. They applaud efforts to develop technologies that can "anticipate, detect, preclude, or negate the use of lethal [weapons], thereby minimizing the killing of people."

It is an appealing thought. When they write about using these "weapons" during UN peacekeeping operations to "separate and disarm . . . warring factions instead of killing them," the future they propose unfolds.

The Tofflers also stress that the United States may have to reconsider some of its present methods for keeping the peace. After discussing the weapons for bloodless war, they ask whether these weapons can be subjected to current theories of arms control. They argue that if these bloodless weapons are lumped in with traditional weapons, society could "overlook important ways to reduce bloodshed in the years to come."

While they look toward the future, they also cite some of the shortcomings of the present. In Desert Storm, the United States and its allies had superiority in computer communications, satellite reconnaissance, and other information technologies. However, the Tofflers warn that these new third wave weapons will soon become the target of newer third wave destructive capabilities.

They caution the United States that it was easy to win Desert Storm: an information war against an enemy using second wave warfare techniques. However, the Tofflers predict that if the United States fails to invest in technologies to protect its new information weapons, it could invite "[a]n electronic Pearl Harbor."

Whether the Tofflers' book is visionary or voodoo, there is no escaping that their theories are shaping the current military debate. To engage in an informed debate about the future of America's military and the viability of "Force XXI," *War and Anti-War* is required reading.

PRISONERS OF HOPE: EXPLOITING THE POW/MIA MYTH IN AMERICA*

REVIEWED BY MAJOR LISA M. SCHENCK**

Are Prisoners of War (POW) or Missing in Action (MIA) service members still in Vietnam? Why do Americans believe POW/MIAs are still over there? What keeps Americans believing? Who benefits from this masquerade? What kind of scams are con artists conducting? How can the government dismantle the POW/MIA myth? In *Prisoners of Hope: Exploiting the POW/MIA Myth in America*, Susan K. Keating responds to these questions with documentation and vivid descriptions.

Throughout this work, the author enlightens the American public about obsessions, deceptions, perceptions, and frustrations of relatives, activists, charlatans, politicians, and journalists. By the end of the reading, the power of the POW/MIA myth is appreciated and one aspires to quash both America's false hope and the exploitation of the POW/MIA families' grief.

Ms. Keating, who began seven years of research in 1985, initially believed that American POW/MIAs remained in Southeast Asia against their will. As a reporter for *The Washington Times*, with prior Army service, Susan Keating became obsessed with the POW/MIA issue. Convinced that she could write the story of the century, this author began her quest for truth.

This book candidly represents the author's discovery of, and disillusionment with, underhanded plots that kept the POW/MIA myth alive. Through extensive interviews with struggling POW survivors, politically pressured congressmen, greedy con artists, and tormented family members, the author supports her contentions. Additionally, Susan Keating uses extensive government documents to uphold her allegations.

After years of research, Ms. Keating provides a thorough investigative report. She delves into how the government mishandled the problem; why the list of MIAs is inaccurate; and how the government mistreated service members' remains. Ms. Keating provides a candid account of how the government, through mismanagement of the POW/MIA issue, undermined its credibility. After this descriptive account of bureaucracy,

* SUSAN K. KEATING, *PRISONERS OF HOPE: EXPLOITING THE POW/MIA MYTH IN AMERICA* (New York: Random House, Inc., 1994); 278 pages (hardcover).

**Judge Advocate General's Corps, United States Army. Written when assigned as a Student, 43d Judge Advocate Officer Graduate Course, The Judge Advocate General's School, United States Army, Charlottesville, Virginia.

the reader understands why activists and families disregard government officials and turn to con artists. The author then exposes the hoaxes and the victims of the POW/MIA myth.

The author divides the book into two parts. The first section concentrates on the inept governmental agencies, while the second describes the exploiting profiteers. Using this skillful framework, the author transports the reader through a shift of suffering—from the POWs to their families—and a shift in blame—from the government to the charlatans. From the outset, the author portrays the unbearable pain POWs endured. However, the author gradually transfixes the reader with her detailed portrayal of the POW families' feelings of agony following the frequent false reports.

Ms. Keating distributes responsibility between the government and underhanded profiteers. In the first half of the work, "The Setup," the author demonstrates why the American public should blame the government. Ms. Keating explains how the government's inaction and mismanagement created the political milieu for profiteers to take advantage of unknowing grieving families. Ms. Keating states the government's mismanagement of the highly controversial POW/MIA problem costs the taxpayers millions of dollars yearly.

The author methodically describes how government agencies bungled such important matters as the MIA list and the return of service members' remains. She calls the MIA list an inaccurate "piece of propaganda." Ms. Keating illustrates why the list is inaccurate and how its inaccuracy is another injustice to the POW/MIA families. In part, the author blames the Pentagon. As Ms. Keating pointedly remarks, the "Pentagon's fall from grace is an integral part of the POW myth." The work also focuses on other government agencies, such as the Defense Intelligence Agency, their inaccurate sources, and failure to complete their mission.

In the second half of the book, "The True Conspiracy," the author skillfully shifts the blame to underhanded profiteers and rescue missions. Although she dedicates a majority of the book to "Rambo" rescue efforts (essentially profit making enterprises), she corroborates these adventures with factual data. Ms. Keating's detailed descriptions of scams are captivating and engrossing. The author refuses to speculate about what occurred during these escapades. Remarkably, Ms. Keating questions direct sources: the participants or profiteers.

Ms. Keating steadfastly contends that the government can resolve the POW/MIA myth. In the epilogue, the author enumerates steps that the government must take to close this chapter in America's history. Ms. Keating recommends that "the government take a firm stance that MIAs are dead" and furthermore, that the United States shift the blame to Hanoi.

Moreover, the government must revise the MIA list and acknowledge the existence of deserters in Vietnam.

Susan Keating further warns that if the government does not take such action that profitseekers "will continue to gain status and make money at the expense of America's MIA families. They will perpetuate the legacy of shattered lives . . ."

The author presents how knowledge of the facts changed her viewpoint, and also should change the American public. Although generally fairly well written, Ms. Keating arrogantly condemns United States Presidents, congressmen, senators, political candidates, and high ranking service members. As a reporter, the author should recognize her audience. Unfortunately, Ms. Keating intermittently informs the reader about her life. For many readers this information may distract and diminish the importance of the POW/MIA issue. The typical reader undoubtedly will read this book to obtain information about an important and controversial issue, not to follow the author's life.

Finally, because of her influential position as an investigative reporter, Ms. Keating tends to leave the reader with the impression that everyone involved in the POW/MIA issue is constantly trying to persuade her. Moreover, few people involved live up to the author's expectations.

Aside from these distractions, Ms. Keating's work is both provocative and persuasive. Easy to read, this book will quickly dispel any reader's belief that POW/MIAs are still in Southeast Asia against their will.

The author does not focus on legal matters, but concentrates on educating the American public about a popular American issue. Consequently, for judge advocates, as well as all Americans, this book is a "must read"—not only for entertainment, but because *everyone needs to know*.

THE LAWS OF WAR*

REVIEWED BY LCDR JAMES P. WINTHROP**

The Laws of War is bound to stir interest among judge advocates and those interested in the subject because of the title. However, potential readers should be aware that this book does not discuss the provisions of modern law of war conventions in the mode of Professor Greenspan's *The Law of Land Warfare*. The book does not discuss any technical or procedural issues relating to law of war convention compliance. The reader will discover in *The Laws of War* a concise and interesting collection of twelve essays by a distinguished group of historians, which discusses the major concepts of the laws of war of western civilization.

In the preface to *The Laws of War*, the editors state their goal of examining both the formal and informal constraints on the conduct of war. Formal constraints include primarily the Hague and Geneva Conventions, while informal constraints include "the cultural regulation of violence." The editors describe these latter constraints as what was "done" and "not done" during combat.

Beginning with the seventh century Greeks, Professor Josiah Ober reviews the unwritten rules governing the conduct in war for the hoplite infantryman. The hoplites made up the phalanx, the critical fighting unit of the Greek city state. A relatively homogenous social group of land owning farmers, the hoplites, on each warring side, benefitted from unwritten rules such as not summarily executing prisoners, not using nonhoplite arms, and not punishing surrendering personnel. These rules broke down, however, when hoplites fought foreign cultures—such as the Persians—in wars of national survival.

According to Professor Robert Stacey, the *jus in bello* in the Middle Ages had similar characteristics. Operating under a legal structure enforced by courts of chivalry, the *jus militare*, medieval knights also had a system which was mutually beneficial to members of a particular social strata. Knights were not to execute captured knights, instead they were to offer them for ransom. The concept of noncombatant immunity also developed during this period for the protection of women, children, farmers, the elderly, and the clergy. As with the hoplites, these rules did not apply to battles when knights fought armed commoners or when they fought non-Christians, most notably during the Crusades.

* THE LAWS OF WAR (M. Howard et al. eds., Yale University Press 1994); 226 pgs. \$29.95.

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Geoffrey Parker views the period in Europe from 1550 to 1700 as a critical period because most modern law of war principles developed during this period. He cites five factors—such as the emergence of military custom in war and of the concept of reciprocity—as being responsible for this development. While atrocities continued to occur, particularly during siege warfare, Parker finds in the treatises and in the treaties of the period the foundations for the Geneva Conventions.

In the view of Professor Harold Selesky, the Colonial Period in North America had few restraints of any kind on the conduct of warfare. Just as the English had dehumanized the Irish during their attempt to subdue the Irish in the sixteenth century, so did English colonists in this hemisphere dehumanize the natives that they encountered. Adding to the brutality of these conflicts was the colonists' frustration with their inability to engage their native adversaries, who preferred guerrilla combat. That, coupled with their small numbers, caused the colonists to make examples of those natives that they did engage and capture.

In his study of the Napoleonic Era, Professor Gunther Rothenberg disputes the claim that this period signalled a fundamental shift in the law of war. While restraints imposed during the early modern period took a hiatus during the French Revolution—as a result of revolutionary fervor that the French Jacobins created among their large conscript armies—Professor Rothenberg argues that this period lasted at most two years. After that, the French recognized the virtues of a more professional army which generally viewed constraints on combat as being in its self-interest.

The midnineteenth century marked the beginning of the period of codification of *jus in bello* and the editors shifted from a chronological to a functional approach. The resulting three chapters on maritime, land, and air warfare are the best in the book. Concise, yet revealing, the authors do an excellent job of placing the development of the *jus in bello* in each environment in context. The chapter on air power, in particular, is a balanced treatment of a controversial topic in the *jus in bello*: air bombardment.

The following two chapters also are noteworthy. In "Nuclear War Planning," Professor David Rosenberg, recognizing the absence of any specific restrictions on the use of nuclear weapons in international law, reviews the bilateral and multilateral arms control treaties. The bulk of his essay, however, focuses on domestic restraints, which he considers the most important constraints on nuclear weapons. He then embarks on a detailed review of United States national security policy regarding nuclear weapons.

In "National Liberation Movements," George Andreopoulos discusses conflicts unique to the midtwentieth century. He addresses the *jus in bello* consequences of guerrilla warfare and the resurrection of

the *jus ad bellum* concept of "just war" in the context of wars of national liberation. The highlight of this chapter is an excellent case study of the seminal war of national liberation: the Algerian Civil War.

In the last chapter, editor George Andreopoulos and Professor Paul Kennedy followed an ambitious agenda. After drawing some conclusions from the historical record, they provide insight regarding trends in the law of war. Some of their positions, particularly their characterization of the concept of military necessity as a "catchall excuse," are controversial. They also tend to minimize the role of formal constraints in regulating the law of war, perceiving this regulation more as a function of political, social, and economic factors. An examination of conflicts since the development of the 1949 Geneva Conventions, such as Korea, Vietnam, Falklands, Iran-Iraq, and the Gulf War, would have been useful to validate the continued accuracy of that conclusion.

Andreopoulos and Kennedy then address the most recent major treaty development in the law of war: Protocols I and II to the 1949 Geneva Conventions. They focus exclusively on Article 1(4), the treaty's scope of application provision. Article 1(4) is controversial as it creates international armed conflicts out of situations involving forces fighting for their right of self-determination against nations practicing colonial domination, alien occupation, and racist regimes. Citing procedural protections and the current world situation (e.g., the fall of apartheid in South Africa and the Israel-Palestinian rapprochement), the authors conclude that this objection is not significant. Regrettably, the authors do not discuss the Protocol protections for civilians, which attempt to codify requirements of discrimination and proportionality. This discussion would have been useful in connection with themes discussed in other chapters of the book, specifically, the protection of civilians.

Finally, the authors devote half of their concluding chapter to what they consider to be the most important trend in the law of war: the substantive intersection between human rights law and the laws of war. While they accurately state that the international community is seeking a set of basic humanitarian norms for all conflicts derived from these two bodies of law, they spend most of this section addressing this "intersection" in terms of the *jus ad bellum*, focusing on the doctrine of humanitarian intervention and the operation of the United Nations collective security process. These topics, although clearly an integral part of the law of war, seem incongruous in a book which has dealt almost exclusively with the *jus in bello*.

These criticisms of the concluding chapter should not detract from what is otherwise an informative book. It is enhanced by generous annotations and an excellent bibliography. Judge advocates would find this book worthwhile because it provides the historical context for the development of the law of war.

CRIME AND PUNISHMENT IN AMERICAN HISTORY*

REVIEWED BY MAJOR W. RENN GADE**

Thankfully, most law professors do not write books. Arcane topics defined in technical terms do not sell books. However, everyone concerned with the nation's crime problem is indebted to Professor Lawrence Friedman of Stanford.¹ *Crime and Punishment in American History* provides a valuable perspective to current policy debates.

Professor Friedman's undertaking is enormous. Professor Friedman presents the criminals, the victims, the jailers, and the judges in dramatic and infamous cases. He deftly integrates criminology, sociology, law, and political philosophy to produce a fusion of social and legal history.

Professor Friedman provides a panoramic view of four centuries of American criminal justice. The author divides this expanse into three eras: the colonial period, seventeenth and early eighteenth centuries; the republican period, from the Revolution to late nineteenth century; and the twentieth century. Each period emphasizes Professor Friedman's predominant themes.

First, criminal justice is not the application of abstract principles, but a social construction. The criminal justice system is reactive to the prevailing social structure and social norms. Criminal justice is the history of "the dominant morality, and hence a history of power." A high price is paid in the form of crime and social disorder for the "rich culture of liberty."

Small, close-knit, hierarchical, religious communities marked the colonial period. Judges and prosecutors were usually part-time lay people.² In some colonies, defendants invariably requested trial by judge alone. In other colonies, trial by jury was customary. Missing church, uttering a blasphemy, and fornicating were considered criminal behavior. The public perceived criminals as members of the community who

* LAWRENCE M. FRIEDMAN, *CRIME AND PUNISHMENT IN AMERICAN HISTORY* (Basic Books 1993); 475 pages, \$30.00 (hardcover).

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¹ Professor Friedman is the author of over a dozen books, including the classic, *A HISTORY OF AMERICAN LAW* (2d ed. 1986).

² The use of a public prosecutor, called a district or county attorney, is an American innovation of the nineteenth century.

had gone astray. The courtroom was a public platform for the transgressor to repent. Reintegration into the community (if the iniquity was not too great) was the common goal.

Public punishment was a necessary concomitant of this philosophy. Incarceration was rare and contrary to the prevailing theory of public shame and redemption. Whipping, branding, and mutilation,³ were more common penalties. The community banished repeat offenders.

Death by hanging could be adjudged for incorrigibles or for serious crimes (including adultery or buggery in some colonies). In the northern colonies, capital punishment was rare. Malefactors were pardoned after expressing contrition. This was not true in the South, where black slaves more often felt the noose.

Professor Friedman asserts that the colonies were theocracies or autocracies. Sin and crime were correlative. The law was divine, often with citations to the Bible. The courts were a secular arm of the church. Colonial criminal justice systems reaffirmed the community's religious aim and reflected popular culture.

The influx of immigrants, territorial growth, and the Industrial Revolution enervated the colonial restrictions. The decline of the homogeneous colonial community resulted in the need for alternate means of social control. According to Professor Friedman, the impulse to reform the law, the evolution toward professionalism, and the mobility of American life defined the early republican period through the nineteenth century.

Enlightened political philosophy (the Bill of Rights is a notable example) transformed criminal justice. A desire for humane punishment replaced the emphasis on public retribution. For example, the American penitentiary was conceived as a place of quiet, soulful penitence. Reintegration in the community remained the intent. By the 1820s, incarceration generally replaced most types of corporal punishment. However, whipping remained a "familiar institution" in the South (and in the Navy) for many more years.

The professionalization of the police and prosecutors also was a "social invention" of this period. Amateur constables and watchmen could not contend with the increasing lawlessness. A professional police force was better able to enforce social constraints over new immigrants, the homeless,⁴ and other groups. The wave of large-scale, urban riots that

³ Punishment included nailing a criminal's ear to the public pillory. After standing for several hours, the person's ear was severed.

⁴ Homelessness was a problem in the late nineteenth century. Police stations in large cities commonly provided temporary shelter to large numbers of people. For example, in 1880, there were nearly 125,000 "lodgers" in New York City station houses.

occurred between 1830 and 1865 underscored the need for a quasi-military police force.

Professor Friedman's term, "mobility," refers to the physical movement of people across a large continent, as well as social progress. The ability to change one's social standing affected the nature of crimes. Mobility encouraged "trust" crimes, such as fraud and seduction, and violent crimes, by providing greater gain and opportunity to bolt and start anew. Mobility and innovation made crime more difficult to detect. It reinforced the drive to professionalization, especially in law enforcement. Professor Friedman points to the rise of the Federal Bureau of Investigation as an example of the federal government's expanding role in combatting increasingly sophisticated and mobile crime.

According to Professor Friedman, social and political factors have influenced the definition of crime itself. Race, gender, and class had a profound impact on the actions considered criminal in American history. Professor Friedman's discussion of slave codes reveals that the law—with the full support of the courts—sought not only to preserve the status quo, but to ingrain the futility of considering freedom. Professor Friedman posits that the same type of social control is evident in the criminal justice system's approach to gender relations and the trade union movement.

As part of his study of the dominant culture's control mechanism, Professor Friedman examines the strong American brand of "lawless law." Dueling, lynchings, vigilante movements, and urban riots⁵ are surveyed. These were secret supplements to the law which were another effective means of social regulation.

Professor Friedman posits that social mobility greatly contributed to a climate of reform. Citizens demanded more individual rights. Consequently, a higher degree of racial and gender fairness exists. "Crimes of the self" are unfortunate by-products of this progress. Professor Friedman asserts contemporary crime is best explained "in terms of exaltation of the self, a 20th century pathology."

Professor Friedman chronicles this century's crimes, criminals, and trials—the Lindbergh kidnapping, Leopold and Loeb, the Rodney King beating, and the O.J. Simpson double-murder trial.⁶ He contends our culture values celebrity and fame as the glorification of the individual. In America, even criminals become celebrities. "Being famous becomes al-

⁵ Until recently, "race riots" were riots by whites against blacks and other minorities.

⁶ The media tumult at the 1935 trial of Bruno Hauptmann for the kidnap and murder of the Lindbergh baby resulted in a judicial canon banning courtroom media coverage. This rule stood until the late 1970s. One can only speculate whether O.J. Simpson's trial will similarly lead to a modification of media rules at trial.

most an end in itself. It distorts our view of what a hero is. It distorts our view of authority."

Professor Friedman concludes with the disheartening facts of the current state of affairs. In the process, he also convincingly debunks the myths of frontier heritage and "soft" parenting as causes of the crime problem. However, he candidly admits he has no better explanation than his psychological theory for the origin.

Professor Friedman decries the politicians' shrill response to the problem as "punitive, irrational, and ineffective." "[B]uilding more prisons and putting more people in them is an exercise in futility." "An important lesson from the past is that the source of crime lies not in weakness in the criminal justice system but in the great marrow of society."

Professor Friedman does not believe that the criminal justice system can deter crime to any greater extent than it does now. Most crimes never are reported. Most criminals never are caught. The criminal justice system is diffuse and fragmented. Americans are unwilling to have it any other way. Americans are unwilling to pay in currency or lost freedom for a truly national, hierarchical justice system. In short, the criminal justice system is marginal and cannot compete with the culture.

[T]he "crime problem" flows largely from changes in the culture itself; it is part of us, our evil twin, our shadow; our own society produced it. It has been a central theme of this book that criminal justice systems are organic, rooted in society. Crime is no different. It is part of the American story, the American fabric. Perhaps—just perhaps—the siege of crime may be the price we pay for a brash, self-loving, relatively free and open society.

....

[W]e are likely to bump along more or less as we are. The siege of crime and all the misery it brings, both to those who commit it and those who are victimized, is a high price to pay for our liberty. It is a high cost that is badly and unfairly distributed. But for now, at least, there may be nothing to do but grit our teeth and pay the price.

It is hard to criticize a book of this scope, particularly when the writing is clear and colorful. Nonetheless, there are two minor faults with *Crime and Punishment in American History*.

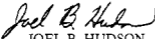
Professor Friedman's concentration on the control function of the criminal justice system neglects the ability of legal reform to bring about changes in social values. Sometimes criminal law is not merely reactive; law and society interact. Professor Friedman's focus may discourage some reformers from undertaking just action.

Lastly, if crime is the by-product of liberty, then the nation must analyze the costs and benefits of freedom. Only after examination can the nation rationally identify and condemn the most destructive behavior without retreating on basic civil rights. This rich book begins the painful analysis, but fails too quickly on the solutions.

By Order of the Secretary of the Army:

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